Barrett lab manual

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General

Introduction

Welcome to the lab! This manual is intended to help guide you through your time in the Barrett lab. Please take the time to look through it for answers to any questions you might have, and for general information about the lab and McGill. You can find lots (and lots!) more information within the lab Google Drive, but hopefully this manual provides a handy resource to locate what you are looking for. If in doubt about anything, please don't hesitate to ask another lab member. We are all here to help each other. Please note that this manual is very much a work in progress, and you can help by editing and adding useful information. In particular, please link to relevant folders and documents on the lab Google Drive. Where text is written in the first person, it refers to me (Rowan), but I welcome (and need!) input from everyone on this document. I have adopted/adapted some of this information from 'lab values' and 'lab protocols' documents created by other research groups that share beliefs/practices/protocols with us. Many thanks to Marc-Olivier Beausoleil for providing the inspiration to put this manual together, and the template on which it is written.

Land acknowledgement statement

McGill University is located on land which has long served as a site of meeting and exchange amongst Indigenous peoples, including the Haudenosaunee and Anishinabeg nations. We honour, recognize, and respect these nations as the traditional stewards of the lands and waters on which we meet and work.

Mission statement

Our purpose is to discover new and interesting things in biology, and to create a collaborative, productive, and friendly environment in which we can train future generations of scientists.

Equity, diversity & inclusion

We strive to foster and promote equity, diversity, and inclusion without group, and more broadly within the scientific community we are a part of. Unlike the notion of equality, equity is not about sameness of treatment. Equity denotes fairness and justice in process and in results. Equitable outcomes often require differential treatment and resource redistribution so as to achieve a level playing field among all individuals and communities. Diversity describes the presence of difference within any collection of people. In discussions of social equity, diversity addresses differences in social group membership related, for example, to race, Indigenous identity, class, gender identity or expression, sexuality, ability, ethnicity, and religion. Inclusion refers to the notion of belonging, feeling welcome, having a sense of citizenship, and the capacity to engage and succeed in a given institution, program, or setting.

Presentations by Victoria & MK

If you have suggestions or concerns regarding equity, diversity and inclusion in our department, please forward them to GARM (Graduate Association of the Redpath Museum) by submitting this anonymous form.

Reading suggestions

- *Decolonising methodologies by Linda Tuhiwai Smith*
- *Braiding sweetgrass by Robin Wall Kimmerer*
- *Guidelines for healthy global scientific collaborations by Dolors Armenteras*
- *Ten simple rules for Global North researchers to stop perpetuating helicopter research in the Global South by Haelewaters et al. 2021, PLOS Computational Biology*
- *Safety and Belonging in the Field: A Checklist for Educators by Greene et al., pre-print*

Commitments from me

- Your time and effort are valuable and appreciated. I am committed to doing my utmost to help you in your work, take your best interests to heart, and guide your efforts in ways that benefit you first and foremost.

- I aim for members of the lab to become accomplished independent researchers during their time here. This includes learning about relevant methods, acquiring scientific independence in projects, mastering the literature in your field, and working on the project of your choice. It also includes learning about other aspects of doing science, such as scientific writing, grant writing, giving scientific presentations, and networking.

- I strive to have a diverse lab. We need multiple voices and perspectives in science, and a safe place to conduct our research. We welcome lab members regardless of race, religion, gender identification, sexual orientation, age, or disability status. As long as you are excited to do good science and respectful to others, you are welcome here. Beyond fostering an equitable, diverse, and inclusive space for my trainees, I aim to be anti-racist and work to correct the systemic injustices in academia.

- I will (in combination with co-supervisors and collaborators as appropriate) provide financial support for your stipend to at least the minimum level required by the Department of Biology for at least a minimum of 2 years for MSc and 4 years for PhD, with the option of additional years of support as agreed upon in discussion with the student. (Note: these – and many of the other items in list of commitments from me – are contingent on successful progress in research and other components of their degree – as adjudicated by the supervisor committee, the PhD qualifying exam committee, and the PhD examination committee.) I will also fund your research to the extent that I am able to from my grants. I will be open and honest about the financial resources available for your work. I also try to provide financial support for each graduate student to attend one scientific meeting each year (although it is helpful if you can obtain your own funding through travel awards, etc.).

- I will provide office and lab space – or arrange for office and lab space from collaborators and colleagues – as necessary for the completion of the student's research.

- I will meet with you frequently (typically once per week, either in person or remotely) to check in and discuss any topics you would like. These meetings are understood to occur at reduced frequency during the summer, over the holidays, and when I am on sabbatical.

- As rapidly as I am able to, I will provide feedback on your manuscripts, applications, and presentations. I will also write recommendation letters for you.

- I will support you in your career goals, whatever they may be. I will help you network with other scientists for collaboration and career advancement.

- Your health and wellbeing are important to me. I will do what I can to help you accomplish your scientific and career goals in a way that keeps you happy and healthy. I will strive to resolve interpersonal conflicts and to maintain a harmonious and safe working environment for all lab members.

Expectations of you

In addition to my commitments to all lab members (above), I have expectations of the people that I admit to my lab. If you do not feel that you can meet these expectations, this lab is probably not a good fit for you. To make sure that you and I are on the same page, I will also work with each lab member to develop an individual mentoring plan. Note that this plan serves as the formal 'Supervisor Letter of Understanding' that can be uploaded to myProgress.

Ethics and collegiality

- Members of the lab are expected to take full responsibility for their research, and to carry out their work honestly, openly, carefully, and with interest.

- Be kind to others. Behave professionally. It is important to realize that the lab is a professional setting, even though we are often very informal with each other. Harassment and sexist, racist, or exclusionary language and imagery are not appropriate at any time. Be careful not to commit microaggressions. Be aware that your actions can be hurtful to others or contribute to a negative environment even if you had no intent of harm. Report incidents to me if they occur, and if necessary to the appropriate offices at McGill.

- Be kind to yourself. Be mindful of your limits. Please discuss any challenges you are facing with me and make use of the wellness resources and support available at McGill.

- Please make an effort to foster an inclusive environment for everyone. Give people a chance to talk and an opportunity to contribute. The functioning and success of our lab depends on a common sense of purpose and cooperation. Although I value and seek out independence in lab members, it is important to realize that we all depend on each other, and must act in a thoughtful manner towards each other. You are expected to be invested in the current and future success of other lab members. Please be an active listener and take the concerns of others seriously.

- Noise levels in the office. Be aware that people have to work together in limited physical space. Respect that others might need to concentrate: try to schedule online and in-person meetings outside of the office space, or find time slots when the office is less crowded and ask your co-workers whether they might be disturbed. At all times keep your voice low if the entire office is not involved in the conversation.

- Please do not come to the lab if you are sick. Take the time you need to recover, and avoid spreading illness to others.

- Take due diligence when leaving the lab.

Productivity

- Lab members are expected to be self-motivated. My work schedule is not yours. You are here to advance your career, not mine. We strive for a supportive and encouraging environment to practice science, and to provide the resources needed for successful research, but how, when, and how much you work is up to you. All lab members are encouraged to attend lab meetings and to participate in lab activities, but the way you conduct your own research is your choice. This holds for everyone from postdocs to undergraduates. One of the great benefits of being a scientist is that for the most part we are free to decide our own schedules. All lab members are encouraged to work in whatever way they personally find most effective. This may include working outside regular hours or remotely. Whatever your choices, be aware of their costs and benefits.

- Identify your personal definitions of success. Discuss your goals with me and if you are comfortable with it, your peers. Re-evaluate frequently. You can develop an Individual Development Path through the use of myPath and the associated resources.

- A core component of being a practicing scientist is to publish your work in a timely manner. This is important to disseminate our findings to the scientific community and contribute to general knowledge. It also advances your career and that of your collaborators. And we owe it to the tax-paying public that funds our research to provide some concrete output from their investment in our work.

- Above all, I value results over process. I don't care how you get your work done - please work in whatever way allows you to be happy while producing the best science possible!

Good scientific practice

- Make all attempts to practice science in an ecologically responsible manner. Conserve, reduce, reuse, recycle.

- Complete all required training at McGill, such as (but not necessarily limited to) WHMIS, animal care, and biosafety.

- Adhere to all McGill guidelines regarding appropriate research practices, such as no plagiarism and no falsification of data or analysis.

- I expect my lab members to attend seminars (e.g., Redpath Museum and 'Organismal') to learn what other researchers are doing and participate in their academic community. I also expect you to read science papers or books most days. If you don't want to read extensively and intensively, examine whether you are doing the kind of science that truly engages you.

- Attend all lab meetings – and read the necessary materials (e.g., papers for discussion) – unless unavailable for valid reasons, such as lab work, field work, holidays, or other needs as discussed with me.

- Backup your data!

- Write up Standard Operating Protocols (SOPs) for any commonly-used method so people who follow after you can replicate your methods exactly. Use the lab GDrive and GitHub account or similar resources to share data, code, and text.

- Learn to keep a budget of your research costs and make sure I am aware of your anticipated expenses in advance of when you need them. This is essential for the management of our lab funds.

- In certain (but not all) respects, a lab works like a small business. We have overhead funding, revenue (grants), a payroll, and a product (our research). Reagents, etc. cost money, but so does your time. We don't always want to save money at the expense of efficiency and time, but keep in mind when purchasing things that it has taken hard work to obtain those funds (hours and hours of grant writing), and money is always finite - if funds are used for one thing they can't be used for something else (like student stipend support!).

- Apply for relevant scholarships or fellowships (e.g., NSERC, FRQNT) – and for relevant travel support (e.g., MITACS, Redpath, etc.) – as needed for your work and as agreed upon with me.

- Accidents happen. Things fall, get broken, and get left on. But there are often steps that can be taken to avoid accidents. Set aside sufficient time for the experiment. Don't rush. Make sure you are focused and not sleep deprived, give some extra thought to what you are doing and why, and be deliberate about all of your actions. Working this way keeps equipment from being broken and keeps everyone safe.

- If you don't understand something or want more information, ask. Becoming comfortable asking questions in meetings and at seminars and conferences is a valuable skill. It is an effective way to learn, and it helps to establish collaborations, develop ideas, and connect you with your peers. A good practice is to try to come up with at least one question you could ask at every talk or discussion group you attend. Asking the question is only part of the exercise. Simply preparing for it will force you to pay closer attention and think critically about what is being presented. And if there is one of those awkward moments where nobody asks a question at the end of a talk, you can save the day!

Authorship

- Discuss authorship expectations before embarking on a project.

- You earn first authorship if you do most of the data collection, analysis, and writing. Students are expected to be first author on papers from their thesis – unless otherwise agreed upon in discussion with the supervisor and any collaborators, or unless the student is unable or unwilling to continue working on the manuscript toward publication. In this latter case, the supervisor can arrange for the work to be completed by another person (or by the supervisor) and the author order could change accordingly. Of course, all such situations would first be discussed with the student and a consensus would be reached.

- You earn co-first-authorship if you and someone else either did equal amounts of work or each contributed most of different stages (collection, analysis, writing).

- You earn co-authorship if you contribute an essential effort to obtaining the data or writing the paper. There should be some distinct result or intellectual idea that you were the primary source for.

- You must have read, understood, and approved any paper you are co-author on and be able to defend it.

- I expect to be a coauthor on work from the student's thesis, unless agreed upon after discussion with you and any relevant collaborators. (Note: my students often publish work on which I am not coauthor – but the key is to discuss the situation in advance of finalizing authorship decisions.)

Leave of absence and vacation policies

Life happens. Leave of absence may be needed for a variety of reasons (parental leave, mental health, compassionate grounds, etc.). Putting your graduate studies (or postdoctoral work) on "pause" is completely fine with me. Of course, the earlier we can plan for it the better so that there is minimal disruption to your research. Although I have no problems with personnel taking a leave of absence, it is important to check the official ramifications in terms of your funding, degree timelines and requirements, etc. Please check the policies on this from McGill and any funding sources you rely on (e.g., NSERC and FQRNT).

Officially, graduate students and postdocs are entitled to vacation leave equivalent to university holidays and an additional total of 15 working days in the year. However, in accordance with my expectations about lab members being self-motivated (see "expectations of you" section), I don't care if you take more (or less) than this if you want to. How much vacation you want to take is completely up to you. You don't need to ask me permission for it either (although please let me know if you will be away for an extended period). Whatever you find works best for allowing you to be healthy, happy, and productive is good with me. However, note that *technically*, students and postdocs with fellowships and research grant stipends taking additional vacation leave could have their funding reduced accordingly by funding agencies.

Graduate students

Biology Graduate Student Handbook

The Biology Graduate Student Handbook is compiled by the Graduate Experience Task Force (GETF) in 2021, with much of the research and writing by former Hargreaves lab member Josh Persi. The purpose of it is to help graduate students understand and navigate various aspects of their experience in the department, including degree milestones and funding.

Any suggestion and feedback are appreciated, and can be directed to Abigail Gerhold or to any member of the GETF (Steph Weber, Arnold Hayer, Fiona Soper, Tamara Western (on sabbatical), Kate Sheridan and Claire Edrington).

Grad student associations

Graduate Association of Redpath Museum (GARM) organises weekly coffee hours as well as other activities for grad students. You can anonymously inform the Graduate Association of the Redpath Museum (GARM) about any issues you may be experiencing as a graduate student at McGill by filling in this form.

McGill Biology Graduate Student Association (BGSA) also organises various discussion groups and events. You can find lots of useful information on their website.

Supervisory committee

The supervisory committee (SC) consists of the supervisor (Rowan) plus two or more other members. If you have a co-supervisor, only one other member is needed (but it is usually good to have two additional members in this case). Please see this page for instructions and the nomination form for setting up your supervisory committee. Note the timelines by which you need to have your first committee meeting.

After discussing potential SC member(s) with your supervisor, email the potential SC member(s). Be sure to include a brief overview of your project, your interests/background (e.g. include CV and transcript), identify the current SC members, and explain why you think this individual would be a good fit for your committee. Once all potential members agree to sit on your SC, complete the SC nomination form and send it to Ancil Gittens.

Initial meeting

Schedule a two-hour time block for the initial meeting and prepare the following beforehand:

1. SC Report with progress/plans sections filled out.
2. Complete page 1 of the Progress Tracking Form.
3. Send both documents to all SC members a minimum of one week before the meeting.
4. A Presentation based on your SC Report.
5. Print the Graduate Student Research Progress Tracking Report .

Discussions to expect at the initial meeting:

- Your academic background (bring CV/transcript).
- Suggested courses that would fulfill your program requirements.
- Your thesis/research proposal.
- Questions relating to your project (e.g. validity of approach/technical issues/ significance of your research/future directions etc).
- An evaluation of your progress (this discussion will not include you).

Post-meeting
After you and your committee members are done discussing your project, you leave the room and they privately discuss your project. During this time, they will determine if your progress is satisfactory/unsatisfactory. Your SC must then complete and sign the Progress Tracking Report.

➢ You send the completed **Progress Tracking Report** and the **SC Report** to Ancil.

Thesis

A thesis can be written either in manuscript format or standard format at McGill. In the Barrett lab, all theses should be written in manuscript format. This saves a considerable amount of time and effort, since each chapter can be submitted for publishing without extensive re-writing. Ideally, each chapter should be a published paper by the time the thesis is finished. This makes the thesis look stronger in the eyes of an examiner and it's unlikely that you will be asked to re-do experiments and analyses, as your research has already passed peer review. Additionally, having published multiple papers by the end of a PhD significantly increases the chances of securing a postdoctoral position and more funding.

Thesis structure & writing tips

A thesis written in manuscript format is like having multiple papers stapled together. However, it's crucial that chapters are tied together in a cohesive manner with an introduction, conclusion and linking statements between chapters.

