# Fowler Lab Handbook

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# Introduction

## Welcome!

If you are reading this, you have probably recently joined the Fowler lab at Simon Fraser University or are thinking about joining us. I am very happy to have you here, and I will do what I can to make your experience here a good one. I look forward to joining you while we work together to advance science. I hope that you will learn a lot about doing research, as well as about microbiology, water treatment, environmental engineering, and ecology, contribute your own knowledge to the group, as well as have some fun and make new friends as you work towards your goals.

The purpose of this handbook is to orient you to how the lab works, in terms of the practical day to day, the values that we hold, and to provide you with some useful resources to help you be successful. It is intended as the first step in a positive mentee-mentor relationship and describes the culture that we try to foster in the lab. If you have questions or comments, or things aren't going as expected or as described in the manual, feel free to bring these up with me. This handbook is a living document – so if you have questions or comments about the content, find something missing, or have clarifications, recommendations or additions, please do not hesitate to bring them up to me or in group meeting.
Jane

## Values and Culture

Below are a few of the key values held by the research group. These values align with and inform our lab culture, and aim to create an environment of mutual respect, collaboration and social cohesion where every member feels that they are heard, understood and valued. The research within our group is highly interdisciplinary in nature, so the diversity of experience and knowledge of lab members as well as collaborators is important to our success. The laboratory culture aims to help members feel empowered, adaptable, and resourceful and to support their growth as researchers.

**Collaboration and teamwork** – We are all more successful when we work together and support each other. No one person knows or is good at everything, so we must work together to most effectively push the boundaries of our knowledge forward.

**Effective communication –** Communicate, and especially, listen thoughtfully with/ to others. This includes giving and being receptive to supportive and respectful feedback.

**Empowerment, continuous learning, personal and professional growth** - constantly seeking personal and professional growth, and helping your teammates to continuously learn and develop.

**Respect and humility**- Recognize what every person has to offer and treat each other with kindness and consideration. This includes recognizing the limitations of your own knowledge and seeking experts in other areas to provide necessary expertise. It also requires recognizing and celebrating your own and each other's successes.

**Integrity** - Academic honesty, respect for your colleagues and their contributions

**Innovation and boldness** - In an environment where you feel supported and recognised, you can take the risks to do things that may be transformational, (or a complete failure - but the most important thing is to learn from the failures)

## Code of Conduct

Some members of our community have been subject to historical and ongoing discrimination on the basis of e.g. race, sexual orientation, gender identity, disability, citizenship, ethnic origin, religion, socioeconomic status, appearance etc.. We have a zero tolerance policy for harassment, abuse, bullying, and discrimination based on these or any other reasons. Systemic and structural issues in our systems and institutions have promoted this discrimination, but implicit bias also plays an important role. Be aware of your own implicit biases and try to rectify them. If you notice someone being harassed, or are harassed yourself, tell Jane immediately. If Jane is the cause of your concern, then reach out to the department chair or another trusted faculty member.

## Roles and Responsibilities

### Everyone

- Creation and maintenance of a respectful working environment
- Engagement with the research group, which includes attending group meetings and participating in group discussions
- Integrity and ethical conduct
- Keeping the lab organized and tidy and contributing to research group maintenance tasks

### Jane

I will do my best to give you the information and support that you need to make autonomous, responsible decisions. I strive to create an environment that fosters teamwork, respect, communication and empowers trainees to continuously learn and improve, developing both personally and professionally. I will provide regular evaluation of the progress of everyone in training roles, which includes providing timely and constructive feedback on your work. In addition, I will help you to identify opportunities for professional development, and help you to articulate and plan for long term professional development.

## Training positions (Undergrad, Grad students, Postdocs)

Undergraduate, graduate and postdoctoral training can be both personally and professionally formative experiences. They can also be rewarding and a lot of fun. Working with trainees is one of the most gratifying aspects of my job. Many graduate students and postdocs feel intense pressure to perform and to publish. While this is not unreasonable given the competitiveness of academia, I recommend that in order to get the most out of these positions, you approach your work with a growth mindset, and compare yourself to your former self, rather than to the people around you. I also encourage you to take advantage of the numerous excellent seminars and learning opportunities that being in the university environment presents you with. There is so much interesting research going on at SFU and in BC, and you never know what connections these may help you make in your own research, or new research ideas you will come up with.

What is expected of you:

- Scientific curiosity and an interest in research
- Engagement with the research group, department and the scientific community
- Initiative and diligence in pursuing all aspects of your project
- Commitment to achieving mutually agreed upon deadlines and broader goals
- Responsiveness to guidance and criticism
- Apply to relevant scholarships and grants

In addition to the above a major component of graduate studies (and science) is disseminating your work. Since our work is mainly funded by the taxpayer, the products of our research are public goods and should be disseminated to the public. In addition, future grant funding tends to be dependent on the quality and number of publications published by a group, so your publications help the group to continue their work. This means communicating your science to the community. This is mainly done through conference presentations and manuscripts. The expected standard number of publications for graduate studies is 1 (MSc), and 3 (PhD). These may end up being higher or lower depending on various factors, but keep these standards in mind as you embark on your work.

