

Gribble Lab Manual

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Welcome

This lab manual can be found on the web at: <https://www.gribblelab.org/labmanual>

Here is the link to head back to the [Gribble Lab website](#)

If there is anything you need to know and you can't find it here, get in touch with me

—Paul (he/him)

Part I

Administrivia

1 Contact Information

1.1 Me (Paul Gribble)

- My office is WIRB 4122
- Our lab rooms are WIRB 3141, 3133, and 2108
- My office phone is (519) 661-2111 x82237
- The lab phone (located in WIRB 3141) is (519) 661-2111 x86185
- the Gribble Lab website: <https://www.gribblelab.org>
- my email is pgribble [at] uwo [dot] ca
- the fastest way to reach me is probably on the [superlab Slack](#)

1.2 WIRB Staff

1.2.1 Denise Soanes (Administrative Officer)

- email: dsoanes4@uwo.ca
- office: WIRB 3190
- phone: extension 86057

1.2.2 Haitao Yang (Computer System Administrator)

- email: htyang@uwo.ca
- office: WIRB 3176
- phone: extension 82736

1.2.3 Derek Quinlan (Research Facility Manager)

- email: dquinla4@uwo.ca
- office: WIRB 3178
- phone: extension 87988

2 Contacting Me

During the regular term I am generally around all the time and available to chat. If I'm not in my office, get in touch on Slack or on email. If you would like to talk for more than a couple of minutes, please schedule a time with me. My response time on Slack and on email is generally very fast, although on weekends and outside of work hours (i.e. between 5:00 pm and 9:00 am) it can be slower. During weekends and holidays I am not on campus. During these times I'm available electronically but my response time may be slow. For anything urgent please don't hesitate to contact me including on my mobile phone number, which you can ask me for. During the summer when my kids are home from school (mid-June through August) I will not be in the lab all day every day. Some days I will be in for a while and other days I may not be, depending on my kids' schedule. I am available electronically so please get in touch when you need to. I will do my best in the summer months to set up regular meetings, either in person or electronically, so that we can together make sure your work is progressing.

3 My Feedback to You

I will try my best to provide feedback to you quickly—feedback about manuscript drafts, abstracts, presentations, data analyses, etc. I'm always happy to help out when you are having difficulties with your work but do remember that part of your training is to work through these kinds of challenges. Do come to me after you've made a solid attempt at a solution, and we can work through it together.

My goal is to get you feedback on short documents within 1-3 days. Short documents are things like Abstracts, or a single section of a manuscript (e.g. an Introduction section). For long documents (an entire manuscript, or an entire presentation) my goal is 1-2 weeks. Typically I am fast with providing feedback.

While you're waiting for feedback, don't stop working on your document! When you have new thoughts or time to work on your document again, feel free to tell me you're going to make some more changes and send me a new version.

4 Onboarding

There are a series of things to do, and we have a Google Docs document that lists them all. Ask Paul to send you a link to the document so you can make a copy and go through it.

5 Communication

We use the lab Slack (sensorimotor.slack.com) for communication within the lab and with other members of the Sensorimotor Superlab (the Gribble, Pruszynski, and Diedrichsen labs).

5.1 After-hours communication

If I Slack or email you on nights/weekends/holidays, I do not expect you to respond straight away. Rather, as a parent & someone who loves the freedom academia gives me to set my own schedule, I work whenever I can/need/want to. And so can you.

6 Purchasing & Lab Supplies

All purchases using research accounts must comply with both University and Tri-Council rules about eligible expenses. If there is any doubt, ask me. The simple rule is, all purchases must be directly related to research activities. You can use your own money to buy things, and then submit an expense report afterwards to get reimbursed (it typically takes 7–10 days to see the money in your account). If the vendor supports it you can also use one of the lab's speed-codes to directly charge one of our research grants. Ask me for the appropriate speedcode to use.

7 Software & Computers

We mostly use computers running MacOS or Linux. Having said that if you want to run Windows, that's fine too, but just know that I can't help, I know nothing about Windows. Our lab research accounts can support buying one computer per trainee for use with your research in the lab. This can be a desktop or a laptop (plus external display(s), additional external storage/backup, and keyboard & mouse). Western has a site license for MATLAB and for Microsoft Office. In general, if there is a piece of software you need for your work, we can buy it using our research account(s). Come and see me and I will likely approve the purchase.