- **Introduction**
  - Aimed at a more general audience to help readers understand the bigger picture that your research is based upon.
  - Provide context by describing the study system (e.g. life history traits) and a justification why the study system is ideal for answering the questions you have.
  - Help the readers understand the bigger picture by linking your research to known global phenomena (e.g. climate change, pollution, etc). Conceptual diagrams and schematics can be particularly useful in this section for illustrating complex ideas.
  - Define concepts and provide other relevant information that is too general to go in the chapters.
  - You can also provide schematics to illustrate how the chapters work together, or potentially a timeline of how the research was conducted.

- **Literature review**
  - The thesis should illustrate a solid understanding of the foundational literature of the subject area either by including a literature review as a chapter, or by demonstrating your knowledge by citing relevant foundational literature throughout the thesis.

- **Chapters**

  - Written in manuscript format. Aim to produce one paper per chapter. Lumping publications into one chapter or splitting chapters into two publications is considerably more work!
  - The absolute minimum requirement is one chapter for MSc theses and two chapters for PhD theses. However, typically students produce two chapters for a MSc degree. For PhDs, students write four chapters on average, but this can vary between three and five chapters.
  - Publish as many chapters as you can as early as possible! It's harder for evaluators to push back or request changes if something has already been published.

- **Linking statements**
  - Sections between chapters to create a cohesive narrative and to set the stage for the next chapter. It's also a good place to describe why the previous chapter had to be done before the next one.
  - Each chapter should be solving a specific part of a bigger problem described in the introduction. Explain which part of the problem described in the introduction is being solved. Avoid redundancy!
  - Describe what is special about the chapter and how it contributes to original knowledge.

- **Discussion**
  - Tie the results of the chapters together for a more general discussion.
  - Discuss failures in this section ONLY if it offers some type of insight. Be conservative and do not write about failures extensively. Be strategic and describe obvious things that you tried to illustrate to the reader that the approach doesn't work.

- **Conclusion**
  - Synergise and tie everything together. Summarise your results and contribution to original knowledge.
  - Talk about the relevance and importance of the results and its applications to real-world problems.

- **Appendices**
  - Useful for documenting negative results and projects that didn't work. Again, do not focus too much on things that failed. They do not count towards your thesis. The defense is often an appropriate place to bring them up.

BWSB & hourglass method

Presenting scientific ideas in a coherent way to someone unfamiliar with your research can be challenging. There are multiple useful methods that can help with organising your thoughts:

1. **The babe-werewolf-silver bullet (BWSB)** method is useful for writing and presenting science and research. The method is described in detail in this blog post.
2. **The 'hourglass' structure** starts by giving a broad view of the topic, then zooming in on a specific question and at the end zooming out to link the answers to the bigger picture. In a thesis, this method is most efficiently used in conjunction with the BWSB method, where you present a general BWSB in the introduction, but each chapter also has a more specific BWSB. In the conclusion, you generalize from the information provided in each chapter.
3. More writing tips can be found here. Feel free to add more resources!

Thesis timeline

1. **Qualifying exam.**
2. **Initial submission.** If you plan to finish in the spring, you would submit the initial thesis in the fall semester. The initial submission window is open for nine months before final submission. You will find out after initial submission if you didn't pass a certain section.
3. **Exit seminar.** Registration form and instructions can be found here.
4. **Oral defense.**
    a. Takes place about a month before final submission.
    b. The defense is the real finishing line of your PhD, although you do not stop being a student until you have officially graduated.
    c. After the defense, you do not pay full tuition.
    d. The supervisory and examiner committees do not typically overlap (except for the PI supervising the student).
    e. There will be internal examiners and an external examiner. For the external examiner, you can use this opportunity to invite a big name in the field who you admire to test your thesis (and to advertise it!).

5. **Final submission.** The submission deadline is flexible, but the official graduations only happen at specific times. The final submission deadline is normally April 15th, if you plan on finishing in the spring and graduating in June.
6. **Graduation**. Although you have theoretically finished your degree after the defense and the final submission, the convocation ceremony is considered the official proof of having graduated and finished your degree. Registration is mandatory, but attendance is optional. The date of the ceremony is your official graduation date and it's relevant for starting a postdoc and applying for jobs.

McGill resources

The thesis requirements and guidelines often change **without** notifying students or supervisors. Therefore, it's important to keep an eye out for updated versions of the thesis checklist and other relevant documents to know what is expected from your thesis.

Thesis evaluation is the time after initial submission and before final submission.

- Preparation of a thesis
- Initial thesis submission checklist
- myThesis guidelines
- PhD exit seminar instructions
- Examiners
- Writing groups
- Deadlines
- Graduate fees

For specific information and clarifications (e.g. page counts, lit reviews, etc), please read through the communications summarised in this document on the lab drive.

Graduate student funding

The Biology Department specifies a minimum level of support for all graduate students (at the time of writing, $16,880 plus tuition and fees). For students with fellowships that cover this amount or more, the funding situation is straightforward. For those without a fellowship, things are slightly more complicated. Students are guaranteed a 'stipend' of $10,600, which must be supplied by funds from my research grants. The remaining $5,300 is expected to come from teaching assistantships. Students are expected to be offered a minimum of 180 hours of TAships per year, which will typically accomplish this amount, and can TA more if they wish to make more money. However, these TAships are 'subject to availability'. If a student is not provided with sufficient TAships to attain the $16,222 minimum level of support I will try to provide additional support through my research grants to get them to this level. I will also do my best to "top up" funding levels for students when my grants allow it. I know how difficult it is to live on a graduate student salary (I was very poor during my own PhD in Vancouver…) and want to help as much as I can. But, it is always a difficult balance because money going towards stipends cannot be used to fund our research.

To keep track of your funding and help me plan expenses, please fill out this form.

Please consult this page for more information about financial support and fees for Biology students at McGill. Read carefully!

Teaching assistantships

Graduate students can be partially supported by being appointed as teaching assistants for one or more undergraduate courses. The salary received as a teaching assistant is subject to income taxes and other applicable employment deductions (Employment Insurance, Quebec Pension Plan, etc.). Regardless of your funding situation, I recommend that all students TA at some point during your graduate training.

This page shows current TAships available. You can see examples of courses that lab members have TAed here, along with their thoughts on the course.

Awards and grants

I do my best to make sure we have sufficient funding for everyone to do world class research. I want you to focus on doing the best science possible and not have to worry about money. However, you can certainly help our collective efforts by applying for funding as well. Funds you obtain can provide you with more independence to attend conferences, do fieldwork, and fund risky or expensive projects. And it also provides invaluable experience in grant-writing, which is a large component of being a practicing scientist. I am always happy to work with you to write grants and apply for fellowships.

You can find a number of funding opportunities here. Examples of applications from lab members that could be used as templates for future applications can be found here.

Intellectual property & patents

If you think your research could have commercial potential, it is probably a good idea for us to meet with a technology transfer manager (we have worked with Jarred Chicoine in the past) and discuss submitting an invention disclosure form. This will provide avenues for us to protect the intellectual property being

developed. You may also be involved in research in the lab that is funded via partnerships or agreements (as opposed to grants) between McGill and an industry, government, or non-profit organization. It is useful to determine the appropriate type of arrangement, which can differ in terms of the parties' control over scope and timing of the project, the nature of the services provided, intellectual property rights conferred to the sponsor, the type of research personnel involved, and the degree of latitude on budgeting.

Undergraduate mentorship

All undergraduates will conduct their projects with a more senior lab member (graduate student, postdoc, or lab manager) as a mentor in addition to receiving supervision from me. This mentor should have relevant expertise in the project and be interested and invested in the research. Nobody will be 'forced' to mentor a project; if no mentor is available, it is likely we will not accept the student into the lab. This mentorship serves two important functions: 1. It provides valuable training and mentorship experience for lab members. Effective mentorship is an extremely difficult skill, and despite its importance for many likely career paths for those in grad school, it is not one that can be easily taught through courses. Direct supervision of an undergraduate project is a very effective way to learn what does and does not work and hone your mentorship 'style'. 2. It ensures that undergraduates have someone who can teach them basic lab methods relevant for their work, and respond to questions or problems they might have. The undergraduate and their mentor should schedule regular meetings to discuss their project. Meetings with me can also be scheduled to discuss ideas and troubleshoot problems that may arise.

- Why involving undergraduates in research is important by Emery et al. 2019.
- Peer mentorship is also critical to increasing diversity in STEM, see Thomas et al. 2015, Kendricks et al. 2013

When an undergraduate joins the lab, please add their name and details to the lab's list of undergraduates. Remember to update this list when an undergraduate leaves the lab! Please also ask them to complete this checklist before they leave the lab (check this section for more information).

Undergraduate recruitment

There are many ways to recruit undergraduates for the lab. We frequently have undergraduates contacting the lab directly asking for volunteering or internship opportunities. These emails are currently forwarded to Lucas, so please contact him if you are looking for help with a research task. Other options include:

- The **Student Research Initiative** (SRI) has a database for research positions to help undergraduates find volunteering and paid opportunities in research.
- The SRI also organises an annual **Faculty Student Speed Networking** event in the spring where someone from the lab (either a student, technician or PI) can talk about available opportunities to potential undergraduates.
- McGill Biology Student Union also has an **Employment Committee** which aims to provide students with a list of available positions for undergraduate students in our department (contact: mbsuvpacademic@gmail.com).
- You can also advertise the position in a relevant lecture (e.g. a course you are TAing)
- **myFuture** is the official site for advertising McGill job postings and internships across subject areas.

When recruiting undergraduates, please try to advertise the positions publicly to increase visibility to applicants from a variety of backgrounds.

Compensation

Undergraduates are a valuable part of research. There are many ways in which undergraduates can be rewarded for their efforts and commitment and you should always look into the various options before taking on an undergraduate.

Possible options for McGill undergraduates include:

- **Work-study**
- Independent Research Project (BIOL 466)
- Honours Research Project (BIOL 479D)
- SURA
- USRA

Options for non-McGill undergraduates:

- Hiring the student as a lab helper

Undergraduate training

All undergraduates should be carefully trained before they conduct research tasks independently. The primary person responsible for the training of the undergraduate is the mentor.

In general, students should first observe someone experienced conduct a task. After that, the trainee should conduct the task by themselves with the mentor supervising the process and providing feedback. Finally, the trainee should conduct the task independently while the mentor is present in the lab to answer questions.

Always give your contact details to the student in case they need guidance or encounter problems!

Undergraduates who will be using the molecular lab must complete the Laboratory Safety Orientation Checklist and return it to the lab manager/technician after an in-person introduction to the general safety practices and rules in the lab.

Undergraduates must also complete all necessary training prior to commencing work in the molecular lab. Any undergraduate working in the molecular lab needs to successfully complete WHMIS 2015, Hazardous Waste Management and Introduction to Biosafety before starting.

Training certificates must be uploaded to the Google Drive by creating a personal folder for the student in the Undergraduate e-certificates folder. Certificates are typically emailed about four weeks after completing the training. Since the undergraduates do not have editing rights to this part of Google Drive, the mentor is responsible for making sure all the relevant certificates are uploaded.

Please ask the undergraduate to complete the NSERC consent form that gives us permission to list the student's name on grant applications. This is optional, so the student does not need to sign it if they wish to remain anonymous. Please upload the completed form to this folder and rename the document with the student's full name.

Grading undergraduate research

Graduate student mentors will provide the first pass at grading independent research projects. Please use a clear rubric. Rowan will then read the report and discuss the evaluation with the graduate student to agree on a grade.

Undergraduates leaving the lab

Before an undergraduate leaves the lab, please ask them to read the document on things to do before leaving the lab. Remember to move the undergraduate's training certificate folder here. If you uploaded the undergraduate's CV to Google Drive at some point, please move the CV here.

Please make sure to complete all columns in the undergraduate spreadsheet. The contact details are especially important, in case we have questions about the samples they worked on.

Lab jobs

Keeping a lab running smoothly is a collective effort. Nobody can do their research on their own. The primary responsibility for managing the lab rests with me, but I need help from everyone to create a productive, efficient, cost-effective, environmentally-responsible, safe, and happy working environment. I will work closely with any salaried research associates to manage the collective resources and requirements of the lab, but to keep everything running smoothly we also have a system of 'lab jobs' for all personnel other than undergrads. There is a primary person associated with each job (the 'sheriff'), as well as two back-ups ('deputies'). The idea is that the sheriff will be in charge of figuring out the primary tasks that need to be done within each job, and generally making sure they get done. For most jobs the sheriff will be a research associate (currently, Wing), and the deputies will be graduate students. The sheriff can either do these tasks themself, or contact the deputies as their first point of contact when they need help with things. But, the deputies are not expected to be responsible for organizing these tasks. I want my students to be able to focus on their research. While I want everyone to contribute to common lab tasks, and this is essential for our group to be able to work smoothly, I don't want them to have to spend any more time on them than is necessary. The deputies will hopefully accumulate knowledge and expertise related to their lab jobs and be effective at helping the sheriff do their job (because they can't do everything themselves), but they are not primarily responsible for these jobs.

All graduate students and postdocs will initially be listed as a being a deputy on two different lab jobs. This is an attempt to spread out the workload evenly, but of course some jobs take more work than others. An effort will be made to have people do jobs that are closest to their expertise or activities that they are heavily involved in. We can continually reevaluate the jobs and shuffle people around as needed. However, we want to avoid too much job switching or people will not accumulate enough knowledge to do their jobs effectively. For instance, people can keep their jobs if they are going to be away for a few months (for fieldwork, etc). The idea behind having two deputies is to build some redundancy into the system when people are unavailable. But of course, if it doesn't make sense for someone to continue in a particular role then we can make a switch (e.g., if someone is done with lab work and won't be in the molecular lab again it wouldn't make sense for them to have a Molecular Lab job).

Assistance with research tasks

If you need assistance with a particular research task, please discuss it with me and list it on this page. The research associate will check this page frequently and come up with a plan (in conjunction with you and me) to help you with the task.

Lab space

Our molecular lab is located in N6/15 (Room 15 of the 6th floor of the North Wing) of the Stewart Biology Building. This lab includes a dedicated eDNA room. We also have lab space on the 4th floor of the South Block of Stewart Biology (currently under renovation, room numbers TBD), and research space in the Phytotron. You will require keycard access to Stewart Biology and all lab spaces. Please contact Carol Verdone-Smith to obtain this access. Please see here for information about our lab policies and protocols.

Office space

Our office spaces are in the Redpath Museum. You can obtain access to the Museum through the public entrance at the front of the building during opening hours (9am-5pm). Outside these hours you must use the side entrance on the Westside of the building (next to Leacock), and have keycard access to unlock the door. Interior doors in the museum mainly require physical keys. Please contact Caroline LeBlond or Ginette Dessureault to obtain these. My office is 303A in the Redpath Museum. All graduate students, postdocs, and research associates have office space in 207 Redpath. When desks become vacant because someone leaves the lab, the most senior member of the lab will have the option of moving to the newly open desk. If they do not want to move to that desk, the next most senior person has the option, and so on. The exception is the large desk in the Northwest corner of the office, which is generally reserved for research associates or postdocs.

The office phone number is 514-398-4086 x094758. Rowan's office phone number is 514-398-4086 x00856.

Facilities & IT services

Please contact facilities services (514-398-4555; fcc.fod@mcgill.ca) if you come across leaks, elevator problems, electrical problems, painting, carpeting, temperature problems, or you need additional locks and keys and equipment servicing. Use the Facilities and Space Management System (FAMIS) to fill out a work request and to monitor progress. You need to be connected to the McGill VPN or use a computer on campus (connected to the McGill wifi) to use the system. The website is often down, so check back regularly if the website is not working.