I highly recommend that all prospective graduate students carefully read through the information provided by the Dept. of Biology at https://www.sfu.ca/biology/graduate/

## Funding for graduate students

Your offer letter will have stipulated the minimum funding support that you will receive. MSc and PhD students in the Dept. of Biology at SFU have a guaranteed stipend of $28,000 as of September 2023. For up to date and detailed stipend and financial information from the department go to https://www.sfu.ca/biology/graduate/current/financial.html

This money comes from a combination of scholarships, TA-ships, grant funding and departmental funding. From this money, students must pay their tuition, fees and health insurance costs. In addition, PhD students receive a PhD Research Scholarship in the amount $5400/yr for the first four years of their program from the university to offset the cost of tuition. This is in addition to the departmental minimum guaranteed funding amount. More

information here https://www.sfu.ca/gradstudies/life-community/news-events/news/2023/phd-research-scholarship.html

Students with external funding (e.g. NSERC PGS/CGS, Mitacs, entrance scholarships) will have the majority of their stipend (and possibly more) covered from their scholarship. In cases where students have been awarded major external scholarships (>17K/yr), I will aim to provide top-ups so that funded students don't have to commit to a full TA-ship (5.17BU) every year. If you do not hold a major award, you must apply for internal awards and TA-ships. I expect that all students will TA once per year, unless we discuss other arrangements. All eligible students should apply for graduate fellowships and other scholarship opportunities.

Due to their heavy courseload and different expectations with respect to research, funding for MET students works slightly differently than for other graduate students. MET students are still expected to TA and apply for scholarships, but funding arrangements will be made individually with each MET student.

Typical operating grants (like NSERC Discovery) provide me with around $30,000 of funding every year that I can spend on research costs and salaries. Evidently, the less salary I need to pay out of this grant, the more we can spend on the research itself, and on conference travel etc.. I am constantly applying for new grants to support the research and people in the lab, and I expect all grad students and postdocs to apply for any opportunities that come up to fund their salaries, research and conference and science-related travel.

## Undergraduate student research opportunities

Two major options exist for conducting undergraduate student research. The first is **credit-based research** – in which you take a course that allows you to do research. In BISC, these courses are 298, 497w (writing intensive), 498, and 499 (3 credits each). You can also take the **ISS (independent study semester)** which consists of BISC 490, BISC 491 and BISC 492w and is a total of 15 credits (5 credits each). Similar courses exist in other faculties/ departments that can be undertaken in the group (e.g. Faculty of Health Sciences, Faculty of Environment, Dept. of Molecular Biology and Biochemistry- ask your advisor for specifics). The second possibility is to apply for **USRA** funding. The amount of money earned by USRA-funded students changes each year, ($8758 in 2021), but the funding provided by NSERC or the university has remained stagnant at $6000 per student. As a result, I need to use considerable funds from my own research grants to top-up USRA recipients. Due to this, I will generally not offer these positions to students who have not previously worked in my lab (or someone else's). IF you are interested in applying for a USRA award, please contact me well before the deadline to discuss the opportunities available. Applications are typically due early in the spring semester (January or February). You can find the upcoming application round deadlines on the SFU website. Another paid opportunity to gain undergraduate research experience is the **work-study program**. To be eligible, you must be approved by financial aid. You then have the opportunity to work in a lab for up to 140 hours per semester. Undergraduate students may also volunteer to work in the lab. Undergraduates that are only in the lab a few hours per week are not expected to attend every weekly group meeting, as this will eat up their lab time. They will have to attend some of them, however, especially to present their work to the group. They are still expected to

engage with lab members and this will have substantial positive impacts on how much they learn and their experience.

### Postdocs

As senior members of the lab, you are expected to play a leadership role in the team. This means things like actively participating in group meeting by asking questions and providing feedback to members, and providing new viewpoints and perspectives. At times, senior members will be expected to lead discussions and meetings. More senior members will want to begin developing their own line of research. You will play a role in informal mentoring of undergraduate and graduate students. You should begin thinking about undergraduate projects that align with your research, and I will assist you in recruiting students for this work. In addition to writing grants to fund your own position and conference attendance, you may also be asked to contribute to writing and editing of other grant proposals. In addition, you should be contributing to the scientific community (and/or other communities relevant to your goals) by doing things like peer-reviewing papers and serving as members of committees (e.g. conference organization). I can help you to identify relevant opportunities

## General policies

### Hours and flexible working policy

Although individual lab members will have varying schedules due to things like courses and TA assignments, you are generally expected to be available from 10 am - 4 pm Monday to Friday, at the lab, or by email if you are working from home. Working from the lab makes it easy to reach you during working hours by Jane or your colleagues. However, the typical workday doesn't work for everyone, and working from the lab may not always be ideal, especially if you are working on something that requires a high level of focus (e.g., writing). It is perfectly fine to occasionally work from home or work different hours, as long as you are not needed in the lab or elsewhere on those days. If this is something that you would like to do on a regular basis to accommodate your personal or family needs, please talk to Jane about your needs and plans and we will come to an arrangement. If you would like to make alternate holiday arrangements, for example to take time for cultural or religious observances, please let Jane know in advance if this will be for more than just a day or two. If you are sick, let Jane know, and remember to reschedule or at least cancel any meetings that you have. I (and others) may work irregular hours. I do not expect you to respond to emails or be otherwise available outside of normal work hours under most circumstances. Similarly, you should not expect this from others.

### Group meetings

Group meetings are held with the group on a regular schedule that is usually determined at the beginning of each semester based on members' schedules. Meetings are a time to go over any relevant lab news and organizational matters and celebrate our wins together, as well as learn together. They will typically include one or two presentations by lab members, Jane or an invited guest on their research, a recent journal article or another relevant topic followed by a group discussion. Occasionally, group meeting may be organizational meetings, or used to discuss a particular topic of relevance to lab members. Attendance at

these meetings is mandatory. These meetings will give you the opportunity to practice your presentation and inquiry skills, learn some new things and help you to learn what your lab mates are up to. All members are expected to contribute to these meetings, ask questions and provide feedback to their lab mates and the group.