Do not store illegal or illicit documents, images, data, etc., on your work computer(s)

7.1 Lab Server

We have a lab computer server that we use to archive lab-related data and documents. The idea is long-term, in-house, on-site archival storage of lab related data and documents. The server is located in the server room on the 5th floor of the WIRB. You should all have login accounts on it so that you can access it remotely, to store and retrieve your files as necessary. If you need a login account or you have lost your password please come and see me. The archive is automatically mirrored off-site, every night. The purpose of the server is to act as an in-house archive repository of all lab data and documents. You should deposit all raw data, experiment scripts and programs, data analysis scripts and processed data on the archive.

Do not store illegal, or illicit, or personal data, media, or files on the lab server

Only use the lab server to store lab-related data and files, **not personal files**.

7.2 External offsite backup

Everyone should purchase (you can file an expense report and get reimbursed) an external hard drive to store an extra copy of your research-related documents and data, off-site (e.g. at home). It is critical to maintain an off-the-cloud, off-lab-site archive of your data, documents and code.

7.3 Automated, Cloud-based backup

In addition everyone should have an automated, cloud-based backup system in place on the computer you use for your research. I suggest [Backblaze](#). Sign up using the annual (or 2-year) plan and submit an expense report and my research grant will reimburse you. Other possibilities include Dropbox, or Google Drive, etc.

Do not store illegal, or illicit, data, media, or files on your cloud-based account(s)

7.4 Dropbox Plus

Optional: if you would like to use Dropbox Plus for syncing your documents across multiple machines, my research grant will reimburse you for the annual fee. Just submit an expense report. Note that with your Western account you have access to Microsoft Office 365 which already includes OneDrive storage, which is like Microsoft's version of Dropbox. At present I use Dropbox Plus, I prefer it to OneDrive. It's up to you whether you need such a service and if so which one you choose.

Do not store illegal, or illicit, data, media, or files on your cloud-based account(s)

Part II
Our Lab

8 Lab Culture

I want everyone in the lab to feel valued and welcome. We have a diverse group of people who bring different skills, personal backgrounds, and strengths. We all have different academic backgrounds as well. Some come from a Psychology tradition, some from Physiology or Biology, some from Kinesiology, some from Engineering, etc. I am happy all of you are here, I care about you as human beings, and I want you to feel happy to be here and excited about your work.

My personal belief is that everyone I welcome into the lab brings something valuable to the table. More than that, I believe everyone I welcome into the lab has great potential to grow as a scientist and as a person. My outlook is to try to always assume people have good intentions, and to be welcoming, supportive, and generous in my approach. I hope we can all adopt this outlook together.

I want our lab to be a collaborative environment in which we can all feel safe to pursue ambitious scientific projects, together. We all bring unique skillsets and experience and I want us all to feel able to work together and draw upon each other's strengths to pursue our scientific goals and solve problems. Please take advantage of the rich scientific environment that is available within our lab and more broadly, across all of the labs in the Brain and Mind Institute. We are really fortunate to be located in such a stimulating and diverse scientific environment.

Science is a collaborative effort and in our lab, we work together on projects. While each of us may be the primary driver of our studies, it is not unusual, and in fact it is encouraged, that we bring each other on board to help out, and contribute our unique bits of expertise and experience. Having co-authors on a paper does not detract from your first-authorship status. By working together we can do our best work, together.

I am not a perfect person and I make mistakes. If something is bothering you about something I have done or said, or not done or not said, I hope you will feel comfortable bringing it to me.

9 Equity, Diversity, & Inclusion

We are committed to supporting and promoting equity, diversity, and inclusion. Diversity is not a challenge to be overcome or a difficulty to be tolerated, it is a tremendous source of strength. We recognize that we are stronger when we embrace different backgrounds, perspectives and approaches, in our lab and in our community. Everyone is welcome and will be supported in our lab, regardless of race, nationality, religion, gender, sexual orientation, age, or disability. Together with Western, the Brain and Mind Institute at Western, and Brain-sCAN, we are dedicated to increasing the inclusion and advancement of women, and other under-represented groups in science and engineering. In our lab we commit to be respectful of each other. We do not tolerate harassment, belittlement, bullying, or discrimination of any kind. We are committed to learning more about how to promote the principles of equity, diversity, and inclusion both in our lab, on campus, and in the scientific community.