For non-billable repairs, you can submit a work order by phone. For billable requests, you need to send FCC an email with a description of the problem and a FAOPAL for billing. Do not forget to send the FAOPAL - not providing a FAOPAL is one of the most common reasons repairs get delayed. Please follow up with FCC on the work order regularly. It is not uncommon for work orders to be forgotten and inactivated. Keep a record of the work order number that you will receive automatically after sending them an email. You will need to provide it when following up on requests.

IT related issues need to be reported to the ICS (514-398-3398; support.ist@mcgill.ca). Any problems relating to lab and office phones need to be reported to the ICS rather than FCC.

Lab meetings & communication

Lab meetings

We have two types of lab meetings: within our own research group and a joint ‘super lab’ meeting in combination with the Hendry Lab (called DRYBAR). Normally we alternate by having a joint meeting and a Barrett lab meeting every other week during the same time slot before the CEEB departmental seminar in the Redpath auditorium.

The objective of the meetings is to share news, updates and other important information. We frequently discuss recent publications and general issues in academia. The meetings are also great for practising presentation skills, so feel free to sign up to give a presentation about a topic of your choice in the lab meeting schedule!

There are a lot of resources on how to organise efficient lab meetings. This post on How to conduct an effective regular group meeting offers some suggestions.

Individual meetings

I have weekly meetings with all graduate students, postdocs, and research associates, typically on Thursdays. These are usually 30 minutes and are intended as a general check-in so I can keep up to date on what you're doing and you can get direct feedback about anything you're having issues with. If 30 minutes is not long enough you are welcome to schedule a longer meeting for some other time during the week. Also, these meetings are not obligatory. If you're busy in the lab or with other things or just don't have anything in particular you want to talk about, it is no problem to cancel. The earlier you can inform me the better so he can adjust his schedule accordingly. Otherwise, assuming I am in town and doesn't have an unavoidable scheduling conflict, this time will always be available for you. A regular meeting time will be arranged when you start in the lab, but may shift from semester to semester depending on lab member’s schedules. My meetings with undergraduate members of the lab are by appointment, but can be as frequent as needed.

Slack

We have a Slack account for a DryBar workspace. New members should ask someone who’s already on Slack to invite them. Please join the channels that are relevant for you. You can also invite others to the workspace (e.g., undergrads), but since I need to pay for each additional member, please check with me first.

GoogleDrive

Barrett Lab GoogleDrive. Take some time to get acquainted with this. It contains a lot of useful information and is the main place where we store collective lab information. You can share access to the Drive, but please keep in mind that it is primarily intended as an internal resource and not for people outside our lab group, unless there is a good reason for them to have access. A general policy is that only current graduate students, postdocs, and research associates will have editing privileges, whereas all other users will have view-only access. Of course, if there is a good reason to give someone (e.g., an undergrad) editing privileges, this can be granted for the relevant documents.

When you upload or create new documents and folders in the lab Google Drive, it is **recommended to transfer the ownership to the PI**. This is to prevent documents from becoming inaccessible to the lab if someone accidentally removes a file or folder. Google Drive is great for tracking changes to documents and for retrieving older versions, but accidental changes to editing rights can only be undone by the owner.

If you frequently use only a small subset of the documents on Google Drive, you can create your own lab folder in your personal drive with **shortcuts** to the documents you need. Creating shortcuts allows documents to exist in multiple locations. Editing the document in one location will update everyone else's copy of the document too.

Please **avoid creating duplicate versions** of a document. This creates confusion and makes it difficult to figure out which version is more up-to-date, especially if both versions have been edited recently. If you want to create a new version of a molecular protocol with your own modifications while also keeping the original version, please rename the duplicate clearly with a descriptive name. Also, please add a paragraph at the start of the document describing the changes to the original protocol, and highlight these sections in the new version. The paragraph should also include information such as your name, date and reason for modifications.

Sharing access to GoogleDrive

1) **Always share access with new members by sending them an invitation to their email.** This can be done by going to the main folder and clicking the icon with two people next to the folder name at the top of the page. Add the recipient's email address and choose whether you want to grant the person editing rights or viewing rights to the drive.
2) **Always share access to the entire lab drive**. In other words, do not share access to individual documents or subfolders. Conflicting access rights between folders can cause documents to disappear when moved between folders. If you want to share access to an individual document with someone without sharing access to the entire drive, please download the document and send it to them.
3) **Please do not share links to the drive.** This is to manage who has editing and viewing access to the drive, and allows us to remove access from people if needed. Shareable links allow anyone with the link to anonymously view and edit (depending on the settings) and they are very difficult to manage.

Google Calendar

You can view the Barrett lab calendar using the public URL. Please ask someone in the lab to add your gmail account to the calendar to give you permission to edit and add events. The calendar can be viewed and edited when opening your own personal google calendar. If it's not visible, select 'Barrett lab' from the list called 'Other calendars' to the left.

Contact details

Please make sure your contact details are up-to-date in the Barrett lab contact sheet. Please also check that the contact details of any undergraduates you are working with are included on the list.

Barrett lab email listserv

To get on the listserv, email LISTSERV@LISTS.MCGILL.CA with SUB BARRETTLAB in the body of the email (not the subject). I will then get a message to approve the request. Or just email me and ask to be put on. You can then send messages to all lab members using the address BARRETTLAB@LISTS.MCGILL.CA.

Other mailing lists & listservs

We have a listserv for the molecular lab and the eDNA lab. Please make sure you subscribe to these lists if you use the lab spaces. Instructions on how to use listservs can be found here and here. Instructions for the listserv owner can be found here. Also, here's the link for setting up a new listserv.

There are a lot of other emailing lists and listservs in the department. Please check this spreadsheet to make sure you are on all the lists that are relevant to you.

Email practices

The unit of email is often three. If you write to someone to ask them a question or request help with something, and they reply, it is good to send a response to their message (typically to thank them), regardless of how brief. This is not only good manners, but simply provides a confirmation that you received their email. I am surprised by how often people request things from me, I take the time to respond and help them, and I never hear back from them again.

Seminars, conferences & workshops

Departmental seminars

The Biology Department hosts three different weekly seminar series:

- The Organismal Seminar (Conservation, Ecology, Evolution & Behaviour, CEEB)
- The Molecular Seminar (Molecular, Cellular, and Developmental Biology, MCDB)
- Neurobiology and Behaviour Seminar (NBB).
- Upcoming PhD thesis defenses are advertised here.

If you would like to suggest someone as a speaker for the organismal seminar, please add their name to this spreadsheet.

Conferences

- Quebec Centre for Biodiversity Science (QCBS) Annual Symposium
- American Society for Microbiology (ASM) Microbe
- Ecological and Evolutionary Genomics - Gordon Research Conference
- Ecological Society of America (ESA)

Workshops

- Centre for Advanced Computing (CAC) workshops
- Compute Canada (CC) workshops
- Data Carpentry genomic data processing course
- Bioinformatics workshops

Data management & computing

Open science & data accessibility

We strive to be an open science lab. Open science is an umbrella topic that ties together the following:

- **Open access.** Anyone can read the published science.
- **Open educational resources**
- **Open source.** Using for example R and python instead of paid software.
- **EDI**. People can access science regardless of their background and circumstances.
- **Open data.**
- **Citizen science & community engagement**

Open science & data accessibility document written by Ananda.

Data management

Back up your data! Backup protocol written by Ananda.

Data Science Solutions Hub (DaS2H): https://www.mcgill.ca/cdsi/solutions offers advice on applied statistics, computing methodologies and data analytics for ongoing research, study design, preparation of grant proposals, etc. for the McGill research community.

Network-Attached Storage (NAS)

Access the Barrett lab NAS through McGill VPN (https://barrettlab.synology.me:5001/) or through the Synology server (http://quickconnect.to/barrettlab). The transfer speed is quite limited through the Synology server, so it's better to use the McGill VPN if you're transferring a large amount of data. Instructions on how to transfer files between the NAS and ComputeCanada cluster can be found here.

High Performance Computing

We have access to High Performance Computing (HPC) resources hosted by Compute Canada. Each fall, our lab applies for priority access for storage and computing resources for researchers through the Resource Allocation Competitions (RAC). Instructions on how to use the additional resource allocations can be found here.

Instructions on how to obtain an account can be found here. You will need the CCRI, which is **xpa-194-01**. The main clusters we work with are Cedar, Graham, and Beluga. Instructions on how to use them can be found here. Compute Canada also has a wikipage where you can find plenty of information on how to use their services:

- Using your resource allocation
- Resource Allocation Projects (RAP) and managing RAP members
- Scheduling compute jobs

- Running jobs
- Available software
- Technical support

IMPORTANT: please clear any files and directories from the cluster that you don't need! Compute Canada has a fixed limit of 500k files for home directories. Once we approach the maximum storage capacity, we won't be able to install new packages. Strategies for reducing the number of files can be found here.

Codesharing & GitHub

We have a lab GitHub account (**barrettlabecoevogeno**) to help us share our scripts and collaborate more effectively. You can read how to contribute your own code and use the repositories here. Github: The general policy is to work on your own personal GitHub page and link it to the lab page when the work is published. You can also work on the lab page if needed. GitHub is free for students. Read more about student access here.

- Ten Simple Rules for Taking Advantage of Git and GitHub by Perez-Riverol et al. 2016
- Good enough practices in scientific computing by Wilson et al. 2017.

VPN

When you are not connected to the McGill network, you must use the VPN to access McGill restricted sites and resources. Instructions on how to access the McGill VPN can be found here.

Purchasing laptops

All laptops must be purchased through the McGill Computer Store due to contracts between the institution and the supplier. Please contact Institutional Sales (is.bookstore@mcgill.ca) to inquire about availability of the model you are looking to buy. Most Apple Macbooks are available through them. After you have chosen a model, IS will create a quote for you to review. If you are paying with a FAOPAL, the order must be placed on McGill Marketplace. Log in to MMP to create a requisition for a non-catalog item. Detailed step-by-step instructions can be found here. The vendor is listed as *McGill Bookstore and Computer Store* on MMP. Attach the quote prepared for you to your requisition and enter the total amount including taxes. All purchases are final. Any item that is dead on arrival (DOA) will be replaced.

Molecular laboratory safety & training

Our molecular lab is located in N6/15 (Room 15 of the 6th floor of the North Wing) of the Stewart Biology Building. This lab includes a dedicated eDNA room. We also have lab space on the 4th floor of the South Block of Stewart Biology (currently under renovation, room numbers TBD).

Safety

General safety

Please refer to McGill's Lab Safety Manual about any questions regarding safety. Please also check Marco's notes on general lab safety. Also, be aware of the lab safety responsibilities of laboratory directors, laboratory personnel and visitors.

In case of an emergency or immediate danger, call **911**. The emergency procedure summarises what to do in various scenarios (fire, chemical spill, elevator emergency, etc.). You can contact McGill Security services for general inquiries (514-398-4556) as well as emergencies (514-398-3000).

The lab phone numbers are: 514-398-7154 and 514-398-4120 (currently not working - repair requested in Sept 2022).

Inspection

Please make sure the lab is kept clean and that safety regulations are followed at all times. This will help us pass an unexpected safety inspection. Please refer to the inspection checklist regularly to assess the state of the lab.

Fire extinguisher

Everyone working in the lab should know how to use a fire extinguisher. Instructions on how to use a fire extinguisher can be found here. You can also sign up for fire extinguisher training by emailing the Fire Prevention Office. The fire extinguisher needs to be checked at least once a year. Please follow the instructions on McGill's website on how to check whether the fire extinguisher needs maintenance.

Eye wash station

There is an eye wash station directly in front of the entrance door, next to a sink. The station needs to be tested weekly, to be recorded on the attached sign in sheet.

Emergency shower

The nearest emergency showers are located at the end of the N6 hall behind the elevators.

PPE

Appropriate personal protective equipment (PPE) must be worn at all times in the lab. Gloves, lab coats and long pants are mandatory regardless of whether you are doing experiments or not. Shorts and skirts should never be worn in the lab.

Gloves

- **Gloves are mandatory in the molecular lab**, even when you are not doing experiments!
- Not all gloves offer suitable protection against the materials we handle in the lab. If you are unsure which type of gloves to use, check out this glove comparison chart.
- In general, **nitrile gloves** give good protection against most chemicals, but not all. For example, nitrile gloves provide limited protection against alcohols and ketones (such as acetone). Check the nitrile glove chemical compatibility reference in Google Drive for more information.
- If you're handling solvents, wear a pair of **latex gloves** on top of nitrile gloves.
- Before leaving the lab, always remove your gloves and wash your hands.
- Do not wear gloves outside the lab in hallways, offices, elevators and restrooms.
- The keyboard and computer are no-glove areas in the molecular lab.
- **Cryogenic gloves** should be worn for handling samples at -80°C and heat resistant gloves should be worn for autoclaving.
- **Soiled gloves** can contaminate objects and surfaces and increase the risk of exposure to hazardous chemicals. When this occurs, you can unknowingly be exposed to chemical hazards and develop health symptoms. Determining which chemical was the source of the exposure can be difficult, which is why labs should do their best to minimise cross-contamination. To reduce the risk of cross-contamination, **change gloves immediately after each chemical-handling task**. **Never reuse disposable nitrile gloves**.

Footwear

- If you work in the lab frequently, keep a pair of **closed-toe shoes** in the lab specifically for lab work.
- **No flip flops, sandals, or open heel shoes are allowed** in the lab!
- If you do not have a pair of lab shoes, please use **shoe covers**. We have a shoe rack in the lab where you can keep your lab shoes.
- The top two tiers of the shoe rack are dedicated for lab shoes and the bottom tier is for outdoor shoes (to prevent dirt and water from soiling the lab shoes, especially in the winter).

Lab coats

- Knee-length lab coats must be worn in the lab at all times.
- McGill has a lab coat laundry service (please do not wash lab coats at home - they may have hazardous chemicals on them that could cause contamination and get into waterways).

Eye & face protection

- Use goggles, safety glasses with side-shields, face shields and surgical/procedural masks as necessary.

Training

Before using the lab, you must be trained in-person by the lab manager/technician about the general safety practices and other important aspects of working in the molecular lab. After training, please complete the Laboratory Safety Orientation Checklist and return it to the lab manager/technician.

In order to work in the lab, you must complete all the relevant safety training:

1. WHMIS 2015. WHMIS-2015 training is required for graduate students working in wet labs, as well as undergraduate students performing special research projects, participating in the

Summer Undergraduate Research in Engineering (SURE) program and/or internship or co-op projects where hazardous materials are used.
2. Hazardous Waste Management
3. Biosafety training

Please upload your e-certificates in your personal folder on Google Drive once you have completed all mandatory training. If you do not have a folder yet, please create one. Certificates will usually be emailed about four weeks after the course. Instructions on how to access your old training records cna be found here.

Safety training courses are usually **valid for 3 years** after which they **must be renewed in order to keep working in the lab!** Once you (or an undergraduate who worked with you) leaves the lab, please move the e-certificates to the folder for ex-lab members.

First aid training

If you're interested in taking first aid training, please sign up here. The course offered by McGill is free for employees. The course costs $128.80 for students, but Rowan has expressed that he is willing to cover the cost if a student in the lab wants to take the course.