## Individual meetings

At the beginning of every semester, a schedule for individual meetings with Jane will be established. Every graduate student and postdoc will have a one hour scheduled meeting with Jane every week to discuss research and any other issues. Undergraduate students will have at least weekly meetings with their main supervisor, and periodic (e.g. biweekly meetings with Jane and their main supervisor). It is best to go into these meetings with a plan for what you would like to achieve, or a list of questions that you would like to ask.

At other times, Jane's door (or inbox) is generally open, but the amount of time required for a response may vary depending on her other commitments. These individual meetings are dedicated time each week to focus on your work. If you feel that having a meeting in any given week is unnecessary, feel free to cancel it, but give me at least a few hours of notice. At times, I may also delay or reschedule these meetings due to things like travel, vacation, and other conflicts, however, if you feel that delay or cancellation is occurring on a regular basis, or you are unable to progress in your work due to the cancellation, bring it up to Jane to work on a solution.

## Professional Development meetings

Professional development planning can help you to develop the skills that you will need to be successful in your career. Undergraduate, graduate and postdoctoral training in science provide you with a multitude of technical and soft skills that are valuable in all sectors, even outside of academia and science. Having a professional development plan ensures that you will have the skills to be successful in your career, and can help you to gain focus and build confidence and motivation. I encourage every member of my research group to develop a personal professional development plan and will support you in achieving your goals. The American Association for the Advancement of Science (AAAS – the publishers of the journal Science) has developed an online system called 'myIDP' http://myidp.sciencecareers.org/ to help scientists identify their skills, likes, and dislikes that can help to identify potential career trajectories and help people to identify gaps in their skills that will help them to prepare for specific positions.

Every year, each long-term member of the lab (i.e. 1+ year) will have a professional development meeting with Jane. The focus of this meeting is not research, but your own personal professional development. This is an opportunity for you to talk about your professional goals with Jane, and for the two of you to develop a plan that we can implement within your training program to help you to reach them. This could involve specific coursework, conference attendance or secondments. An important part of the preparation for this meeting is to take time to reflect on your personal and professional goals, as well as your strengths and weaknesses, likes and dislikes. In subsequent years, you will also consider your progress and any changes to your goals since your last meeting. The outcomes and utility of the meeting will be much more valuable if you devote dedicated preparation time to thinking about your goals and developing a plan ahead of time. This

meeting is meant to be a conversation that is structured around a list of questions, that you will take time to reflect on prior to the meeting.

## Conference attendance

Attending conferences and disseminating your research are essential aspects of being a scientist. In general, Jane aims to support graduate students and postdocs to attend at least one conference per year. In order to attend a conference, you should be presenting your research (i.e. an oral or poster presentation). All lab members must apply for any available funding to attend conferences. The department and SFU offer scholarships for conference travel, as do many societies and conferences. These often need to be applied for well in advance of the conference. Typically, these will cover only a portion of the associated costs, and research grants awarded to the lab will be used cover the remainder. Funding includes registration, travel, accommodation (sharing is likely required), and food at reasonable rates (see https://www.sfu.ca/content/dam/sfu/finance/Payments/2020-10-01%20BTE%20Procedures%20and%20Rates%20v2.pdf for details on eligible travel costs). Conferences that are usually of greatest interest include ISME, IWA Microbial Ecology and Water Engineering (MEWE), IWA Biofilms, ASM (American Society of Microbiology) conferences, CSM (Canadian Society of Microbiology), Gordon Research Conferences. If you find other conferences you are interested in attending, discuss these with Jane well in advance of the abstract deadline. To streamline travel expense claims remember to keep all receipts, boarding passes etc. It is often expected that individuals will pay up-front for flights, accommodation etc. and be reimbursed later. In my opinion, it is not really a reasonable expectation to make of students that they can afford to wait for reimbursements, so do ask about advances to cover travel costs.

## Other work-related travel – secondments and courses

You are encouraged to seek out other opportunities to enhance your studies including spending time in other labs, attending courses etc.. Jane will do her best to support you in this using grant funds, but you must also seek out and apply for funding for this. Some sources for funding include SIAM (anaerobic microbiology in the Netherlands), Michael Smith Fellowships (for NSERC award holders), and Mitacs Globalink (for undergrads). Many individual countries also offer funding for visiting researchers. Seek out these opportunities and get them added to this list.

## Work-life balance and time off

Our job as scientists are basically:

1. Ask interesting questions and come up with ideas that will solve problems and/or create new knowledge
2. Figure out how to approach these questions/ ideas
3. Answer them.
4. Tell people what we found

Being able to do this requires a lot of preparation – like knowing the literature in the field, being familiar with methodologies and learning how to use new techniques that will help you to solve complex problems. This is challenging, and it takes time and dedication to learn these things and to be successful in research. But one of the most frequently overlooked

aspects of being successful is down-time. You are much more likely to come up with great ideas or solutions if you are relaxed, have time to daydream, sleep well, and have new experiences than if you are stressed out in the office or lab all the time trying to appear productive. There is also a lot of evidence that productivity does not increase substantially with time beyond about 6-8 hours (of actual work) per day. In addition, spending too many hours working in the lab can lead to mistakes, which might require you to repeat entire experiments or potentially even lead to accidents. There are short and long-term negative mental and physical health effects of chronic overwork. Therefore I encourage all lab members to work a reasonable number of hours every day/week, and to take weekends and holidays. There will be times when you are facing deadlines and have to work very hard, but remember to take breaks in between, and to spend time on your hobbies and with friends and family. Try to establish a work-life balance strategy that takes both your goals and limits into account. Canadian labour laws require a minimum 2 weeks vacation for full time employees (10 days/year). This is a good place to start, and if you wish to take more time, do not hesitate to discuss it with Jane. In addition, in the week between Christmas and New Year, the university is closed, and you receive paid time off. Discuss your vacation plans some time in advance with Jane, so that we can plan your work around your time off. **Please submit your vacation plans to me in writing by email as I need to track vacation time taken, especially for paid employees** (not grad students). If you need to take a day or two off to recharge, don't feel the need to ask for permission, but do let me know so I don't worry that something has happened to you. Remember to cancel and/or reschedule any meetings you have.