10 Conflict resolution

It's really important to me that everyone in the lab can get along and work together in a mutually respectful and intellectually generous environment. Working together with people who have different personalities, a wide range of ages, and a diversity of life experience can be challenging at times, for sure. It's something we all have to work together to support.

If you have concerns about how a fellow lab member is behaving interpersonally, please first try your best to resolve the situation with each other, if appropriate. If you still have concerns please communicate them to me. I will listen, without judgment, and do my best to support you. If needed, I will take steps to address a situation that is causing interpersonal conflict. Ultimately though it is up to each of us to find a way to work together.

11 Egregious behaviour

I expect us all, including myself, to be respectful of each other. We do not tolerate harassment, belittlement, bullying, or discrimination of any kind. Being respectful means many things, but it includes: not gossiping about each other's private lives; respecting confidentiality in official matters with the University; being mindful of how other people might interpret jokes differently than yourself; behaving in a professional manner in the lab, on campus, and when dealing with the public in your capacity as a scientist (e.g. experimental participants, patients, visiting speakers, etc). If you have concerns about harassment, unprofessional behaviour, in the context of our lab or any other situation on campus, please come to me straight away to communicate your concerns.

12 Scientific Misconduct

The Office of Research Integrity at the U.S. Dept. of Health and Human Services provides a [definition of research misconduct](#):

Research misconduct means fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results.

- (a) Fabrication is making up data or results and recording or reporting them.
- (b) Falsification is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.
- (c) Plagiarism is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit.
- (d) Research misconduct does not include honest error or differences of opinion.

Scientific misconduct of any kind will not be tolerated in our lab. We are in a privileged position, to spend our time working towards understanding how the world works. We have a responsibility to conduct ourselves with integrity and transparency.

We will treat scientific misconduct of any kind very seriously, and you will face severe consequences. Do not do it.

12.1 Responsible use of Research Funds

Research funds are to be used only for the direct costs of research. Research funds may not be used for personal expenses.

NSERC publishes a [Use of Grant Funds](#) document which goes into some detail about what are eligible expenses against grant funds, and what expenditures are not eligible. If you are unsure about what may or may not be an eligible expense, please ask me.

Misuse of research grant funds is a very serious offence. You will face severe consequences. Do not do it.

Part III

Staying Well

13 Work-Life Balance

In general I expect us all to be in the lab for normal-ish work hours. Typically I arrive in the lab around 9:00 am and I leave in the late afternoon. Some days I leave mid-afternoon when it is my turn to pick up the kids from school. I never work on weekends or evenings (and I rarely did as a graduate student). Occasionally there are “crunch” times, like before the deadline to a grant application, or before a big presentation, where it might make sense to work longer hours or get stuff done on evenings or weekends. In general I try to avoid that kind of situation, and I suggest you do as well. Try to be organized and efficient, and plan ahead, so that your work can get done without having to work in your spare time.

I may now and then send you email or contact you on Slack outside normal work hours, usually because I've found some free time to catch up on things. Know however that I don't expect you to respond outside of your normal work hours. I respect and support the idea of protecting non-work time.

Being present in the lab counts for a lot. You will bump into people and conversations will start, you will talk about your work, their work, a paper you read, a talk you saw. Ideas will happen. Spontaneous interactions like this are a big part of science and of any kind of creative work. The more you're present, and interactive, the more this will happen. I'm a big proponent of being present as much as possible. Reading papers? Read them here. Writing a results section? Write it here. Grading assignments? Grade them here.

Statutory Holidays are real. Take the time off. I do.

In the summer I typically take several weeks in August for holidays, during which time I won't be in the lab. I encourage you to do the same, but I realize that your schedules and personal constraints may not align with my own holiday schedule. That's fine. Just talk to me about when you would like to take time off. Be sure to take time off in the summer. It's important.

When you're sick, please stay home. Just let me know you are taking a sick day, stay off your computer, get some rest, and get better. If you come to the lab when you are sick, you will likely get other people sick, and there may be people in the lab, or in the building, for whom it's dangerous to get sick because of chronic medical conditions. Please stay home if you're sick.

Being ambitious and working hard are part of our lab culture, but the key is to know your limits. Like in sports, you advance by pushing out of your comfort zone, but if you push too hard you end up injured and stuck on the sidelines. You will probably find as you spend more years in the lab and you mature as a scientist and as a person, your capabilities will expand and you

will be able to manage more commitments and projects. Managing your motivation and work habits while integrating interests and commitments outside of work is a key self-leadership skill that will serve you well throughout your career, and now is a great time to build that skill.