Rules

- **No food or drink in the lab ever. This includes water bottles!**
- **Wear gloves**, a **lab coat** and other necessary **PPE** at all times. The only exception is the Barrett lab computer area - no gloves should be worn here.
- **No open top / open heel shoes in the lab.** Please keep a pair of appropriate shoes in the lab specifically for lab work. The top two tiers of the shoe rack are dedicated for lab shoes and the bottom tier is for outdoor shoes (to prevent dirt and water from soiling the lab shoes, especially in the winter). Alternatively, you can use shoe covers - we have some in a container next to the shoe rack.
- **Do not wear lab coats, lab shoes and gloves outside** the designated **laboratory area**.
- **Wash your hands before leaving the lab, even though you wear gloves!** Use the pedal under the sink to avoid touching the tap. Hand washing reduces the risk of contamination of toxic chemicals and biological agents outside the laboratory. It also protects you from contamination, as gloves do not always provide full protection from hazardous materials.
- **Do not apply cosmetics** (makeup, lip balm, lotion, etc.) in the lab.
- **Keep work surfaces clean.** This includes the sink!
- **Clean up after yourself.** Empty waste buckets, clean equipment, wash up your glassware and disinfect the bench. Leave the work area clean for the next user!
- **Drop off EHS biohazardous waste boxes when full**. Joe on the 3rd floor can show you where and how to do it. Pick up a new box, set it up and fill out the contact info on the sides before using it.
- Label all deliveries you receive as follows:

    - **lab name** (Barrett)
    - **date received** (e.g. ‘Rec. January 2019’)
    - **date opened** (e.g. ‘Opened 15 April 2019’)
    - N.B. Please avoid ambiguous date notation. For example, 12/1/20 could be interpreted as ‘20 January 2012’ or ‘12 January 2020’.

- **Dispose your chemical waste correctly**. You are responsible for the correct disposal of the waste you generate. Follow the instructions on the side of the fume hood. Aim to reduce the amount of chemical waste produced as much as possible and substitute harmful chemicals with safer alternatives whenever you can. Only use EHS containers for your chemical waste.

- **Contribute to the general maintenance of the lab:**

    1. Check if the eyewash has been tested this week. If not, check that it works and update the label with your initials.
    2. Remove all dry items off the drying rack and put them where they belong

- **Leave the lab cleaner than you found it! :)**

Good laboratory practices

- Keep a lab journal. Recording detailed notes regarding experiments and lab work helps with trouble-shooting. Documentation of your work also acts as proof of having completed the work.

- Use sample datasheets for recording sample IDs, extraction dates, PCR results, etc. Share it with the PI or other people who may need to work on the same samples.

- Be mindful of others running experiments at the same time. You may need to coordinate with others to use popular equipment and work stations.

- Before graduating or leaving the lab, make sure you complete the molecular lab part of this checklist. Please note that the section regarding the molecular lab can be completed when you no longer expect to do lab work.

- We have a limited amount of drawers in the lab. To keep things fair, each lab user should only have one personal drawer. If you do not expect to do lab work in the next 6 months, please empty your drawer so that an active lab user has somewhere to store their things.

- Whenever you come into the lab, please check if the drying rack above the sink needs emptying. The drying rack is not meant for long-term storage. Move any dry bottles, flasks, cylinders and gel parts to their appropriate places. Try to make this a habit, so that there’s space to dry tube racks and beakers you wash up after experiments. If you don’t know where something belongs, please ask.

- The eye wash needs to be checked once a week. When you come into the lab, please check if it has been tested. Pull the eyewash slowly to avoid flooding the desk and write down your initials on the eyewash card.

- We have some complicated and delicate equipment in the lab. If you are unsure how to use a piece of equipment correctly, **ask someone**.

Lab sustainability

Research laboratories are some of the most resource intensive environments. The energy and water consumption is significant compared to regular office spaces. Ventilation, fume hoods, freezers, autoclaves, water baths, incubators and other specialised equipment use considerable amounts of energy. Please follow the following rules to reduce our lab's ecological footprint:

- **Cold units**. Labs frequently store samples at lower temperatures than necessary. The colder the unit, the more energy it requires. All samples that can be stored at RT, should be stored at RT. Only use the ultralow freezer for samples that cannot be stored in the fridge or the -20.
    - **Defrost and clean the condensers** regularly for more efficient cooling and to extend the lifespan of the unit. More information can be found here.
    - **Avoid constantly opening the freezer doors** and minimise the amount of time they're kept open.
    - **Keep cold units organised and the inventory up-to-date**. Clear out samples before defrosting. An organised cold unit minimises the time taken to find samples and keeping the door open.
- **Fume hood.** Always close the sash after use and work with the sash as low as possible. This reduces the energy consumption of the fume hood and minimises your exposure to hazardous chemicals.
- **Autoclave**. Autoclaves use considerable amounts of water and energy to pressurise and heat up the chamber. Avoid autoclaving just a few items. Communicate with other lab members to consolidate loads.
- **Turn off equipment after use**. Do not leave any heating units on after use (water baths, heat blocks, incubators). This is both a sustainability issue as well as a safety issue. Take out your PCR products from the thermocycler after use - the thermocycler is not an energy-efficient fridge.
- **Order only what you need**. Many reagents and chemicals have a short shelf life (6-24 months). Be realistic about how much you need and the timeframe for your lab work. Ordering large volumes often turns out to be more expensive and wasteful if the items are not used up in time. To avoid double orders, communicate with others when placing an order for a commonly used reagent.
- **Share chemicals.** If you only need a small amount, check MyLab's shared chemical inventory to see if another lab might be able to lend you some. Keep the inventory up-to-date and delete any items that you have used up. Substitute harmful chemicals with less hazardous alternatives whenever possible.
- **Turn off the lights when you leave the lab**. This also indicates that the lab is empty in case of an emergency.

Sustainability in the field

- **Permits.** In the planning phase of your research, keep in mind sustainability issues when preparing animal use protocols and applying for collection permits:
    - **Specimen numbers**. Do not collect more samples than you need! Not only is this ethically questionable, but leftover samples often end up taking up space in cold units wasting energy indefinitely until someone someday *might* process the samples.
    - **Share samples.** Collaborate with other researchers to study as many tissue parts and aspects of the specimens that are collected.
    - **Substitute harmful substances.** For example, use clove oil instead of MS-222 for anaesthetising or euthanising fish.

- **Transportation.** Some of the highest carbon emissions from our research are likely to be caused by the transportation required to reach our field sites. We may not be able to eradicate the carbon footprint entirely, but there are ways to reduce our overall emissions:
    - **Air travel.** Try to book direct flights whenever possible. Routes with multiple layovers are more likely to have higher carbon emissions. Minimise the number of trips by staying for a longer period in the field at a time.
    - **Carpooling**. When accessing field sites by car, try to minimise the number of vehicles used.
    - **Community engagement**. Recruit local technicians or volunteers to participate in the fieldwork to reduce the number of personnel that need to fly to the fieldwork location. This is also a great way to incorporate outreach in your work and an opportunity to learn local knowledge about the habitat and/or study system. Local people are also a valuable asset when encountering cultural or linguistic barriers in the field.

- **Disturbance.** Working in the field can cause various types of disturbance to the habitat, wildlife and local people:
    - **Vegetation.** Accessing field sites sometimes involves traversing dense or delicate vegetation. Retrace your entry to the field site to minimise destruction of plants.
    - **Soil erosion.** If accessing sites after heavy rain fall or snowmelt, try to step on more durable surfaces (such as rocks) to prevent paths from becoming wider. Avoid creating multiple new paths.
    - **Noise & light**. Avoid loud music and bright lights in habitats where it might affect the wildlife and/or local people.

    - **Culture**. Keep in mind that we are visitors representing the university and scientists when we conduct fieldwork. Be respectful of local people and their customs!

- **Waste & Recycling.** Waste management and recycling practices vary between countries. Many places lack recycling and sophisticated waste management altogether, so it's good to check in advance what the local customs are beforehand:
    - **Recycling.** Find out before your trip if recycling exists, what the local sorting rules are and where recycling stations are located.
    - **Reusable materials.** Avoid single-use items whenever possible. Look into cleaning and sterilisation methods of equipment in advance.
    - **Hazardous waste.** Find out where you can dispose of hazardous waste and empty chemical containers beforehand.
    - **Leave no trace.** When in the field, pack all your trash when you leave and be careful not to drop anything on the way!

Submitting samples to the McGill Genome Center (MGC)

Before submitting a job request

MGC has specific requirements for what type of tubes/plates they accept for different types of sequencing, as most of their workflows involve the use of specialised liquid handling robots that are only compatible with specific materials. To avoid delays in sample submission, make sure that we have the right tubes/plates in stock. Always check the latest version of the sample requirements guide to verify what you will need. Consult the lab manager about stock and storage location for plates and tubes, and if we don't have what you need, place an order as soon as possible. Deliveries can take a long time, especially if the item is backordered. Communicate with the lab when ordering supplies, to avoid having multiple people ordering the same item twice.

Creating a job request

When submitting a project to McGill Genome Center, please use MGC's online submission system at hercules.genome.mcgill.ca. The user guide can be found here. You need to know how many samples you will submit, what type of sequencing, etc. After creating a request, it usually takes about three days to receive the quote.

Filling out a sample manifest

After receiving and accepting the quote, you need to fill out a **sample manifest**.

Creating a PO number

You also need to enter a requisition on MMP to generate a PO number. This can take a few days. You then need to submit the PO on Hercules to get the waybill (usually takes a few minutes or hours).

N.B. Although MGC sequencing services are not taxable, taxes are added automatically when a requisition is created on MMP. Once MGC invoices, they only invoice the amount without taxes. This means that there is a leftover commitment on the research fund that needs to be liquidated. After the invoice has been submitted and paid, the remaining amounts should be liquidated by using this form.

Preparing samples for submission

Follow the instructions in the sample requirements guide carefully regarding materials, volumes and concentrations! Make sure you use the latest version of the guide, as MGC sometimes changes its requirements for sample submission. The version is written in the bottom right corner of the document.

Measure your concentrations on the Tecan SPARK by using PicoGreen for DNA and RiboGreen for RNA. Do not trust NanoQuant readings, as the instrument gives very rough estimates which are frequently highly variable. Adjust the concentrations of your samples to correspond to the MGC requirements by diluting them (if the concentrations are too high) or by using the SpeedVac on the 5th floor (if your concentrations are too low).

If you are submitting your samples in plates, make sure you use good quality seals to minimise evaporation. Aim to plate your samples no more than a day before dropping them off to avoid evaporation over time which will affect the volume in each well.

Dropping off samples

MGC is located on campus, so you can drop off your samples on the 7th floor in the sequencing lab (turn left at the elevators and ring the doorbell). Print out the waybill and place it in a ziplock bag with your samples. To keep your DNA samples cold, use a polystyrene box with some ice packs. RNA samples are safest transported on dry ice. Adjust the amount of ice depending on the outside temperature (add more ice in summer months when it's hot).

Sample storage

- *Add information on storage recommendations for tissue samples, DNA and RNA.*
- *Carefully label all your samples.*
- *Whenever possible, keep samples and reagents separate to avoid contamination.*
- *Samples in flammable storage solutions should not be kept in the fridges and freezers.*
- *Cold storage is very energy-consuming, so only store samples at low temperatures when necessary. All samples that can be stored at room temperature (RT), should be stored at room temperature.*

The fridges and freezers require regular maintenance. Instructions for cleaning the condensers and defrosting can be found here.

DNA and tissue storage: https://evol.mcmaster.ca/~brian/evoldir/Answers/Tissue.storage.answers

Biohazardous samples inventory needs updating!

Cold storage

Fridges

We have a small 4°C fridge for reagents in N6/15. Corrosives that need to be stored at cool temperatures can be stored in the plastic box (spill tray) on the bottom shelf of the small reagent fridge.

We also have a large 4°C fridge for samples that we share with the Cristescu lab (the left side is for the Cristescu lab and the right side is for the Barrett lab). The cooling mechanism of the large 4°C fridge relies on airflow. Impeding the circulation of air can lead to erratic temperatures and overheating. Do not overfill the fridge, especially the top shelf. Leave plenty of clearance between the shelves (do not stack items too high) and distribute the load evenly, when possible.

Freezers

We have two -20°C freezers in N6/15: a large one for samples and a smaller one for reagents. We also have an additional sample freezer in the hallway on N7 due to the lack of space and power outlets on the 6th floor. The general rule is to store items that aren't actively used in the lab in the N7 freezer, in order to free up space for active projects in the lab. Only store items in the freezer that cannot be stored at room temperature or in the fridge.

Ultra-low freezer

Please keep this unit organised. All samples must be fully labelled according to the instructions on the fridge. Only use cryogenic boxes, as many plastics are prone to degradation at extreme temperatures. Loose tubes, tube racks, ziplock bags and polystyrene boxes are forbidden.

Personal boxes

Everyone who is actively working in the lab has their own box for storing items in the large sample fridge and the -20°C sample freezer. Please let the lab manager know if you need a box.

Chemical & reagent storage

Labelling

All reagents must be labelled with the date it was received and the date it was opened. This is crucial in order to keep track of expired reagents. All solutions made in the lab must also be labelled with your name, date and the complete chemical names and concentrations.
Please note that we're an international lab and date notation varies between countries, so please write out the name of the month and the full year. For example, 12-2-21 could be interpreted as 12 February 2021 or 21 February 2012.

Corrosives

All corrosive substances need to be stored in the yellow cabinet found in the Cristescu lab area. The top shelf is for the Cristescu lab and the bottom shelf is for the Barrett lab. Corrosives that require cold storage can be stored in the small fridge under the PCR machines in a corrosive resistant tray.

Only store compatible corrosives together. For example, acids and bases can react together violently. Do not store them beside each other. Use corrosion-resistant trays to contain spills or leaks. If you notice damaged containers or leaks in the cabinet, it is your responsibility to notify about the problem!

Flammables storage

All flammables need to be stored in the flammables cabinet underneath the fume hood. The right side is for the Barrett lab and the left side is for the Cristescu lab.

Ordering & receiving reagents

There are three steps to ordering items for the molecular lab:

1. Place the order on McGill Marketplace (MMP). Please check the instructions on how to place an order or request a PO on MMP.
2. Write down what you've ordered in the 'New orders' tab in the Barrett Lab Orders spreadsheet. Try to fill out all details.
3. When you receive the items, move it to the 'Completed orders' tab in the spreadsheet. Please also read the instructions for receiving orders for the molecular lab carefully.

Ordering Supplies to an address outside of McGill University (i.e. to collaborators abroad)

1. Contact the vendor directly before making an order to ensure that they can send an order to a foreign address, using the existing Canadian (McGill-based) account.
2. MMP will not let you change the shipping address directly so follow all instructions above.
3. Include a note in "internal notes to vendor" as to where they should ship the order. Be sure to state " Do not ship the order to the listed shipping address (i.e. McGill University)".
4. Once a PO is made, contact the vendor directly to ensure that they are shipping the package to the correct address.

*Note, this is a very messy process. Some vendors will require you to make a new account.

MyLab

MyLab is an electronic inventory for hazardous materials used by research laboratories at McGill. Instructions on how to use MyLab can be found here. You can either log in with the lab's username, or with your McGill email and password. If you cannot log in with your personal credentials, contact myLab.ehs@mcgill.ca cc'ing Rowan.

There are two types of accounts for accessing MyLab. Full Access accounts can view and modify the full inventory and SDS documents. Read Only accounts are generic user accounts for the laboratory that allow multiple users to use the same account to view the full inventory and SDS documents.

You can also request hazardous waste pickup through MyLab.

UPDATE: Individual access credentials are no longer used to access the new version of myLab, instead EHS provides the following:

1. *Access to the SDS sheets at the following URL: https://chemmanagement.ehs.com/9/E037E8C6-8E23-44FF-81A5-45B498C395BE (accessible from anywhere, no password required)*
2. *Access to a report of your current inventory (read-only) at the following URL using the password we have generated for you: https://mylab.it.mcgill.ca/EHSA/public/reportmenupublic/reportmenuindex?menu=ChemReadOnly (accessible only via McGill Campus Networks or VPN), password: 133173*

As you will be providing these access credentials to individuals in your lab requiring read-only access to your inventory: It is very important that these credentials are not shared outside of your laboratory, and that they are not posted in public spaces or on publicly accessible websites.