## Other factors impacting your work in the lab

In addition to overwork or feeling like your workload is unmanageable, burnout and excessive stress can be caused by a negative workplace environment. These can include feeling like you lack control over your work, a dysfunctional workplace environment, and a lack of fairness in the workplace. The lab values and code of conduct strive to create a supportive working environment that establishes a sense of community and support to mitigate these. If you feel like your work is being negatively impacted by any of the factors described above or any other issues, please discuss them with me, and we will try to find solutions. I am here to help and support you. Also consider taking advantage of the university's mental health services (see Support Services).

## Illness

If you are sick, stay home and take care of yourself. This is not only to help you but also out of respect for your labmates who probably don't want you to share your illness with them. Let me and any labmates you're working closely with know

## Workplace accommodations

If you have concerns about the impact of your lab work on your health (e.g. potential exposure to chemicals and/or pathogens/ opportunistic pathogens), please discuss these with Jane. For example, if you are pregnant, immunocompromised or have other medical conditions it is important to ensure that you are taking additional measures to protect your health. Accommodations can often be made and Environmental Health and Safety can assist

with these kinds of issues. These communications will be kept in confidence, and only shared with those who must know (e.g. EHS).

Other workplace accommodations may be needed due to disability or protected characteristics. You have a right to seek workplace accommodations. If you need accommodations, talk to Jane about your needs and find out more on SFU procedures relating to workplace accommodations here https://www.sfu.ca/human-resources/rtw-dm/workplace-accommodation-procedures-.html

### Taking Leave

Graduate students and SFU employees are entitled to take leave for a variety of reasons (e.g. parental, health etc.). If relevant, refer to the relevant documentation on the SFU and Biology websites, and discuss with Jane

## Communication

### Soliciting feedback, help and support

Collaborating with your teammates and respectful communication are some of the key values in the lab. Part of respectful communication is being aware of the demands you place on others. There is a limited amount of time that your labmates and Jane can devote to helping you. Don't hesitate to ask for help, but be thoughtful about how and when you ask for help so that is straightforward to help you, and so that other's energies can be as useful as possible.

### Research

**Recommended workflow for dealing with research challenges**

1. Sit down and think about solutions yourself
2. Look for answers in the peer-reviewed literature, manufacturer's manuals or online communities.

*Document your findings from steps 1 & 2 so these can be shared with the others you seek help from down the line.

3. Solicit advice from your lab-mates. This could be in an informal setting, or you might consider putting together a couple of informational slides and asking for advice during group meetings (be mindful of how much time you will take up – 5-10 minutes is fine, 20+ mins requires more formal planning/meeting to address complex issues).
4. Seek advice from your PI. I am always happy to discuss issues, but it's in all of our best interests if you first work through the problem as much as possible yourself, and with the help of your labmates.
5. If we're still struggling, we will seek external advice

Additional considerations:

- If it's an emergency, always interrupt.

- If someone is pipetting/ concentrating, first observe them and make a judgement about whether they can find a pause point to answer your question.
    - Will there be a safety issue if you distract them? Are they working on something delicate e.g. RNA? Are they particularly stressed looking? *Don't interrupt them unless your needs are important. Otherwise wait for them to finish.*
    - If they are doing something routine (for them) and they can pause at a reasonable point: *Use body language to indicate you want their attention soon (e.g. look at them, stand nearby with a relaxed posture that indicates you're willing to wait until they can direct their attention to you.)
- Consider making a list of "Questions I have for Jane / other person" and ask those questions as a *batch*. This is especially useful when you are doing something for the first time, or you are new to the lab.
- Write down the information so that you're less likely to ask the same questions repeatedly. Even if you ask the question again (*no one is perfect*), writing down the answers shows that you value the persons' time.

**Giving Support**. Even if you aren't friends with a labmate, it is in your best interest to have a kind and professional relationship with them. If you help each other, the altruism will benefit you.

- It makes the lab a positive work environment.
- It makes everyone's work more efficient. This might free up financial or mentoring resources that can be used to benefit your research and professional growth.
- It helps you build soft skills that will improve your professional work no matter your career path. If a labmate's approach to asking for your support is not effective for you, kindly communicate better ways for them to work with you.

### Writing, presentations or posters

If you are soliciting general feedback on written work, ensure that you are submitting your best work to your labmates or Jane prior to soliciting feedback. This means spell and grammar checking to the best of your software and your abilities, and having done your due diligence in reading the relevant literature. If you are soliciting advice on content or other specific aspects before you have completed an entire document or presentation, make sure that you have a detailed outline, and consider making a list of specific questions before soliciting feedback. Scientific writing is difficult. Everyone struggles with it. The best ways to improve are to get formal or informal training, reading papers while critically paying attention to organization and style, and actually writing, getting feedback on that writing and reflecting on the feedback that you get. See the resources section for some writing resources.