14 Well-being

We are all here to grow as scientists, leaders, and people by pursuing ambitious research goals. However, that should never come at the cost of your well-being. Your mental and physical health are by far the most important consideration in all that you do while in our lab. Moreover, success should not come at the cost of maintaining your interests/hobbies or healthy relationships in your life. In fact, you are more likely to be successful if you take care of yourself and give time to the things outside of work that matter to you. Below are some general guidelines on well-being, but every situation is unique, and I am always open to discussion on this topic, so please don't hesitate to ask.

If you are not feeling well, either physically or mentally, take the time off you need to seek out help and take care of yourself (see the "Need Help?" section above for pointers to specific services). If you are struggling with depression or anxiety and wondering: "Is it okay to go see a counsellor instead of running a participant this afternoon" the answer is Absolutely! Get the help that you need. If you have an acute situation that requires help, take the day (or a few days) off with no questions asked. If you are going to be out for more than 3 days or miss a lab meeting, just let me know so that I know you are okay—no need to give details if you don't want to, it is sufficient to email and say that you have a personal health situation. If you need to take more substantial amounts of time off, you can work with me to facilitate this.

Being an undergraduate, grad student, or postdoc can be stressful. Moreover if you are a member of the lab for multiple years, the chance that one or more significant/stressful life situations will arise is high. When this happens the top priority is taking care of yourself and dealing with the situation. If possible, communicate with me to let me know that you are dealing with something and approximately how much time you will need off. You can share as much or as little detail as you feel comfortable with. These situations are stressful so also make sure you are taking care of yourself and getting help if needed.

15 Need Help?

The Graduate & Postdoctoral Studies Society at Western (SGPS) has a number of services available for trainees including Health Services, Housing Services, an Equity & Human Rights office, Disability Services, Indigenous Services, and Pride Western. See [this link](#) for details.

The Student Health Services office has a variety of services including medical appointments with Physicians, Birth Control information, Counselling & Psychiatry, Allergy injections & immunization (including annual flu shots), sexually transmitted disease testing, wellness activities (meditation, tai chi, yoga), Sports-Medicine Clinic (the [Fowler-Kennedy Sports Medicine Clinic](#), which provides sports-medicine appointments with Physicians & Surgeons, as well as Physiotherapy) and Crisis Intervention. I encourage you to take advantage of the services offered here, as needed. Please let me know if I can help you find the services you need on campus and elsewhere.

If you are in crisis or you are concerned about someone who is in crisis, there are daytime and after-hours crisis services available, please [see this webpage](#) for contact information.

15.1 Emergency Phone Numbers

- Campus Police: 911 (Emergencies) or 519-661-3300 (non-Emergencies)
- London Police: 9-911
- Fire: 911
- Ambulance: 911
- Sexual Assault Centre London: 519-438-2272 (24-hour crisis support)
- Mental Health Crisis Service (24-hours): 519-433-2023
- Distress Centre Help-Line (London): 519-667-6711
- Equity & Human Rights: 519-661-3334
- Student Health Counselling: 519-661-3771

Part IV

The Work

16 General Expectations

My expectations of you and your expectations of me will vary depending on your role in the lab and your prior experience and skills. You will also find that expectations change as time goes on and you gain more experience in the lab.

16.1 Mentoring

A general principle I would like to encourage and foster, is an approach whereby we all develop our mentoring skills with each other. We all have unique knowledge, experience, and skills that may well be of value to others. If we are all open to helping each other, and open to being helped *by* each other, that will help us do our best scientific work and will contribute to a positive, supportive, and exciting research environment.

16.2 Drive your research project

A critically important general principle is that you should take ownership of your research project. You take the steering wheel and you drive the bus. As a supervisor I may give you advice, or suggest you go in certain directions and not others (back-seat driver?) but ultimately you must take charge of the destiny of your research project, and you make the decisions about what to do next and how to do it. More generally it is up to you to take charge of your own personal journey in graduate school. This is critically important. Depending on the project, your experience, and your personal style, I may offer more or fewer suggestions/nudges, with greater or lesser assertiveness. I will do my best to respect your own research interests while at the same time doing my best to ensure that you are likely to succeed. If you do not regard your research project as your own, you will not be excited about it, and it will not be a fun time. We will work together to develop research projects that are of mutual interest to us both.