Chemicals & Waste management

It's important that all chemicals in the lab are properly stored, handled and disposed of. Proper storage involves having a dedicated storage area for different types of chemicals. Safe handling means that appropriate PPE is always used and handling of hazardous chemicals is restricted to fume hoods. Proper disposal of chemical waste involves following the EHS guidelines.

If you witness improper storage, handling or disposal of chemicals by another lab member, please bring this to their attention. Many people develop careless lab practices over time, which is why the primary person responsible for rectifying unsafe laboratory practices is the person witnessing it.

Chemical storage

Storing chemicals correctly is essential to maintaining a safe laboratory space. In the molecular lab, never store chemicals above eye-level and avoid overcrowding shelves.

All incompatible chemicals should be segregated according to hazard class. For example, we have separate storage cabinets for flammables and corrosives in the molecular lab. Bleach should be stored in the cupboards underneath the sink away from other chemicals. A non-comprehensive list of incompatible chemicals and a table of basic chemical segregation recommendations can be found on Google Drive. Fisher has also put together a useful Chemical compatibility poster.

Physical contact is not always required for chemicals to react. Chemicals can seep or leak from open or damaged containers and react with nearby reagents. Always close caps firmly to prevent chemicals seeping out of containers into the air (that we breathe!). Wipe off any minor external leaks that may have occurred during use before placing a container back in its storage place. Use spill trays for harmful or highly reactive chemicals in case of accidental leaks.

Always make sure that the chemicals are **labelled** and have the **relevant hazard warnings** on them. If a label has worn off, you must replace it with a new detailed label.

All chemicals need to be updated in MyLab when depleted or re-stocked. Instructions can be found here.

All chemicals should be labeled and dated upon receipt and when opened for the first time. This is especially important for peroxide-forming chemicals (e.g. isopropanol, ethers, dioxane and tetrahydrofuran). Solutions also need to be clearly labeled and dated when prepared. Label all new reagents you receive with the following information:

- **your first name** (if the reagent is for you)
- **date received** (e.g. 'Rec. January 2019')

- **date opened** (e.g. ‘Opened 15 April 2019’)
- **lab name** (Barrett)
- N.B. Please use unambiguous date notation to avoid confusion. For example, 12/1/20 could be interpreted as ‘20 January 2012’ or ‘12 January 2020’.

Chemical handling

Perform all steps involving hazardous chemicals inside the fume hood. Only work with materials once you know their flammability, reactivity, toxicity, safe handling and storage and emergency procedures. This information can be found in the material safety data sheets (MSDS).

Wear appropriate PPE. Use a lab coat to protect from spills and goggles for eye protection against sprays. Choose the appropriate type of gloves depending on what chemicals you are working with. Nitrile gloves are excellent for general use. Latex gloves give good protections against biological and water-based materials, but give poor protection against solvents and chemicals. You can always wear double gloves to increase the thickness, or you can wear two types of gloves to get the benefits of both materials.

Change gloves immediately after each chemical-handling task. Soiled gloves can contaminate surfaces and you can unknowingly expose yourself or others to chemicals with adverse health effects. Determining which chemical was the source of the exposure can be difficult, which is why labs should do their best to minimise such contamination. Never reuse disposable nitrile gloves. Before leaving the lab, always remove your gloves and wash your hands. Do not wear gloves in hallways, offices, elevators and restrooms. Also, please note that the computer area is a no-glove area in the molecular lab!

Sometimes accidents happen. Report any accidents or dangerous incidents ("near-misses") promptly to the principal investigator. EHS also requires accidents to be reported through the EHS Service Desk Portal.

Fume hoods

Perform all procedures that involve hazardous chemicals in the fume hood. Chemical fume hoods are ventilated enclosures that usually vent separately from the building’s ventilation system. They are able to capture and exhaust even heavy vapours. **Do not use biosafety cabinets for handling hazardous chemicals** - they are not designed to capture chemical vapours and will not protect you from fumes! You might also end up damaging the BSC. More information on BSCs can be found here. Also, **do not use PCR hoods for handling hazardous chemicals.** These laminar flow hoods push the air towards the user to minimise contamination of products inside the hood. For more information on PCR hoods, click here.

For safe and efficient use of the fume hood, only keep materials needed for ongoing experiments inside the hood. Clutter will disturb the airflow and reduce the efficiency of the equipment. When it is necessary to keep a large apparatus inside a fume hood during an experiment, it should be placed upon blocks or legs to allow air to flow underneath.

Operate the hood with the sash as low as practical. Work as far into the hood as possible (a minimum of six inches). Do not lean into the hood, this disturbs the air flow and also places your head into the contaminated air inside the hood.

Fume hoods use a lot of energy. Always close the sash when the fume hood is not in use.

Chemical spills

Universal spill kit with instructions is located on top of the large cupboard by the entrance.

Chemical waste disposal

Every user of the molecular lab is responsible for disposing of the chemical waste they produce. Unused or unopened chemical waste can be disposed of in their original container (assuming they have not been removed and poured back in). All other waste must be disposed of in containers provided by EHS.

EHS provides containers for different types of waste. The yellow containers (10L) are for corrosives and the white containers are for solvents (available in 10L and 20L). You can pick up an empty container from the 3rd floor in N3/17. Ask Joe at the receiving for the key and he will show you where to find the containers if you are picking one up for the first time.

Only mix compatible chemicals in a waste container. A chart of incompatible chemical groups can be found here. You can check the category of the reagents in the safety data sheets. Use separate yellow containers for basic and acidic corrosives. Fill out the tag on the container completely without using abbreviations for chemical names. Never fill the container above the top line. Do not store chemical waste containers in labs indefinitely - dispose of any waste as soon as you are done with your work, even if you have only accumulated a small volume. Bring the waste back to N3/17 and sign the log sheet at receiving. EHS picks up the waste weekly and will not accept any other containers than the white and yellow ones.

Disposal of tips used with hazardous chemicals

Tips that have been in contact with hazardous chemicals - instructions can be found on the side of the fume hood.

Reusing chemical bottles

When reusing old chemical bottles, make sure the container is properly rinsed and relabeled. All waste must be compatible with the original contents of the container. Also, make sure the composition of the container is suitable. For example, acids and bases corrode metals, hydrofluoric acid corrodes glass and solvents can degrade plastics.

Ethanol

The only place to buy medical grade ethanol (i.e. non-denatured ethanol that doesn't contain additives like benzene), is through the Goodman Cancer Institute's BioBar. Fill out this form. You will need the full FAOPAL string to complete the form (ask Wing or Rowan). Orders are processed twice a month and new requests must be submitted by the 2nd and 4th Thursday of the month by noon. Orders sent later will be processed on the next ordering date. You will receive an email when your order is ready for pick up. This can sometimes take up to a month, so please place your order early. The pick up location is room 106 on the ground floor of the Goodman Cancer Research Centre. The room is a bit tricky to find, you basically need to go to McIntyre's loading dock and walk through to GCI and turn left. If you have questions, please contact the GCRC Biobar at 514-398-6986 or email etoh.med@mcgill.ca.

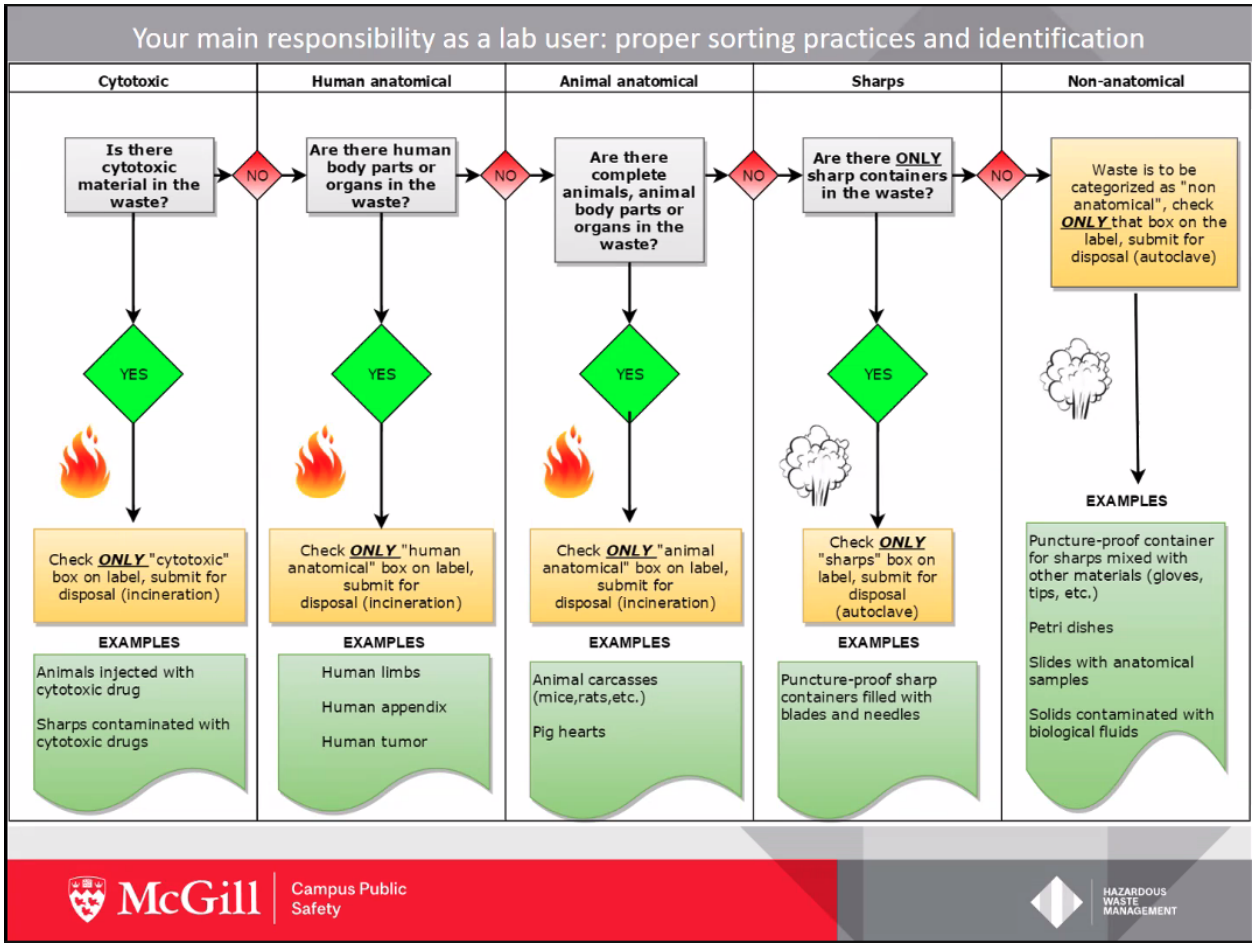
Whenever you pick up ethanol, add the volumes to the Ethanol log sheet. This is to keep track of ethanol purchases and consumption in labs. Also, whenever you use ethanol in the lab, write down how much you have used. The log sheets are subject to inspection and monitoring, so please keep them up to date!

Biohazardous materials

Biomedical waste regulation differs between provinces in Canada. In Quebec, there are three main types of biomedical waste:

1) Human anatomical waste - body parts or organs (excluding teeth, hair, nails and biological liquids)
2) Animal anatomical waste - carcasees, body parts or organs (excluding teeth, hair, claws, feathers, blood, etc)
3) Non-anatomical waste - biological tissue, vell cultures, microbial cultures or materials in contact with such materials

Biohazardous waste needs to be either incinerated or steam sterilised (autoclaved). These practices have high emissions and use lots of energy. It is therefore important to identify lab waste accurately to reduce the amount of non-biohazardous materials ending up in the hazardous waste stream. We also do not want to end up with contaminated waste in the recycling system! Below is a chart to help with sorting:



No waste can be recycled from tissue culture rooms!

15% of containers (identified contents) sent for incineration in Maryland, Baltimore. Steam sterilisation is done somewhere closer.

Biowaste is the largest hazardous waste stream at McGill!

- 35% incinerated (Baltimore, Maryland). 65% sterilised (Ontario)
- Aiming to reduce volume by 80% by shredding, shifting to onsite treatment.

Regular waste limits pH 6-10 (can go down the drain). Neutralize, rinse and recycle the container.

It is the labs responsibility to make sure items placed in the recycling are non-hazardous! Materials can be recycled despite having been in contact with non-WHMIS items:

- TBS
- PBS
- Tris-HCl
- HBBS
- Unused culture media
- MOPS
- HEPES
- Sugars
- Amino acids, etc

What are biohazardous materials + required training + biosafety manual

Place pipet tips in small plastic bags and label plastic type on the outside.

The PI needs to submit an application form before starting new projects involving biohazardous materials. Requests are usually approved in 7 working days. The application must be renewed annually by filling in this form and a new application must be submitted every 5 years. More information about the application process can be found here.

Biosafety cabinets

Biological safety cabinets should be used when working with biological materials that can liberate infectious particles and aerosols. They also minimize contact between the operator and biological materials through the use of directional inward airflow, a physical barrier and HEPA filtration. The class of the BSC

BSCs are ineffective against gases, so **do not use BSCs with hazardous chemicals**. Most models recirculate air back into the laboratory and the hazardous chemicals can damage the HEPA filters.

Disposal of animal carcasses

Please contact Hazardous Waste Management (hwm@mcgill.ca) for the disposal of anatomical parts and odourous carcasses from Stewart and Redpath, especially dead fish. Do not dispose smelly things in the anatomical waste drums on the third floor in Stewart. Someone will pick up the waste directly from the lab to prevent odour from accumulating in the biowaste room.

Only dispose of sealed, double-bagged, non-odorous, dry anatomical parts in the biowaste drum on the third floor of Stewart Biology (ask Joe for the key).

eDNA lab

The eDNA room is only for low-copy DNA projects which are **highly sensitive to contamination**. **You must be trained before being allowed to access and work in the eDNA room!** Please read the rules of the eDNA room before training.

Rules:

- The eDNA room is only for **pre-PCR eDNA samples**.
- **No tissue or bulk samples** should be taken into the eDNA room.
- **PPE:**
    - **Shoe covers are mandatory**, unless you have a separate pair of shoes for the eDNA room.
    - **Only use eDNA lab coats** in the eDNA room. Place your named lab coat in the hamper once every two weeks for washing.
    - **Always change your gloves when you enter the eDNA room** from the main lab.
    - Wear a **hairnet** and **face mask**.
- **Researchers should not work in the main molecular lab* before working in the eDNA room.** This is to prevent PCR amplicons from contaminating the space.
    - *Other places where PCR amplicons may be present at high quantities include other labs and for example McGill Genome Centre. You may only enter the eDNA room after working in the main molecular lab or other similar spaces if you have showered and changed shoes and clothes first.
- Order separate reagents, tips, paper towels, PPE, equipment, etc., for the eDNA room. These should not be shared between the labs, so make sure you have sufficient stocks before you start a project.
- **Only use filter tips**.
- Keep a **separate eDNA notebook** in the lab - do not move it around between labs. Disinfect the notebook with bleach when bringing it to the lab for the first time.
- **Do not dispose gloves in the yellow bin!** We've received complaints about this. Gloves fill up the yellow bin very fast and we pay for disposal by weight.
- **Clean all surfaces before experiments** (including bench top surfaces, taps, drawer handles, underside and top of lab shelving).
    - Surfaces should be wiped down again with distilled water or ethanol, to avoid spoiling lab benchtops with residual stain marks.
    - Clean pipettes with ethanol or DNAaway.

PCR hood

PCR hoods (also known as clean benches or laminar flow hoods) filtrate the air that is sucked into the hood, providing sample protection from contamination. However, the air is pushed out of the hood towards the user, meaning that it is **not suitable for handling hazardous chemicals**, as it doesn't provide any user protection.