This blog by Elisa Granato from the University of Oxford has some good tips for requesting help and feedback from people that might not be in your lab, or even in your university. http://elisagranato.com/phd-tips-asking-for-help-with-your-project

## Disseminating your work

Science is most useful when it is shared. You can share your work in formal and informal settings with other scientists, stakeholders, knowledge-users and the general public. As mentioned earlier, as much of your research is funded by public sources, your work should ultimately become public knowledge. That being said, sharing work at early stages, before conclusions have been reached can be unwise, and potentially dangerous depending on the subject matter. If your work is subject to any NDAs (non-disclosure agreements) due to collaboration with industry or other groups, make sure that you know and follow the stipulations of these agreements.

## Manuscripts

Manuscripts are one of the most important ways to share your work, because they are often the most important metric for your own career or educational attainment. They are one of the main metrics to demonstrate the success of the lab and help the lab to obtain future funding to continue our work. That doesn't mean that we need to publish everything, and there is definitely a balance between quality and quantity (while quantity is important, we should publish only high quality research). Writing is one of the most important parts of being a successful scientist and academic. All the well-designed experiments, rigorous analysis, and technical achievements will not be worth very much if you cannot write about them. Writing is not easy, it takes practice. To get an idea of the structure and content of manuscripts, my advice is to read a lot. Different journals have different formats, but they are all fairly similar. If you are embarking on writing a manuscript, discuss it with Jane in one of your meetings. Make a clear plan and outline each section. This article may also contain some useful suggestions https://www.nature.com/articles/d41586-018-02404-4

## Presentations and posters

Learning to present your research is important. You can reach a lot of people at conference talks and posters. Also, if you plan on staying in academia, getting a post-doc position and getting a faculty position both significantly depend on your ability to present your data in formal and informal settings. Even if you want to leave academia, presentations are likely to be an important part of your job.

It is therefore highly encouraged that you seek out opportunities to present your research, whether it is at departmental talk series and events, to other labs, at conferences, or to the general public. Remember that every time you present your work, you are representing not just yourself but the entire lab. If you are going to be giving a presentation (a poster or a talk), be prepared to give a practice presentation to the lab at least one week ahead of time Two weeks or more are advisable for conference presentations, and many weeks ahead of time are advisable for job talks which require careful refining (for securing a postdoc, faculty position, many industry science positions). Practice talks will help you feel comfortable with your presentation and will allow you to get feedback from the lab and implement those changes well in advance of your real presentation.

**Posters.** Ask Jane and your labmates for example posters if you've never made one before. Some general rules for posters should be followed: minimize text as much as possible (if you wrote a paragraph, you're doing it wrong. If you write a sentence, use judicious formatting to emphasize key words), make figures and text large and easy to see at a distance, label

your axes, and make sure different colors are easily discriminable. When using color, less is more. Use color to draw attention to key details. If possible, use consistent colors for the same bacterial strain / treatment / important variable between graphs in the same project. The ideal text size to figure size ratio is different when putting a graph in a paper vs. a poster/talk. You want the axes & labels to be easy enough to read at a distance. Other than that, go with your own style. Here are some resources from U of T that will help you to get started with poster design and content.
https://guides.library.utoronto.ca/c.php?g=251277&p=1673732

# New employee orientation

## SFU orientation

All new or returning employees must take the SFU safety orientation. People working in the lab will need to take EHS safety courses, and those working in certain capacities will need additional training (e.g. working with biosafety, radionuclides, lasers etc.). See https://www.sfu.ca/srs/work-research-safety/training.html for details about safety training. The basic safety courses that everyone (or almost everyone) has to take are below:
SFU safety orientation, Respectful Working & Learning Environments, EHS safety essentials, EHS Laboratory Safety, EHS Biosafety, WHMIS. Go to the link above, read the information provided and sign up for safety training courses. Get more information about lab safety here: https://www.sfu.ca/srs/work-research-safety/research-safety.html. Jane goes through a job specific safety orientation and has an orientation checklist for every new person. You will complete this with her after you have completed the online SFU Safety Orientation module. Ask her if you haven't seen it. Save your completion certificates after each safety course and send them to Jane as she maintains records. Both Jane and yourself are responsible for ensuring that your safety training is up to date. Read more about lab health and safety in the Health and Safety section.

## Health and Safety

Safety in the lab is everyone's responsibility. If you have concerns about safety in the lab, bring them up to Jane and/or any other people involved. If you have an accident (including minor ones), or a near miss, tell Jane and report these to EHS https://www.sfu.ca/srs/work-research-safety/contact/report/report-incident/incident-reporting-faq.html. Reporting of near misses and minor accidents can help to prevent more serious accidents in the future. Before using any new methods or making new solutions, review the SDS's for the chemicals involved. Be familiar with any special considerations related to using and disposing of these chemicals. Remember to label everything that you are not using immediately after you make it, even if it is a personal stock solution. Our lab is a CL2 (Containment level 2) lab. This means that we are certified to work with agents that may be opportunistic pathogens. Therefore it is not permitted to eat and drink in the lab, and you cannot store food in the lab. We have a special location for storing lab member's food. Ask for details if nobody shows you this during your orientation. Unauthorized people are not permitted to enter the lab. If you have visitors that want to enter the lab, talk to Jane first. This also means there are special considerations for the way you work in the lab. You will learn more about these in the Biosafety course.

### Working alone

In some cases, you may find yourself working alone. In general, this should be avoided for safety reasons, but it can be necessary in some cases. Working alone occurs when there is nobody else in the lab with you, and you are working outside of normal hours (approx. 830-5 pm weekdays). If you are going to be working alone, let people from the lab know, and make sure they know how to contact you and vice versa. Campus security provides a service where they regularly check-in with people while they are working alone, and check that they have evacuated in case of emergencies. Call them at 778-782-7991 to let them know you are working alone. Additional consideration of risks are needed for working alone. See the SFU working alone policy here: (http://www.sfu.ca/policies/gazette/general/gp39.html).