16.3 I am not your boss

I already have a job. I already have a MSc and a PhD. You are not doing your research “for me”, you are not my employee (unless of course you are a paid staff member in which case, yes you are an employee).

Note that in some labs, trainees are hired specifically to work on particular projects that appear in funded research grants. This is typically not the approach in this lab. Sure, I have a general research program in my lab that is supported by research grants that contain proposals about particular experiments... but my approach is usually that as long as the research is in the same general realm and as long as we both find it exciting and relevant, I will support it and I will support you. We will work together to specify a research project that is compatible with the ongoing work in the lab, that is likely to be of broad interest to others in the field of sensorimotor neuroscience, and that is interesting to you and to me.

16.4 Replication

Often the place to begin when you start in the lab is to replicate a previously published finding. This is a great way to familiarize yourself with the lab equipment and with the techniques we use, in the context of an experiment for which we know (usually) what the results ought to look like. Replication is by no means a waste of time. First, it’s an important scientific contribution. Second, a novel scientific question is often based on an existing paradigm, and before assessing whether a novel effect exists, it is important to verify that the paradigm itself is capable of detecting the novel effect, whatever that may be. Replication is a great way of doing this.

16.5 Reading papers

I’ve heard it said that as a researcher (whether a grad student, postdoc, or a Professor), your “job” is to **read papers**. As you start your MSc or your PhD you should adopt this idea as well. Your main job is to familiarize yourself with the extant scientific literature. The main way you will do this is to read voraciously. When you are starting out it will be difficult to distinguish between relevant papers and irrelevant papers. I as your supervisor will be able to help with this by guiding you towards researchers/labs/topics that we already know are highly relevant to the work that we have done in the past and are doing presently. It is impossible to know everything and nobody does. We are all limited by virtue of what we have read about. We all have blind spots. But a mature researcher will have deep knowledge of the background literature that is most relevant to their work. I’ve heard it said that at the time that you defend your PhD at your oral exam, you are the person on the planet who knows the most about your specific research topic, nobody else knows more. It is not a bad target to strive for.

Something to do immediately when you start is to choose a reference manager like [Zotero](#) or [Paperpile](#) and sign up for an account. Maintain a database of papers that you have read. We will also use shared databases for research projects/papers. Personally I use Paperpile. I will reimburse you from our research grant(s) for a Paperpile license.

16.6 Staying on track

I expect you to please come to me if you are not sure what you should be doing day to day. Let me know if you are concerned about the progress of your project. Please come to me often with data. Show me plots. Show me sample signals. Get feedback from me and others about how the project is progressing. You should look at your data often, in particular to make sure that the various signals (kinematics, forces, EMG, EEG, etc) look as they should, and to make sure that participants are performing the task as we require. The data are what this is all about.

You should expect me to make myself available to you at regular intervals to look at data, talk about your experiment, talk about papers in the literature, etc. Sometimes this could be multiple times a day, a week, and sometimes this may be once every week or two, depending on the stage of your project, and your experience in the lab. You can expect me to provide critical feedback of your research in a supportive manner. I will do my best to support your work by seeking out research grants to fund the lab. I will support your travel to conferences to present your research. You can expect me to do my best to promote a positive, supportive, collaborative research environment in the lab.

16.7 What is grad school?

Here are some excerpts from a [Twitter thread](#) by Dr. Chanda Prescod-Weinstein on what research and grad school are, and are not, and how to set up the right expectations to succeed:

The hardest phase transition for PhD students, I think, is that you are supposed to be working toward competent intellectual independence. That means that your advisor doesn't solve the problem: you do. You write your grant and fellowship proposals.

And in the case of the actual science: it's not a problem set. There are often not step by step instructions for how to solve the problem. You are finding the instructions and implementing them and sometimes your first through fourth tries fail and it's no one's fault.

Of course, as in all professions, sometimes your boss [advisor] is an asshole. But sometimes it's just hard and not because you're being abused.

If working at the boundaries of what we know — being confused often and working hard to reduce the confusion — doesn't sound like fun work, research may not be a fit for you, no matter how well you are being compensated.

Research is mostly the part where you are doing the work, not mostly the part where you are presenting known results. If you mostly enjoy presenting neatly packaged results, that's a different kind of problem solving: scicomm is great and challenging and different from research.