The AirClean 600 PCR Workstation (model AC648) requires regular maintenance. It has a UV light and filters that need to be changed when they have reached the end of their lifespan. This is indicated by an alarm that will sound when a filter change is due. There are two types of filters that need to be changed regularly to ensure clean air flow. **Pre-filters** should be changed every **3 months** with average use and the **HEPA filters** need to be changed every **18-24 months**. Instructions on how to change the filters can be found here. Also, please remember to update the Equipment maintenance log after changing the filters.

Filters can be ordered on MMP through Fisher Scientific. The models are listed below:

- **Pre-filter** model 648 (package of 12 filters), catalog number ACFLFPRE-7
- **HEPA Filter** model 648 (two HEPA filters are required for our PCR hood), catalog number ACFHEPA-18

Equipment maintenance & repairs

Equipment list

A list of all our equipment can be found here: Barrett lab equipment list. Please add any new equipment you have purchased to this list and remove any old equipment we no longer have.

Equipment disposal

Contact Carol Smith-Verdone for the disposal of broken equipment. You will need to fill in a form about the decontamination of equipment before the disposal request can be made by Carole. Equipment that has been in contact with hazardous chemicals, biohazardous substances or radioactive materials need to be decontaminated appropriately. Attach the completed decontamination form to the equipment and keep a copy for your records.

Maintenance protocols

The equipment in the lab needs regular maintenance in order to function accurately and precisely. Please record ALL servicing and maintenance in the Equipment calibration & maintenance log and provide sufficient details on the issue and service provider. Descriptions on how to request servicing for some commonly used equipment can be found below.

Pipette calibration

In order to maintain accurate and precise pipetting results, pipettes need to be calibrated at least once a year, or whenever noticeable inaccuracies can be observed. Waldo Lefener (Lefever.W@eppendorf.com) from Eppendorf usually calibrates our pipettes. He usually sends out an email once a year when he knows the dates during which he will be doing pipette maintenance at McGill. Additional instructions regarding pipette calibration can be found here.

Fume hood

The fume hoods need regular maintenance. If you notice that the fume hood suction has become weaker or stopped working, discontinue use until it has been serviced. Place a work order (WO) with Facilities first to have someone check whether the problem is with the equipment or in the mechanical room (such as a burnt out motor or a fan that is not functioning properly). Contact Carole Verdone-Smith (carole.smith@mcgill.ca) if you don't know how to place a work order. Once the problem has been assessed, they can fix whatever they can and/or contact an external contractor. EHS uses Preston Phipps for inspections and they have serviced our fume hood in the past, but there are other companies to choose from as well.

TECAN servicing

Fill in the web form at https://lifesciences.tecan.com/support/helpdesk. You will need to fill in your contact details, the serial number and a description of the issue you are experiencing. A technician, Robert Roman (robert.roman@tecan.com), usually services our Tecan when he is in Montreal. He will be in touch about scheduling a time when he knows the timing of his next visit to Montreal. Please note that if you are experiencing problems with both the Tecan Spark and the Tecan NanoQuant, you need to submit separate service requests.

Freezer & refrigerator maintenance

Cold units require regular maintenance in order to function properly. Cleaning the condensers and defrosting twice a year will help reduce the amount of energy the equipment consume and extend their lifespan. Please refer to the manufacturer manuals for specific information about maintenance and troubleshooting for each model. You can also find physical copies of the manuals in the blue binder above the computer area.

Condensers

Condensers should be cleaned at least every 6 months or more often if the laboratory area is dusty. In heavy traffic areas, condensers load with dirt more quickly. Failure to keep the condenser clean can result in equipment warm-up or erratic temperatures. Information about condenser location and cleaning procedures can be found in the manufacturer's manual. You can borrow the backpack vacuum cleaner cleaner in N5/12 (the door is unlocked) to remove excess dust.

General instructions:

1. Disconnect the power.
2. Remove the cover at the bottom front of the unit by lifting it up and towards you.
3. Remove all dust (preferably with a vacuum).
4. Place the cover back on.
5. Reconnect power.
6. Record the cleaning in the lab maintenance log online.

Defrosting freezers

Freezers need to be defrosted at least once a year or when the layer of frost is more than 0.5 cm. Consider defrosting sooner rather than later - the more ice and frost accumulates, the longer the defrosting process will take and the more water you will have to mop up!

Regular defrosting is essential for extending the life-span of cold units and also for saving energy. The cooling capacity of freezers with frost buildup is considerably worse for your samples too, not to mention that entire boxes can get buried inside the frost and the cardboard can disintegrate when it gets wet during defrosting.

Stewart has a ULT freezer on the third floor that can be used for temporary storage of samples while defrosting. Talk to Joe in order to make a booking. We have a towel in the lab for wiping off water (currently located in one of the drawers underneath the PCR machines). A mop can be found on the fifth floor in the cleaning cupboard in N5/12.

Power-cuts

If possible, keep the fridge/freezer doors closed until the power is back on. Note that our freezers and fridges are not plugged into emergency outlets. Emergency outlets can be recognised by a red frame around the outlet. They are connected to a generator in Stewart which will kick in immediately if there's a power cut. The -80 has a CO_2 back-up system in case of a freezer failure or power cut. Instructions for the back-up system can be found here.

Freezer/fridge failure

What to do if a fridge or freezer breaks?

1. Inform everyone in the lab about the issue.
2. Relocate samples to other freezers. If we don't have enough space in the lab, contact other labs to ask for help with temporarily storing samples. Freezers and fridges often accumulate expired reagents etc that are no longer needed. Consider disposing of such items if you come across them.
3. Troubleshoot. Appliances usually come with a manual with troubleshooting steps.
4. Check if we have a service contract for the appliance.
5. Contact Carole to arrange servicing (ask for FAOPAL)

Fume hood maintenance

The performance standard for fume hoods is the delivery of a minimum face velocity of 100 linear feet per minute at half sash height. An anemometer for determining a fumehood's face velocity is available from EHS.

Biosafety cabinet maintenance

Biosafety cabinets must be tested and certified annually. Cabinet performance must also be evaluated upon initial installation, when moved (even when moved from one area to another within the same room), whenever maintenance is carried out on internal parts, and whenever filters are changed. Annual certification is provided at no charge, and can be arranged by contacting EHS.

Costs of certification of new installations, relocated cabinets, and units that have been repaired are the responsibility of the user. Testing and certification must be done by a certified company. The HEPA filter must be decontaminated by a certified company prior to moving a BSC or prior to changing the HEPA filter.

The above information is adapted from the McGill Biosafety Manual.

Equipment protocols

We have a lot of complicated and delicate equipment in the molecular lab. If you are unsure how to use some of the equipment, please ask an experienced member of the lab to train you.

PCR machines: the Barrett lab PIN is 112233.

PCR
Milli-Q
Autoclave
Bioanalyser
PicoGreen Tecan SPARK
Robot
NanoQuant Plate

Molecular protocols

Please **avoid creating duplicate versions** of protocols in Google Drive. This creates confusion and makes it difficult to figure out which version is more up-to-date. If you want to create a new version of a molecular protocol with your own modifications while also keeping the original version, please rename the duplicate clearly in a descriptive way. Also, please add a paragraph at the start of the document describing the changes to the original protocol, and highlight these sections in the new version. The paragraph should also include information such as your name, date and reason for modifications.

DNA extraction protocols

Anolis extraction protocol

Darwin's finches extraction protocol

Stickleback extraction protocol

Extraction data sheet

DNA cleanup protocols

Nucleospin DNA cleanup

DNA size-selection protocols

Pippin prep
KAPA beads clean-up

Double digest restriction-site associated DNA

ddRADseq

Molecular lab inspections

Laboratory information card (LIC)

Each lab should have a laboratory information card (LIC) attached to the door. To update the current lab card, please use the lab card generator available through myLab. Only full access users will be able to edit and print the LIC. Instructions on how to use the lab card generator can be found in the myLab laboratory information card generator user guide.

The LIC is created by room and PIs who share the same room will need to add their respective contact information and the hazards/pictograms on the same LIC. Do not delete the information already present on the LIC from the other PIs. Add only additional information pertinent to you. The LIC must be printed ONLY after all PIs sharing the room added their required information. For shared rooms among several PIs, it is essential to communicate with all parties so that the information presented on the LIC is accurate and up-to-date. Please note that each PI sharing the room must print their own laboratory information card. Please contact mylab.ehs@mcgil.ca if you have any further questions.

The MyLab sign needs to be on the door of every lab where chemicals are used. A copy of the sign can be found here.

Safety data sheets

Everyone working in the laboratory must have access to safety data sheets (SDS). SDSs are widely used for cataloging information on chemicals and include instructions for safe use, potential hazards and spill-handling procedures. If you develop symptoms after being exposed to a hazardous material, please present the SDS information of the chemical to the healthcare professionals.

McGill uses two SDS databases. The **McGill e-binder** has all the SDS documents for every chemical used within the McGill research community. The other database is the **MSDS online library** which includes over 3 million MSDS documents. Instructions on how to use the online libraries can be found here and here.

Laboratory safety posters

Each lab space in Stewart Biology needs to have an Emergency Poster on the lab door with the contact details of the professors and lab managers. The contact details must be up-to-date. Do not cross out the names and phone numbers, EHS will point this out during an inspection. A new poster can be picked up from the mail room in N8/11. If there are no posters left, please contact Carole, the building manager (carole.smith@mcgill.ca).

Labs should also be equipped with relevant laboratory safety signs, such as the ones provided by McGill. Copies of the lab signs created by Åsa can be found here.

Training

General information about working with animals can be found here. Working with animals requires the successful completion of specific training courses. The courses you need to take will depend on the study organism.

Occupational Health Program

Participation in Occupational Health Program (OHP) is mandatory for personnel in contact with non-human primates. OHP is a prevention program related to occupational diseases, as well as diseases and incidents involving animals.

For McGill staff, the OHP provides all necessary vaccinations and medical surveillance through appointments in the Occupational Health Clinic as well as medical support services in the event of an exposure. Appointments to see the nurse in the Occupational Health Clinic can be made by contacting the OHP Administrator at 514-398-4766 or by email.

For McGill students, the OHP provides medical support services in the event of an exposure, as well as bi-annual PPD testing clinics for non-human primate users in the Occupational Health Clinic. Students participating in the program receive their vaccinations by contacting the Student Wellness Hub, but can contact the OHP Administrator at 514-398-4766 or by email to book an appointment in the Occupational Health Clinic for a measles titer.

The above information is adapted from here.

Animal use protocols

All animal use protocols have been transferred to the new AMS software from the old Darwin system in spring 2022. People listed on an AUP may need to take theory and practical training courses. In order to take the relevant courses, read the course material available online and request a link to the online exam by emailing animalcare@mcgill.ca. After completing the exam, you will receive your score by email. You need to score 80% in the theory course to pass and the training is valid for 5 years.

Annual reviews

AUPs need to be renewed in the AMS system each year. Follow the instructions in AMS on how to submit an annual review. After submission, an FACC administrator will add comments to the protocol that need to be addressed. The system will automatically generate an email notification when the AUP comments are ready to be reviewed. To access the comments:

1. Login to AMS.
2. On the left hand side, click ‘Protocols’ and select ‘AUP’.
3. Select the right protocol and click on the most recent version with the status ‘For PI revision’.
4. Click ‘Review’. A pop-up window opens.
5. To view a list of all the comments, go to the upper left corner and click ‘All’.
6. Make the necessary changes in the protocol and respond to all the comments.

Quality Assistance Program

All animal use protocols approved at McGill University are subjected to post-approval monitoring via the Quality Assistance Program (QAP). The aim of the QAP is to ensure that research and teaching activities involving live vertebrate animals are conducted in accordance with all applicable laws and regulations.

One crucial component of the QAP is to observe the methods employed by researchers as well as the conditions in which the animals are handled. For wildlife protocols that take place in the field or overseas, the FACC will be requesting the submission of photos and/or videos, to illustrate the animal-based procedures, environment and equipment used (e.g. capturing, handling, restraint, holding areas, injections, etc.). More information, visit the QAP website or contact animalqa@mcgill.ca.

Phytotron

If you require your animals to be kept under controlled conditions (e.g. light, temperature), a growth or greenhouse chamber in McGill's Phytotron is a potential option. For more information, you can contact the Phytotron's managers: Mark Romer (mark.romer@mcgill.ca) and Mahnaz Mansoori (mahnaz.mansoori@mcgill.ca).

Animal care protocols

Aiptasia

Permits

Exporting & importing samples

Exporting & Importing samples

Fieldwork safety & planning

Fieldwork is an essential part of many projects in our lab and it allows us to understand scientific processes in a natural setting. However, collecting data in the field poses risks and challenges that can be very different from the usual environment we work in. Careful preparation will mitigate potential risks and increase the likelihood of successfully collecting all the data that you need for your degree. Below is a list of questions to help prepare for your trip regardless of where you are conducting fieldwork. Please read through it carefully well in advance before heading to the field:

Information about destination

- Have you researched:
    a. **visa requirements**
    b. **diseases & vaccination requirements**
    c. **crime levels**: areas to avoid, safety of public transport and taxis
    d. **local customs**
- The Canadian government provides insights regarding safety for certain countries https://travel.gc.ca/travelling/advisories

Wildlife safety: animals

- Are you familiar with potentially dangerous local wildlife (bears, moose, snakes, insects, etc)?
- Do you know the appropriate ways to reduce the risk of encounters?
- Do you know how to best respond in the event of an encounter?
- If you are allergic to bees, do you have a prescription for an epipen? Always pack one with you in Montreal - epipens can be hard to get in some countries. (You might bring one with you anyway in case someone develops an allergy while on the field, especially in remote locations)

Wildlife safety: plants

- Do you know how to identify and avoid any poisonous plants that can trigger allergic reactions? (e.g. poison ivy, deadwood, etc)

Itinerary

- Do you have/know the
    a. exact addresses for your accommodation?
    b. addresses/coordinates of all your field sites?
    c. all the flight details for your trip?
    d. dates you will be staying in each location?
    e. itineraries of all other crew members? A table is usually really helpful to keep track of arrival/departure times if the group is not travelling together from the same location.
- Have you printed **and shared**
    a. **hard copies** of all of the above information? Many places don't have signal/wifi and your sim card may not work in your destination.
    b. **your itinerary** with at least one person who is not coming on the trip? This can be a family member, PI, flatmate or partner.

Communication

- Do you know the names and phone numbers of all the personnel coming on the trip?

- Have you agreed on the primary way to communicate fieldwork related information and questions within the group? It's useful to set up a messaging group (e.g. on WhatsApp or Signal) before the trip to make communication easier.

Medical

- Have you checked whether your health insurance is valid in your destination?
- If not, have you purchased private insurance?
- Have you checked what vaccines are required/recommended? Make an appointment well in advance to get vaccines - it can take multiple weeks after a shot to develop immunity.
- Do you know the
    a. location of the nearest hospitals based on your itinerary?
    b. local emergency phone number? (Emergency, police, firefighters, ambulance, poison center, specialized health care centers, pharmacy, etc.) It varies between countries!
    c. emergency contacts of the people you're working with? Have you provided your own emergency contact?
    d. team members that have had first aid training?
- Are you aware of other people's allergies (e.g. medication, bees, diet) and have you communicated your own allergies to others?
- Have you printed a **hard copy** of your medical insurance, proof of vaccines and emergency numbers?

Food

- Do you know everyone's dietary restrictions (and allergies) in the group, and have you communicated your own with others?
- Have you discussed how you will be sharing food costs with the group? i.e. is everyone buying their own food or are you cooking together.