**Undergraduate students should generally not work alone. If you are an undergraduate and you feel you must work alone, discuss this with Jane and your immediate supervisor beforehand.**

### Other useful information

Students and staff automatically have a membership to **SFU Recreation**. This needs to be activated before you can use it. See https://www.sfu.ca/students/recreation/memberships-and-passes/activate-membership.html for details. For more information including facilities, locker rentals etc. see https://www.sfu.ca/students/recreation.html

**Grad students:** Get your U-Pass – this is part of your tuition and allows you to travel on public transit anywhere in MetroVancouver. https://upassbc.translink.ca/

As a student or postdoc you have access to **extended health and dental insurance**. You can also get this insurance for your spouse and children. Get more information on the SFU student society webpages.

**If you are moving from another country or province**: Register for MSP (BC healthcare) as soon as you move to BC. It takes 3 months to become active. In the meantime you will need additional coverage. Out of province folks can usually keep the coverage from their previous province for the 3 months before MSP is active (but look into this to be sure). See https://www.sfu.ca/medical-insurance/g-international-us-students.html for details.

**For international graduate students**, there are a lot of resources about moving to Canada, building community, housing etc. on the SFU grad studies website
https://www.sfu.ca/gradstudies/life-community/guide/international.html
Also check out international student services https://www.sfu.ca/students/iss.html

## Data management

### Laboratory notebooks

When you start in the lab, you will be given a book to keep records of your experiments. The records of your work, and the original data that you collect must be left in the lab when you leave the lab. Every departing group member will have an exit interview, and part of this

exit interview is to discuss how and where your data and records are stored when you leave so that they can be accessed by other group members as needed after you leave the lab. Maintenance and access to original data files is a requirement of most funding agencies and journals in which you have published, and is a tenet of responsible, reproducible science. Someone else may need to consult your notebook sometime, so please make your entries clear and legible, and always include the date including the year and a logical title for each entry. For a new laboratory study, write down a very brief introduction to the study, and list the objectives. If you have a specific hypothesis, write it down. The object is to make it completely clear what you intend to do.

Record everything you do in the lab while you are doing it. Don't wait until later in the day/ the next day to update your notebook as you will forget specific details about your work. If you are following a published procedure, you don't need to copy it, but write down any details that are not included in the procedure. In particular, record quantity of materials that you've used (e.g. for DNA extractions), etc. How much you write down is up to you, but any relevant information should be there. If you change a protocol in any way or decide between alternative methods, then the correct information must be recorded in the notebook. For example, a protocol may recommend centrifugation at 9400 x g, but we may decide to use 12,000 x g in the lab. The correct g force must be noted. Also include images (e.g. pictures of gels), or if you will save these digitally, mark down the file name and location.

If you make a mistake, put a line through the mistake and write the new information next to it. Never erase or obliterate an entry or rip out pages.

## Planning experiments

A lot of frustration and repetition of experiments can be saved by good planning. Spending time to plan your work in detail will never be wasted time as it will save you time later, and potentially save the lab money when you don't have to repeat the experiment. Before starting an experiment, go through the process step by step. This usually involves drawing/ writing a plan (put the details in your lab notebook once you've worked them out). Make sure you are familiar with all of the methods you need to use before you do them, including where to find the reagents and equipment you need and that all of the materials and solutions are available and ready, and that you know how to dispose of waste. Plan big experiments together with Jane. Think about things like how many replicates you will need for statistical power, what controls you need, how long to incubate samples or run experiments and how often to sample.

## OneDrive

All students and employees have access to OneDrive, secure cloud storage with version control that allows for collaboration. Every SFU employee or student is allocated 1 TB of storage. For more information see https://www.sfu.ca/information-systems/services/software/microsoft-365/microsoft-onedrive.html