Research requires a kind of confidence in your own logic, that you can reason your way to a solution because the solutions are a matter of reasoning. So it requires a flexible intelligence mindset: you can learn the techniques you need to know.

But no one is going to do the learning or hard work for you. Nor should they. If your advisor does too much for you, you never become competent to do things on your own. It is a difficult balancing act that is hard to get right.

One of the most important roles of faculty advisors: helping you pick the right problems; topics that are unsolved, do-able in ~3 years, will be of interest to the community and within the student's skill set.

17 Specific Expectations

17.1 Undergraduate thesis students

You have 8 months to complete a research project and produce a well polished thesis document. This is not a lot of time. When you first arrive in the lab we will work together to decide on a focused, feasible research project that is of mutual interest to us both. You may be paired with a graduate student or postdoctoral fellow in the lab, or you may be paired with me! It depends on the project.

You are expected to meet with me regularly to review progress. This is our chance together to make sure that your project is progressing and that you will be able to complete it successfully. I am here to help. You drive the bus, I provide advice and feedback ... but you are the driver.

You are also expected to take advantage of the knowledge and experience of your fellow lab members: graduate students, postdoctoral fellows, research staff, and volunteers. We are all here to help each other learn. We are all busy but part of our lab culture is to foster collaboration and mentoring so please do not hesitate to approach fellow lab members for help. We are not here to do your research or solve your research-related problems but we can and should be able to show you where to look for solutions. On this point: it is not a competition. We don't draw boundaries around our ideas. We include each other as co-authors when scientifically appropriate. Including others on your project does not diminish your accomplishments. We help each other in this lab.

17.2 Masters students

You have 2 years to complete a research project and produce a well polished thesis document, and also to complete whatever coursework is required for your MSc degree. Your research project should be something that is publishable no matter how the results turn out. We will work together to come up with a project that fits the bill. A MSc thesis typically involves a single scientific question and a single study (sometimes composed of 2 or 3 small experiments) designed to test a specific hypothesis. The scientific question ought to be novel in the context of the existing literature, and of interest to other researchers doing work in the field of sensorimotor neuroscience.

Often a novel scientific question involves the development of novel techniques or experimental paradigms. You will take the lead here. We have many sources of technical help and experience both within the lab (including me) but also among the other labs in the WIRB. You will learn to draw on these sources of assistance to implement your experiments the way you want them implemented. Ours is not a “plug and play” kind of a lab, though occasionally a project will build on a previously developed experimental paradigm. The most interesting scientific questions do not have a pre-canned solution.

As a graduate student you are in charge of seeing your research project through to completion. I am here to guide you and to help by providing critical feedback, suggestions, advice, and encouragement. The more we interact the more likely you are to stay on track. It is your responsibility to ensure that this happens. I am here to help.

You are also expected to take advantage of the knowledge and experience of your fellow lab members: graduate students, postdoctoral fellows, research staff, and volunteers. We are all here to help each other learn. We are all busy but part of our lab culture is to foster collaboration and mentoring so please do not hesitate to approach fellow lab members for help. We are not here to do your research or solve your research-related problems but we can and should be able to show you where to look for solutions. On this point: it is not a competition. We don't draw boundaries around our ideas. We include each other as co-authors when scientifically appropriate. Including others on your project does not diminish your accomplishments. We help each other in this lab.

You are responsible for applying for funding to support your salary (e.g. OGS, NSERC, CIHR, etc). In the absence of external awards I will support you using funds from my research grants, providing that you take on teaching assistant positions (where possible) to partially offset the funds required.

17.3 PhD students

A PhD is the highest scholarly level one can achieve in a chosen academic discipline and is awarded after completion of a 4-year course of study. A PhD thesis document (a “dissertation”) is produced based on the work, which is examined by a committee composed of Professors from Western as well as an external examiner from a different University. There is also an oral examination by the same committee.

You have 4 years to complete a PhD and to complete whatever coursework is required for your PhD program. A PhD dissertation is typically composed of 5 or more chapters. Chapter 1 is a General Introduction—a literature review in the context of your thesis topic. Chapters 2, 3, and 4 are individual studies. Typically each of them are published in peer reviewed journals (or to-be submitted) papers. Chapter 5 is a General Discussion in which you synthesize the results of your experiments and discuss the implications of your findings in the context of the existing literature. Depending on the nature of the experiments, sometimes two inner chapters

instead of three is acceptable (but not typically). More than three is OK but that is pushing the limits of the patience of your dissertation examiners.