Expenses

- Have you discussed with your PI(s) **before the trip** which expenses can be reimbursed? e.g. flights, gas, supplies, food, etc. Remember to *ask* (they are not always given automatically) and to keep all your receipts in order to get reimbursed!
- If you are co-supervised, have you discussed with your PIs **before the trip** who will cover the expenses or whether they will be split?
- Have you applied for available travel awards?

Documents

- Have you checked the expiry date of your passport? Some countries require you to have at least 6 months left in order to enter. Apply for a new one well in advance - wait times can be long!
- Have you applied for all relevant visas?
- Have you printed all your fieldwork permits?

Permits

- Have all your collection permits been approved (CFIA, SEG, etc.)? Are the permits needed in Canada (e.g., when importing material) and on the field site (e.g., scientific investigation permits)?
- Do you have a valid animal use protocol (ethics) approved by the university?

Materials

- Have you checked what materials (personal, safety, scientific, etc) you will need in the field?
- Have you checked what chemicals you will need in the field? Are they safe to travel with (e.g., ethanol above a certain percentage is not allowed)?

- Is there an inventory of what is already available at the field site?
- Have you ordered everything that's missing?
- Do you know how you will be bringing all the supplies to the field (in luggage, shipped from McGill or shipped directly to destination by vendor)? Do you need a broker?

Chemical safety

- Have you researched and printed the MSDS of the chemicals you will be using in the field?
    a. toxicity and health effects
    b. safe storage
    c. safe handling
    d. safe transport
    e. correct disposal
- Have you ordered all supplies needed for safe handling and disposal of the chemicals you will be using (PPE, hazardous waste containers, spill trays, plastic protector for work surfaces)
- If you are using needles, glass capillaries, pipettes, slides or syringes, have you ordered a sharps container?

Exporting samples

- Do you know how you will be exporting all your samples from the field?
- Do you have all the necessary paperwork and documentation for shipping/transporting the samples out of the country?
- Do you know the procedure for shipping/transporting samples stored in chemicals classified as dangerous goods (e.g. ethanol)?

General packing list:

- Passport, travel documents
- Medications and proof of prescription
- Glasses, contact lenses, contact lens solution (if applicable)
- Clothing appropriate for fieldwork based on the climate
- Personal hygiene products
- Reusable water bottles

More information about planning fieldwork:
A guide for developing a field research safety manual that explicitly considers risks for marginalized identities in the sciences. Available at https://besjournals.onlinelibrary.wiley.com/doi/10.1111/2041-210X.13970

Travel registry

McGill requires that all students who leave the country on school-approved ventures (i.e. fieldwork, field course etc.) register on the Minerva Travel Registry. Contact Ancil Gittens (Graduate Student Affairs Coordinator) to create a trip on the travel registry.

N.B! The **McGill Student Travel Registry App** will replace the Minerva Travel Registration process, which will be decommissioned shortly. With the new app, students will be able to receive critical and timely travel updates and advisories, check-in requests from McGill Abroad, and access to important safety resources. **All students travelling outside of Montréal on university-related activities must register their travel through the app.** University-related activities include:

- Exchange programs
- Field work
- Conferences and workshops

- Research
- Performances

To register, you must have your host destination contact person's information, McGill ID, and personal emergency contact information on hand. More information can be found here. Faculty and staff members who need to access the McGill Student Travel Registry app for administrative purposes will need to fill out an authorization form to gain access.

Expense reports & advance requests

If your supervisor has agreed to cover the cost of your flights and other fieldwork expenses, you can request a travel advance to avoid paying out of pocket. Once the advance has been processed, the money will be deposited in your bank account. After the trip, you will need to file an expense report (even if you requested an advance). Keep all your receipts from the trip, including boarding passes. You will need to submit these with the expense report.

Remember to read the expense report checklist **before** you travel. The most up-to-date instructions on how to submit an expense report can be found on McGill's website. Please also check our lab protocol for submitting expense reports here.

Always save the reference number of the expense report before submitting! You may need it for printing or viewing the file once submitted (see below). When printing the expense report, make sure the reference number and total cost is marked in the header and footer of each page. Instructions on how to do this can be found here.

Viewing & printing submitted expense reports

Sometimes when you submit an expense report, the system doesn't give you the option to print at the end. If this happens, go to the 'View Advance Request and Expense Report History' and search for the relevant expense report by using the reference number.

Fieldwork techniques

Stickleback trapping using minnow traps by Andrew Hendry (video).

Shipping

The information in this section is largely adapted from 'Receiving and shipping mail/packages' written by Caroline in 2015. The original version of the document is kept on Google Drive. Please update this section of the lab manual if you notice that some of the information has changed (no need to update Caroline's original document).

Shipping

Internal mail

You can ship things free of charge within McGill's internal mailing system. All mail should be clearly labelled with the recipient's name, building, room number, and department. Place the mail in the bag hanging behind the door in room 102 in the museum. The bag in the museum is both for internal and external mail. When shipping from Stewart, place the mail in the bag specifically for internal mail in W4/2.

External mail

External mail is first processed by McGill mail services, then by Post Canada. Allow an extra day or two for processing. If you need a tracking number, consider shipping directly from a Post Canada office. Shipping directly from a Post Canada office is faster, since the shipment will not be subject to processing by McGill. External mail is not free of charge, so please check with Rowan before shipping large items or shipping something internationally. All shipments must be labelled with the **complete address**, including city and postal code. For international shipments, also include the country. Place the mail in the bag behind the door in room 102. When shipping from Stewart, place the mail in the bag specifically for external mail in W4/2.

FedEx

The lab has a FedEx account. Shipments will automatically be paid by the p-card which is attached to the account. Please ask Rowan for the password if you need to ship something with FedEx.

1. Prepare your samples or items for shipping. Consider the following:
    a. Storage conditions (RT, +4, -20) and how you need to pack your samples. Will you need a polystyrene box, ice packs, etc?
    b. Chemical contents. Does the package contain materials classified as dangerous goods? (e.g. ethanol, dry ice, corrosives, etc).
    c.
2. Ask the recipient for their address and phone number.
3. Create a shipping label using the lab's fedex account.
4.

Shippinging from the museum

Express shipping delivers shipments within 48 hours. You can schedule shipment with the McGill preferred courier service, Globex. The Museum has an account for this. Make sure your package is ready

to go, then see Marie La Ricca or Caroline LeBlond to fill in the request for parcel pick up. Leave your package in room 102. If room 102 is closed, leave your package in the corridor in front of the office for Globex to pick it up.

Shipping samples

Permits

Make sure you have all the necessary permits for shipping samples (Animal care, CFIA, SEG permit [**S**cientifiques, **É**ducatives ou de **G**estion], U.S. Fish and Wildlife Service, Convention on International Trade in Endangered Species CITES], etc.). The permits you need will depend on what species you are shipping and its IUCN classification, as well as what type of material you are shipping (live specimens, blood samples, DNA extracts, faecal samples, etc). Please note that some types of material are easier to get permits for than others. For example, getting permits for shipping DNA extracts is usually easier than shipping blood and faecal samples. This is particularly relevant for samples from endangered species where governments have strict regulations on returning unused tissue and material to the country of origin. If you only need genetic data, plan to do the extractions in the country you collect the samples (if possible) and ship only the DNA to streamline the process. Some sample types have been assessed by McGill University, Environment, Health and Safety (EHS), as not requiring an import permit. Please contact Rowan to determine the specific protocol for your work, as well as this documentation from EHS, if applicable.

Note on CFIA:

CFIA is making the permit system online. You need a myCFIA account. This account probably needs to be associated to McGill party on the myCFIA portal. There is no protocol at the moment for how to do this. As of 2021, Eduardo Ganem Cuenca eduardo.ganemcuenca@mcgill.ca is the profile authority and manager and can help you connect to the McGill party on the CFIA website. You can ask help from one of the Environmental Health and Safety (EHS) officers.

Customs broker

Using a customs broker is highly recommended when shipping samples. The custom's broker will be contacted if any issues arise at the border. Thompson Ahern International is the university's contracted vendor for international shipments and payments are usually done by FAOPALs. Please contact mcgill@taco.ca to arrange shipment. You will need to provide details on package size, weight, destination and type of material for the invoice estimate. If you are receiving samples from another academic institution, you will also require a customs broker. For certain FedEx shipments, FedEx is automatically the customs broker (e.g. International Priority).

Dangerous goods

Some samples are shipped in materials classified as dangerous goods (DG). DG shipments require both origin and destination postal codes to have DG service. Universities and other research institutes typically have DG service. Do not attempt shipping dangerous goods to private addresses!

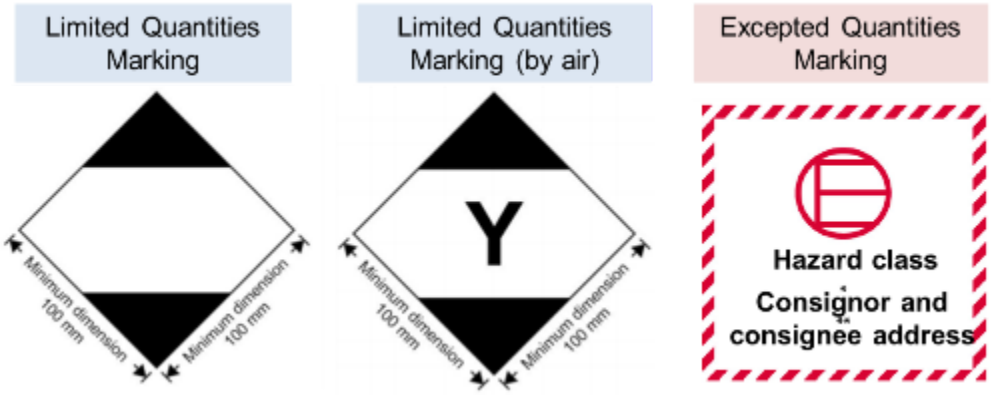
The most common dangerous goods that we ship in our lab are dry ice and ethanol. These require additional documentation and are subject to strict rules, so it's advisable to avoid shipping such materials whenever possible. In order to ship packages containing dangerous goods, you will need to know the UN number.

Check this document on common mistakes regarding the packaging of dangerous goods (the document can also be found here on the drive). The information below is written by Åsa (last updated in September

2022). **Always check with FedEx that the information you have is up to date before submitting your samples.** The FedEx phone number is 1-800-463-3339. Explain that you need to talk to a dangerous goods specialist. You can also email fedex with questions about dangerous goods at dghotline@fedex.com.

Ethanol is a highly flammable material that requires specific documents and labels.

- Shipments under 30ml qualify for **excepted quantity.** No shipper's DG declaration is needed, but the items need to be pckaged per IATA 2.6.5 and have the excepted quantity hazard label.
- A dangerous goods declaration is required if the volume exceeds 30ml per shipment. The package also need the **limited quantity** label with a 'Y'.
- Volumes over 1 litre are subject to additional restrictions and can only be shipped on cargo aircrafts (as opposed to passenger aircrafts). The shipment requires both a shipper's declaration and a limited quantity label.



The **UN number** for pure ethanol is UN1170. The same UN number applies for any concentration of ethanol as long as it's diluted with water (opposed to other chemicals).

You must fill out this **shipper's declaration for dangerous goods**. Below are the details needed for filling it out. An example of a shipper's dangerous goods declaration can be found here. You will need three copies of the declaration printed in colour.

- **Filling out shipper's dangerous goods declaration:**
  - **Shipper:** your name and address
  - **Consignee:** recipient's name and address
  - **Air Way Bill number:** add this information after creating a shipping label online
  - **Pages:** write 1/1
  - **Shipper's reference number:** not needed
  - **UN number:** UN1170
  - **Proper shipping name:** ethanol solution
  - **Class**: 3
  - **Packing Group:** Information can usually be found in section 14 of safety data sheet (should be '2' or '3')
  - *Cross out 'radioactive'*
  - *Cross out 'cargo aircraft'*
  - **Airport of departure:** leave blank
  - **Airport of destination:** leave blank

    - **Quantity:** 1 (assuming you are shipping one package)
    - **Packing instructions:** Y341 for limited quantity exemption (less than 1L of ethanol); 343 for larger volumes shipped in specific UN box.
    - **Authorisation:** leave blank
    - **Additional handling information:** provide 24h emergency contact phone number (you can provide two numbers if needed)

- **Preparing the package.** The following must be written on the outside of package on the same side:
    - UN number
    - Proper shipping name
    - Volume
    - Label: Class 3
    - **Limited quantity sticker.** Shipments containing 30-1000ml of ethanol are subject to a limited quantity exemption. This is indicated by a black and white diamond, with a 'Y' in the middle for shipments by air. Print the symbol (~10cm) and attach it on the side of the package. A copy of the label can be found here.
    - 24h emergency contact phone number

How to prepare Excepted Quantity shipments with ethanol?
Shipments containing non-infectious specimens of mammals, birds, amphibians, reptiles, fish, insects and other invertebrates with small quantities (<30ml) of ethanol must be packaged according to IATA 2.6.5 regulations:

1. Samples should be placed in vials or other rigid containers (plates) with no more than 30ml of ethanol per shipment. Do not use the plastic seals for plates (they tend to leak), Instead, use foil seals. Use a roller to seal the plate and pay attention to the corners that are susceptible to evaporation due to tiny wrinkles formed around the edges.
2. Place the tubes or plates in a plastic bag that is then heat-sealed.
3. Place samples in spill-absorbing material and place in a second plastic bag that is then heat-sealed. You can use a spill absorbing wrap or other material.
4. Wrap the bag in bubble wrap or other cushioning material.
5. Create a shipping label on the Fedex website using the lab account. Make sure you write "Not Restricted" in the description of the article or substance on the Air Waybill.
6. Place bagged samples in a cardboard box that is large enough to affix shipping documents and labels.
7. Add copies of the following documents inside the package:
    a. Fedex shipping label x 1
    b. Commercial invoice x 1
    c. Letter from professor x 1

8. Mark the package 'SCIENTIFIC RESEARCH SPECIMENS, NOT RESTRICTED - SPECIAL PROVISION A180 APPLIES'.
9. Print out an Excepted Quantity hazard label in colour (minimum size 10x10cm) on adhesive paper and stick it flat to the side of the package away from edges and corners.
10. Place the following documents in a shipping label sleeve:
    a. Fedex shipping label x 3
    b. Commercial invoice x 3
    c. Letter from professor x 3
    d. Make sure that the dates match on all the documents!

Packing samples

It's important to pack your samples appropriately. Fedex has a useful guide on how to pack perishable samples. Genohub also has a very useful article about how to pack samples for sequencing, and the following information is largely adapted from their website.

If you are shipping DNA or RNA samples, consider using screw cap tubes. Wrap the tubes in parafilm and place them in cryogenic freezer boxes. Choose a thick styrofoam box (about 4 cm) and fill it with dry ice or wet ice packs. Fedex requires you to fill out additional paperwork when shipping dry ice (since it's considered a dangerous good), so avoid using it unless you really have to. RNA samples should be shipped on dry ice, but DNA can be shipped on wet ice.

The amount of ice will depend on the shipping distance. For shipments within your continent, use about 4kg of ice. For shipments to Europe, use 6kg of ice and for shipments to Asia and South America, use 9kg. A styrofoam box that is 4cm thick, 3-4 kg of dry ice should last for more than 48 hours.

Place the styrofoam box inside a suitably sized cardboard box. The cardboard box will protect the styrofoam box from breaking. Fedex can refuse to pick up polystyrene boxes without an outer cardboard box. Label the box as 'non-hazardous research sample' and 'temperature sensitive, keep frozen'.

Some tissue samples may need to be shipped at **ultralow temperatures** (e.g. samples for epigenetic work). The most reliable option is to ship the samples in a cryoshipper. Please be aware of these cryoshipper properties before shipping.