## Backups

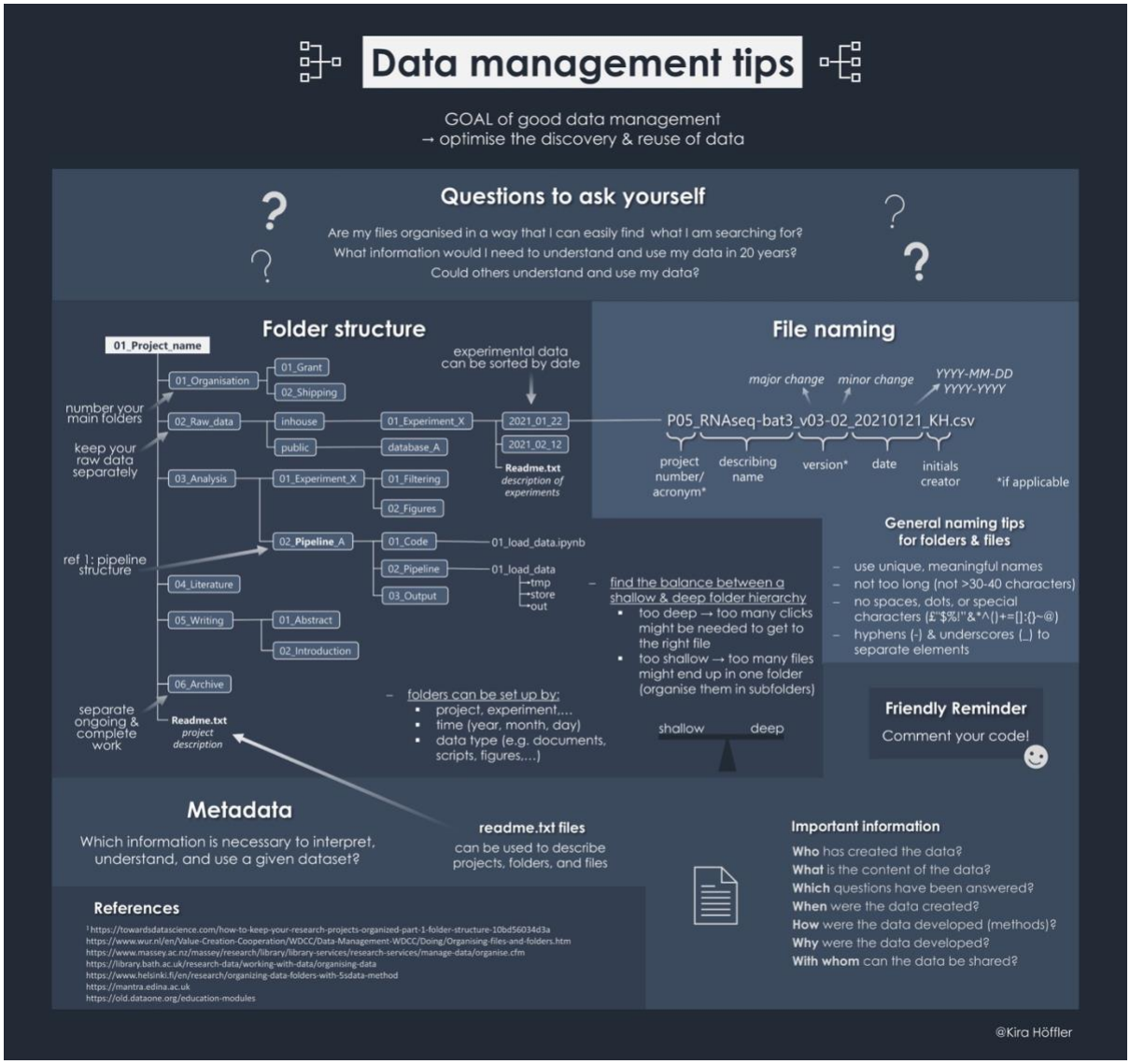
Regularly backing up your work will save you a lot of pain when your computer inevitably bites the dust. Laptops have a peculiar penchant for dying when you are in the deepest depths of thesis writing, so do backup regularly, especially during times of intense work

(when you may feel that you just don't have time for backups). Backups can be cloud-based or hard drive based but no matter what, make sure that you regularly backup your work. Using an automated system for backing up to an external location is probably best, as once it is set up you don't need to think about it. On Mac or PC, Time Machine or Backup and Restore are your friends.

Data that is produced from yours or others work in the lab **must be backed up on lab backups**. These include hard drives and lab computers. Data should be backed up to lab backups as soon as possible after being obtained or created, and a backup of all data must be made before you leave the lab.

## Data organization

For tips on how to organize your data, see the image below. For lab data (like sequencing files), always make sure that the date and sample information is summarized in the file name. An additional excel file should exist for all sequencing projects that includes metadata on each of the samples and the names of the data files containing the sequencing data. This will make your life a lot easier when you deposit this data to a repository (e.g. NCBI) which is required for publication. It will also make it a lot easier for people to go back and use your data for things like meta-analyses which will often occur years after you've left the lab.




# Research resources

## Shared folder

The lab has a shared folder that contains all kinds of resources like how to use specific instruments, and specific protocols that we use regularly, recipes for solutions and media etc. This folder is in OneDrive and is administered by Ramis Rafay – get him to give you access to this folder if you are a new lab member.

## Computational resources

Compute Canada provides free access to computational resources for all Canadian-based researchers. CEDAR is the largest academic supercomputer in Canada and is based at SFU. To get started with CEDAR visit https://docs.computecanada.ca/wiki/Cedar. To register use Jane's CCRI# (hhp-800-01) and Jane will confirm that you are a member of the lab so that your account can be created. The following links may contain useful info to get started: https://docs.computecanada.ca/wiki/Getting_Started

https://docs.computecanada.ca/wiki/Technical_support

SFU has licenses for a variety of software that you may find useful. Find them here https://www.sfu.ca/itservices/technical/software.html

### Shared equipment

Both the Biology department, MBB and chemistry have a variety of shared equipment that might be useful for you to know about. Training is required for most of this equipment. Look at the websites below to find out what is available from biology, MBB and chemistry and the FoS and to figure out how to get the necessary training to access this equipment.
https://www.sfu.ca/biology/information-portal/researchers/research-facilities/other-facilities.html and https://www.sfu.ca/mbb/facilities-bookings/facilities/instrumentation.html and
https://www.sfu.ca/chemistry/research/facilities/other-instruments.html
https://www.sfu.ca/science/research/facilities--resources---services/facilities---equipment.html

### Other resources at SFU

**4D labs** has equipment like an ICP-MS, SEMs, atomic force microscope, XPS, XRD etc.
http://www.4dlabs.ca/our-capabilities/equipment.html
**Flow cytometry facility** – including a few FACS and lots of lasers - https://www.sfu.ca/fhs/research/research-centres-labs/flow-cytometry-laboratory/equipment.html
**High throughput chemical biology centre** - https://www.sfu.ca/htcb/facilities/
**LC-MS-MS** – Dr. Frank Gobas in the Faculty of Environment has kindly offered to allow lab members to use his LC-MS-MS.

Other departments and facilities might also have shared equipment that could be useful to you and your labmates. Please add these to the handbook as they are discovered.