We will work together when you start, to develop a general scientific question, hypothesis, or theory, that guides the subsequent development of individual experiments/studies. The general scientific question ought to be novel in the context of the existing scientific literature and of interest to other researchers working in the field of sensorimotor neuroscience. Each individual study should be publishable in high-quality peer reviewed scientific journals such as *Journal of Neuroscience*, *Journal of Neurophysiology*, etc. Sometimes Chapter 1 also turns out to be publishable in the form of a review article.

As a PhD student, you will rapidly learn to become independent in the lab. As with MSc students, you will be primarily responsible for drawing on technical and scientific assistance within the lab and across the other labs in the WIRB in order to implement the experimental paradigms that you want to use to test your scientific ideas. I am here to help and to guide this process, but you are in charge of your research project. You will learn to become independent in the lab so that by the middle of your PhD you will be coming to me with new ideas, new pilot data, and the results of tinkering in the lab, looking for your next interesting scientific question. You should not expect to rely solely on me to hand you scientific questions for your thesis studies. However, you can rely on my experience and knowledge to help guide you towards scientific questions that are interesting, relevant for the field, and feasible in the context of graduate studies. We will work together to help you develop the scientific questions that guide your thesis work. At the beginning, the balance may be more on my end but towards the middle/end of your thesis work you will likely be convincing me of the importance of new ideas that you generate yourself.

You **must** pursue research questions that interest and excite **you**. Do not make it a goal to think up questions you think I will like, or ideas you think the big shots in the field will like, or experiments that you think can be published in *Nature* or *Science* or some other high-end scientific journal. This is a recipe for disaster. The motivation for pursuing your PhD research must come from within, not from me, or from anyone else. This is absolutely critical. A PhD is a lengthy process that involves many ups and downs. You must be motivated from within and one of the best ways this can happen is if you are pursuing scientific questions that excite you. I can certainly help you navigate the literature and the scientific landscape, and give you feedback about your ideas. We can work together to develop your own ideas but they must be your own. You must enjoy the **process** of working on a PhD, not just the anticipated *outcomes* of the degree (fame, fortune, etc.) If you don't enjoy the work itself, it will be a very rough time and it will be difficult to succeed.

You are also expected to take advantage of the knowledge and experience of your fellow lab members: graduate students, postdoctoral fellows, research staff, and volunteers. We are all here to help each other learn. We are all busy but part of our lab culture is to foster collaboration and mentoring so please do not hesitate to approach fellow lab members for help. We are not here to do your research or solve your research-related problems but we can and should be able to show you where to look for solutions. On this point: it is not a competition. We

don't draw boundaries around our ideas. We include each other as co-authors when scientifically appropriate. Including others on your project does not diminish your accomplishments. We help each other in this lab.

You are responsible for applying for funding to support your salary (e.g. OGS, NSERC, CIHR, etc). In the absence of external awards I will support you using funds from my research grants, providing that you take on teaching assistant positions (where possible) to partially offset the funds required.

17.4 Postdoctoral Fellows

You will typically begin with a one or two year contract providing salary and benefits during which time your job is to pursue original scientific research, in service of getting a job, either in academia or in the private sector. As a postdoc you are expected to be independent in the lab. There are many scientific and technical resources to draw upon and I am here to help.

I will support the pursuit of any scientific questions that are of mutual interest to us both. Your research is your own and you may take it with you when you leave, and continue to pursue it. This is your chance to pursue a new line of research with the full support of a lab environment around you, without being burdened by the need to apply for grants, teach, or do administration (as you will have to do if you pursue an academic job).

You are also expected to take advantage of the knowledge and experience of your fellow lab members: graduate students, postdoctoral fellows, research staff, and volunteers. We are all here to help each other learn. We are all busy but part of our lab culture is to foster collaboration and mentoring so please do not hesitate to approach fellow lab members for help. We are not here to do your research or solve your research-related problems but we can and should be able to show you where to look for solutions. On this point: it is not a competition. We don't draw boundaries around our ideas. We include each other as co-authors when scientifically appropriate. Including others on your project does not diminish your accomplishments. We help each other in this lab.

As a postdoc you should expect to (and embrace the chance) to take on a mentorship role within our lab and within other labs with which we collaborate.

You are responsible for applying for funding to support your salary (e.g. OGS, NSERC, CIHR, etc). Typically an initial contract is for one or two years of support from my research grants. In some cases this may be extended but this is highly dependent on circumstance, budget, etc.