## General lab stuff

For security reasons, and to avoid getting locked out, keep track of your keys and ID card. The doors to the lab lock automatically when you leave. Be mindful of the amount of noise you make in the lab. A general level of noise or conversation is tolerated and even expected. If you want to have a noisy or long discussion with someone, consider doing it in the lunch area or another meeting space to avoid disrupting your labmates. If you want to play music, use earphones or seek everyone else's permission beforehand. If you are sensitive to noise, or require silence to focus you might consider keeping a set of earplugs at work or investing in some noise cancelling headphones. If you are finding the lab noise intolerable, respectfully ask your noisy labmate(s) to leave or be quieter, and always be considerate if someone asks you to keep the noise down.

## Resources

The following resources include links to webpages and documents that might be useful to you at some point during your stay in the lab.

## Practical resources at SFU

### Finance – expense reports etc.

FINS (fins.erp.sfu.ca) is used to process things like travel expense claims and lab order requisitions. For quick help links (like how to process a travel expense) go to https://www.sfu.ca/finance/departments/payments.html and look at the Quick Link on the right hand side of the page.

SFU Biology – the website contains a lot of useful information. Especially check out the information portals for specific information on a lot of different topics
http://www.sfu.ca/biology.html

Graduate & Postdoctoral studies - Includes general information including things like policies, requirements for degree completion, sources of funding and a lot of other stuff
https://www.sfu.ca/gradstudies.html

## Resources for scientists

**English communication in science** – this ebook goes over a number of the aspects of scientific communication. Despite the title, it is not just written for non-native english speakers https://www.nature.com/scitable/ebooks/english-communication-for-scientists-14053993/contents/

**How to write an abstract** – This example gives detailed advice on how to construct an abstract. This applies for conferences, papers, or theses.
https://www.nature.com/documents/nature-summary-paragraph.pdf

**Imposter syndrome** – Many science students and scientists feel inadequate and not smart enough at times. Imposter syndrome to a certain extent or at discrete times is totally normal, but it can lead to loss of motivation and eventually burnout if it gets out of hand. There are a lot of resources out there about how to deal with imposter syndrome (just google it), but one of the best ways for me is to commiserate with my peers. Once you realize that you are not alone, it feels better. If you feel that your imposter syndrome is getting out of hand and you are not managing well because of it, take advantage of SFU's mental health services. Feel free to talk to Jane about it too if you worry that it's affecting your work. Also read the essay below to put the field of scientific research in perspective with respect to not knowing enough.
This essay **"The importance of stupidity in scientific research"** by Martin Schwartz argues that the nature of our work frequently leaves us feeling like we don't know what we're doing but that it's meant to be that way.
In case the link breaks, the doi to this article is: 10.1242/jcs.033340
https://jcs.biologists.org/content/121/11/1771

If you have resources that have been helpful to you on any aspects related to science, talk to Jane about including them here.

## Support services

Graduate studies and working in STEM/academia can have its challenges. If you feel that your mental or physical health is suffering, please seek the help that you need. Everyone needs a little support now and then. Take advantage of the following services and groups if you need them. Please feel free to talk to Jane about any issues that you feel comfortable discussing with her. While she might not be able to give you all of the support that you need and will probably refer you to some of the services below, it is important that she understands what you are going through especially if it is impacting your work. It is doubly important to report issues to Jane if you are experiencing these issues at work, as discrimination, harassment and bullying are not tolerated but she must be in a position to address these issues when they arise.
Here are some university-based support services:

**SFU Health and Counselling** sfu.ca/students/health have many options to access counselling services including drop-in and virtual services and in person appointments. Their website includes a ton of other resources to support mental health, so check it out. They also provide medical services.

**My SSP** is an app available to all SFU students that provides mental health resources and support in many languages and can also be used to book counselling appointments https://www.sfu.ca/students/health/resources/my-ssp.html

**SFU Graduate Student Society** - The GSS is the student society and government for all graduate students at Simon Fraser University. Advocates for graduate students and provides diverse services such as legal aid, financial aid, etc. https://sfugradsociety.ca/

For assistance and advice if you are experiencing discrimination or harassment:
**SFU Human Rights Office** sfu.ca/humanrights 778-782-4446, hroadmin@sfu.ca

**International Services for students** - Services for international students (advising, orientation, aid with insurance, taxes, visas, work and study permits) and domestic students (Exchange, Study Abroad, and Field Schools) https://www.sfu.ca/students/iss.html

**Indigenous student centre** - Provides a welcoming gathering space, supports for academic success, as well as a social and cultural community to help all Indigenous students succeed and thrive, with a balance of culture, tradition, and academic success
https://www.sfu.ca/students/indigenous/

For spiritual or faith-related support, check out the resources available through the **Multifaith Centre** sfu.ca/students/multifaith

**Gender based support services**
See http://www.sfu.ca/sexual-violence.html for all kinds of information for survivors and supporters.
**If you need emergency help, call 911.**
If you need confidential, coordinated sexual violence support contact:

**SFU's Sexual Violence Support and Prevention Office** M-F 9-1630
778-782-7233, or email sv-support@sfu.ca anytime or visit https://www.sfu.ca/sexual-violence/contact-us.html for more info.
**SFSS Women's Centre** sfss.ca/wctr The women's centre provides a lot of services not limited to crisis referrals and peer support and also not only to people identifying as women. Check out their website to learn more, email studentcentre@sfss.ca, or call 778-782-3870 M-F 10-16.
**Out on campus** also provides crisis referrals and peer support, as well as a number of other supports and resources to LGBTQ2S+ and allies https://sfss.ca/ooc/ ooc@sfss.ca

### Other services:

Student Food Bank https://sfss.ca/services/food-bank-program/
Legal Clinic https://sfss.ca/services/free-legal-clinic/

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