17.5 Research Assistants

As an employee of the lab your role is to perform whatever duties I have assigned to you. Sometimes this will involve working with other lab members, helping them with their research projects. My role is to make sure that your duties are well defined and that you have the resources you need to carry out your work. While your duties might involve working with other lab members, ultimately you report to me. I regard working as a research staff member in my lab as an opportunity to learn new research-related skills in a supportive and friendly environment. If you find that every minute of the day is not occupied by the tasks I've assigned to you, please feel free to spend that time exploring your research-related interests (within reason). As a heuristic, if around 20% of your time is spent this way that is OK by me. Please come to me whenever you have questions or concerns about your work in the lab.

18 Lab Rooms

18.1 Room Reservations

Lab rooms are booked using an online Resource Booking System: <https://bmicalendar.ssc.uwo.ca>. Log in using your Western credentials. If you have problems logging in, please contact Haitao Yang (htyang@uwo.ca).

18.2 Lab Upkeep

It is our shared responsibility to keep our lab rooms tidy, organized, clean, and safe for ourselves and our experimental participants.

Please keep computer/equipment/cables off of the floor.

Please put items to be disposed of in the recycling or trash bins.

Tidy up before leaving the lab for the day including powering down lab equipment.

Please tell Paul right away if a piece of equipment is damaged or is not functioning properly, so that we can get it working again.

18.3 Emergencies

For urgent matters or emergencies related to facilities (e.g. a water leak) please contact me and/or Florence, Denise, or Haitao right away.

If there is smoke or a fire, leave the building, pull a fire alarm if you pass one on the way out, and phone 911 immediately.

If there is a medical emergency, phone 911 immediately.

If you are concerned that some kind of **serious security incident** is occurring, leave the area first and then and phone 911 immediately.

19 Lab Meetings

Sometimes we have a regular lab meeting “just us” (just the Gribble Lab). Whether this is happening or not depends on the season, on my teaching load, and on the composition of the lab. You should regard attendance at these as mandatory, unless you have a class that is scheduled in conflict.

Sometimes we also attend the Pruszynski lab meeting, or the Diedrichsen lab meeting, depending upon who is presenting and what is being presented. We should regard the three labs as one cohesive unit, and we should feel free to attend each other’s lab meetings optionally when there is something of interest being presented.

We also meet together with the Pruszynski lab and the Diedrichsen lab for a shared “superlab” meeting & journal club. The exact time & location may change from year to year. You should regard attendance at these as mandatory, unless you have a class that is scheduled in conflict.

Lab meetings (shared and on our own) are a great opportunity to get feedback and constructive criticism on new or ongoing projects, in a supportive and safe environment. Reading and discussing papers outside of one’s specialty is a good thing, it helps to broaden your perspective and it can result in new ideas.

20 Research Ethics Protocols

All experiments must have approval from Western's Research Ethics Board (REB). Each of you is responsible for obtaining an REB approval for your study/studies. You are responsible for keeping detailed records of each research participant including receipts for payment of subject fees. Getting a study approved can sometimes take several months so start early. It's better to submit early and submit revisions than wait until your study design is perfected.

21 Conference Travel

Travel to conferences is dependent from year to year on our lab budget. Generally our model is that to attend a conference, your research project should be sufficiently developed such that it makes sense to present a poster or give a talk. This is something that we will decide together.

We often attend [SFN](#) and [NCM](#) each year. If there is another meeting or meetings that you would like to attend, that is a possibility, budget permitting. Typically trainees attend 1 major meeting per year.

21.1 Conference Abstracts

IMPORTANT: You will need to show me your draft abstracts, posters, etc, well in advance of the conference deadline, as typically we will require several edits before they are ready to submit. I would like to see your final draft **at least one week before the conference deadline** so that we have a chance to edit it together.

21.2 Conference Talks

For talks, you should have a complete talk prepared at least two weeks before the meeting (if not more), so that you can give one or more practice talks to our lab group, and make adjustments in advance of the meeting.

Acknowledgements

Portions of this lab manual have been adapted from materials posted on twitter by [@jenheemstra](#), [@PaulMinda1](#), [@jpee1e](#), [@mariam_s_aly](#), and others.

This lab manual was created as a Quarto book. To learn more about Quarto books visit <https://quarto.org/docs/books>.