Please note that the amount of ethanol per shipment might be limited to 500ml in some cases.

Documents

All international shipments require a commercial invoice. If you don't include a commercial invoice, your shipment can get delayed at the border indefinitely until you provide one. Always include a copy of your commercial invoice INSIDE as well as on the OUTSIDE of the package. Instructions on how to fill out a commercial invoice can be found here.

The details of your shipment will determine which documents are required. The most commonly required documents for international shipments, in addition to the commercial invoice, include:

- an **export declaration** (not required for shipments to the US and not required for commercial goods with <2000 CAD value);
- a **certificate of origin** (required to demonstrate that a good was wholly produced in a given country for import duty purposes);
- a **toxic substances control act** form (needed if shipping hazardous materials, including dry ice).

These documents can be found on the Fedex website - do not attempt to create the forms yourself.

Samples will typically be shipped using a courier service as explained above in the 'Express shipping' section. Always choose a shipping option with tracking!

Please read the Fedex international shipping guidelines for more information.

Harmonised code

Providing a harmonised code (HS) will significantly speed up the processing of your package at customs. If you create your Fedex label online, you will need to find out the correct code for the package.

Ice packs (e.g. Va-Q-Tec box): 3824990090
Ethanol
Dry ice

Importing samples

There may be restrictions on what you can import across the border to Canada. The primary source for information is the Canadian Border Service Agency (CBSA). What you can import will depend on the species as well as the type of material (tissue samples, carcasses, live specimens, blood samples, DNA extracts, etc). You will want to check for import requirements in the Automated Import Reference System (AIRS) for commodities regulated by the Canadian Food Inspection Agency (CFIA). If you require a permit to import, you can request it through the Agency's online service portal, My CFIA.

Ensure that the shipper has completed all necessary documentation (i.e. Export Declaration etc), and provide the shipper with all required information. We encourage the shipper to include a letter from the PI detailing a description of the samples (i.e. research samples collected under permit XXX for purposes XXX), and include Wing's name and contact information on the shipping label, if possible. International mail should be addressed as follows:

YOUR NAME
Barrett Lab,
McGill University,
Stewart Biology Building (Rm N6/15),
1205 Dr Penfield Ave,
Montreal, Quebec
H3A 1B1, Canada

Ordering

McGill Marketplace (MMP) is the recommended way to purchase items for the lab. Items are paid for using FAOPALs which are a string of numbers used by McGill's accounting system. Please check the instructions on how to place an order or request a PO on MMP.

Purchase orders are legally binding contracts between the university and the vendor. Each approved requisition will be given a purchase order (PO) number.

Catalog items:

- **Hosted catalog:** contracted supplier that has a catalog in MMP. You can login and search products. The prices have been pre-negotiated.
- **Punch-out:** complete catalog specific to McGill with special pricing for McGill buyers.

Non-catalog items: you search for a supplier and order items manually. Add a meaningful description and include applicable quotation numbers, contract numbers, etc. Attachments are viewed only internally and are not shared with the supplier.

If you need to cancel an order that has already been approved, please notify the vendor and fill in this form online.

Sponsored requestors. Regular MMP users can place orders and assign the shopping cart to the PI or a sponsored requestor for approval. To become a sponsored requestor, the PI needs to login to Minerva, go to the Finance Menu, select Procurement Admin Menu and click Sponsor a Requestor. The PI then needs to enter the McGill ID of the individual being sponsored to procure in the 'ID of Intended Requestor' field. More detailed instructions can be found here.

Processing receipts in MMP. A three-way matching system has been introduced at McGill to avoid inconsistencies regarding what is requested, received and invoiced. All received items must be marked in MMP to finalise orders by entering the packing slip number and date of receipt. Instructions can be found here. Please save the packing slips for our records (place them in the binder in hte molecular lab). Do not fill out the packing slip field if you did not receive one.

1. Login to MMP.
2. Click the icon with the paper and the clock in the left menu.
3. Go to 'My orders' and select 'My purchase orders'.
4. Click on the PO number of the order you have received.
5. Go to 'Available actions' in the upper left corner, select 'Create quantity receipt' and press 'Go'.
6. Add the (approximate) date when you received the product.
7. Add the packing slip number (if you have one).
8. Remove any items from the list you haven't received yet (only applicable to partial orders).
9. Click 'Complete'.

P-Card

One-time suppliers, and suppliers that are used less than once a year, should be paid with a P-Card. Only Rowan can actually make the purchase with this card.

FAOPALs

Some orders and services requested within the McGill system will require you to provide a FAOPAL. This is a string of numbers that indicate the fund, account, organization, project, activity and location. The coding structure is used to classify, record, budget and report financial transactions within the university. You will need the complete FAOPAL string for ordering ethanol, for requesting certain repairs and maintenance, for filing expense reports, etc.

Fund (F) = the PI will provide the fund code.
Account (A) = this number usually starts with a seven. A list of internal purchasing account codes relevant to our lab can be found here. A full list of account code tables can be found here**.** Use 700001 for materials and supplies.
Organization (O) = use 00054 for Redpath museum, or 00286 for Biology if the PI is not affiliated with the museum. The full table of organisation codes can be viewed here.
Program (P) = normally we use the code for research, 2000.
Activity (A) = use 000000
Location (L) = use 000000

Receiving

Location

Orders can be shipped to the Museum or Stewart Biology as appropriate. Mail will be delivered to 102 in the museum, where each lab also has an assigned mailbox. In Stewart Biology, mail is primarily delivered to room N3/17, and sometimes to W4/2.

Instructions for receiving items

When receiving an order, always verify that the order is for the Barrett lab. Open the parcel and look for the packing slip or invoice (can be inside or in a plastic pocket outside the box). Double check the items listed on the packing slip are included in the box. Make sure quantity, size and format match with the packing slip.

If the order is complete (all items on the packing slip are in the boxes), write the date and your initials. Store the items where appropriate and recycle the empty boxes in the green recycling bin in the corridor. Additionally, for **molecular lab orders**, please label all the items you receive as follows:

- **your first name**
- **date received** (e.g. 'Rec. January 2019')
- **date opened** (e.g. 'Opened 15 April 2019')
- **lab name** (Barrett)
- N.B. Please use unambiguous date notation to avoid confusion. For example, 12/1/20 could be interpreted as '20 January 2012' or '12 January 2020'.

If the order is <u>not</u> complete (items on the packing slip are missing or the items on the packing slip do not match the contents of the shipment). Write a clear note on the packing slip, the date and your initials. Do not unpack the wrong item for now. Leave aside for potential return.

Sometimes shipments are missing items and they are shown as 'BO' on the packing slip. This means that the item is **backordered** and the company is waiting for the item to be restocked. Consider such orders complete for now.

ALL PACKING SLIPS AND INVOICES SHOULD BE PLACED INSIDE THE BLACK FOLDER ABOVE THE COMPUTER IN THE MOLECULAR LAB.

Personnel resources

Lab manager:

- Wing-Zheng Ho
- If you need help, please write down the task here and contact the lab manager.
- Scope of work: bioinformatics, molecular lab management, equipment maintenance, protocol revision, lab manual, training new students, undergraduate opportunities, etc.

Redpath Museum

- Hans Larsson, Director of Redpath Museum
- Ginette Dessureault, Redpath Museum administrator (514-730-5942)
- Anthony Wayne Howell, Redpath Museum collections & long-term sample storage

Biology admin

- Ancil Gittens
- Carol Verdone-Smith

Financial services, FST

- Carol Guag
- general enquiries go to the SciencePod.

Procurement services

- Nadia Orsini

Immigration advisor (Faculty of Science)

- Maxime Grenier-Labrecque

HR

If you have questions about anything related to recruitment, salaries, benefits, work contracts, etc, please use the HR & APO service portal to create a request. Make sure you are connected to the McGill VPN, and login with your McGill username and password. There is also a Knowledge Base where you can look for information relating to various HR-related topics.

Any correspondence regarding new hires please send email to workday.science@mcgill.ca. You can also contact Lisa Maggio (lisa.maggio@mcgill.ca) who is the HR contact for the Biology Department and Ginette Dessureault (ginette.dessureault@mcgill.ca) who is our contact for the Redpath Museum. Check this document for information about the hiring process timeline and complete the form as soon as possible to avoid delays in hiring.

Teaching resources

- Academic writing: https://advice.writing.utoronto.ca/student-pdfs/
- Active learning activities, University of Waterloo: https://uwaterloo.ca/centre-for-teaching-excellence/teaching-resources/teaching-tips/developing-assignments/assignment-design/active-learning-activities
- Building rubrics: https://www.lsu.edu/oie/assessment/degree_program_assessment/files/buildingrubrics.pdf
- Citation resources at McGill: http://libraryguides.mcgill.ca/citation
- Flipped classroom model: https://omerad.msu.edu/teaching/teaching-strategies/27-teaching/162-what-why-and-how-to-implement-a-flipped-classroom-model
- Formatting reports: https://owl.purdue.edu/
- Free iClicker interface: https://app.reef-education.com/#/login
- Make RPG-like environment for meetings: https://gather.town
- General teaching strategies and approaches: https://www.saltise.ca/resources/strategies/
- Teaching and Learning Services at McGill: https://www.mcgill.ca/tls/instructors
- T-PULSE McGill: https://www.mcgill.ca/tpulse/
- STEM active learning activities, by topic: https://www.saltise.ca/resources/activities/
- myDALITE: https://mydalite.org/en/
- SALTISE: https://www.saltise.ca/

Learning resources

Courses at McGill

The lab has put together a list of relevant graduate courses at McGill to help others choose relevant courses. Please add to this list any relevant courses you've taken during your degree!

Textbooks

Buying textbooks can be very expensive, so you might want to check if the book can be **borrowed** from somewhere. The lab has a **collection of textbooks** that anyone in the lab can borrow. Please use the sign-out sheet when you borrow something, so that we can keep track of the books!

Other places to find textbooks include the university libraries and various publishers with free online textbooks. For example, here's a list of free books by Springer. McGill Community for Lifelong Learning also has a list of resources for finding books (including audiobooks, e-books and fiction).

Recommended textbooks

Below are some reading suggestions that other people in the lab have found useful. Feel free to add your own recommendations!

- R for Data Science by Garrett Grolemund & Hadley Wickham
- Statistical Population Genomics edited by Julien Y. Dutheil.
- Bioinformatics for Evolutionary Biologists by Bernhard Haubold & Angelika Börsch-Haubold.
- The Analysis of Biological Data by Whitlock & Schluter.
- Population genomics: wildlife edited by Paul A. Hohenlohe & Om P. Rajora.
- Biostatistics online course by Yaniv Brandvain

Science blogs & podcasts

Know of any good science blogs? Please add them to the list below!

- Computational Biology and Genomics blog by Dave Tang.
- Eco-evo evo-eco blog by Andrew Hendry, Daniel Bolnick, and others.
- Dynamic ecology by Jeremy Fox.
- The Biology of Superheroes, a popular science podcast by Shane Campbell-Staton and Arien Darby.
- Heredity podcast
- The insight genetics podcast.
- Jess McLaughlin's blog - genomics + justice & equity in science

Writing and Communication tips

- Morrison guide to the process of writing
- Tips from Anna Hargreaves (these are great and I agree with all of them - importantly, I highly recommend starting with an outline and discussing with me before moving on to writing a manuscript draft)

- MIT commkit has a series of useful guides for putting together various types of documents (fellowship applications, conference presentations, abstracts, etc).

Online course providers

- McGill Community for Lifelong Learning has a list of online course providers.
- Coursera offers a wide variety of online courses by universities and companies.
- MIT OpenCourseWare Massachusetts Institute of Technology has a selection of free courses.
- FutureLearn offers short courses on a variety of subjects.
- edX an online learning platform founded by Harvard and MIT.
    - "Analyze Your genome!" University of California, San Diego
    - "Data Science: Computational Thinking with Python," University of California, Berkeley

Forums

Bioinformatics:

- Biostars https://www.biostars.org
- Seqanswers http://seqanswers.com
- Unix http://unix.stackexchange.com

Coding:

- Stackoverflow http://stackoverflow.com
- Cross Validated http://stats.stackexchange.com

General Biology:

- Stack exchange http://biology.stackexchange.com

Programming & Data Analysis

- Advice on how to Teach yourself programming in 10 years by Peter Norvig.
- Bolker, B.M., Brooks, M.E., Clark, C.J., Geange, S.W., Poulsen, J.R., Stevens, M.H.H., and White, J.-S.S. (2009). Generalized linear mixed models: a practical guide for ecology and evolution. *Trends in Ecology & Evolution*, 24, 127-135. https://doi.org/10.1016/j.tree.2008.10.008
- Zuur, A.F., Ieno, E.N., and Elphick, C.S. (2010). A protocol for data exploration to avoid common statistical problems. *Methods in Ecology & Evolution*, 1, 3-14. https://doi.org/10.1111/j.2041-210X.2009.00001.x
- Tredennick, A.T., Hooker, G., Ellner, S.P., and Adler, P.B. (2021). A practical guide to selecting models for exploration, inference, and prediction in ecology. *Ecology*, 102, e03336. https://doi.org/10.1002/ecy.3336
- Online programming resources:
    - Software carpentry organises workshops and has online tutorials on how to get started with R, Python, Bash and Git.
    - Data carpentry's tutorials specifically aim to teach data management and analysis for genomics.
    - Codacademy has a wide range of courses in different programming languages.

- Bioinformatics training resources by the Coppola Lab has compiled a lot of useful learning resources into one place.
- Harvard Informatics Group has a GitHub page with resources for learning bioinformatics at home.
- Microbial 'omics course material by the Meren Lab.
- Common statistical tests are linear models (or: how to teach stats) by Jonas K. Lindeløv
- The Biostar Handbook: 2nd Edition
- SNP Filtering Tutorial
- How to capture population structure with PCA? by Florian Privé.
- Patterns of divergence and gene flow between populations and species by Simon Martin.
- Orchestrating Single-Cell Analysis with Bioconductor
- Fundamentals of Data Visualization by Claus O. Wilke
- Towards Data Science
- Foundations of Data Science, By Ani Adhikari and John DeNero
- Shiny apps for Population genetics assembled by Katie Lotterhos
- Bioinformatics Canada has all training material online for their RNA-seq analysis and epigenomic analysis workshops
- GenPipes - the Canadian Center for Computational Genomics (C3G) multi-step genomic workflows
- Simple explanation of hierarchical modeling

Bioinformatics help

Statistics, R and Python help: The SOS (statistics online for students) helpdesk is maintained by graduate students or senior undergraduate students with sufficient knowledge in statistics and statistical computing.

C3G has a very useful 'open door' bioinformatics consultation at https://www.computationalgenomics.ca/open-door/. All you have to do is sign up and you can have an hour with an expert bioinformatician helping you with whatever you're struggling with.

Good coding practices

- Check out Marco's coding tips.
- R
  - R cheatsheets
  - R markdown is great for writing reader-friendly scripts. If you're new to R markdown, check out An introduction to R markdown and the R markdown cheat sheets.

- Git & GitHub
  - Git and GitHub cheatsheets.
  - Barrett Lab GitHub page.
  - GitKraken.
- Bash
  - Introduction to Bash by Marcus Sanatan.
  - Unix cheat sheets.
  - Explainshell is a neat tool for breaking down confusing commands. It also tells you exactly what each part does!

Outreach

The scientific community has a responsibility to communicate the importance of primary research to the public; unfortunately this is not always done effectively. As a result, we often fight an uphill battle against misconceptions and ignorance about basic scientific issues that we study. It is incumbent on scientists to make an effort to educate the public through outreach programs about the importance of our research for addressing basic and applied problems in science and society. To this end, I encourage members of the lab to make efforts to develop relationships with the communities where we conduct our fieldwork, and to contribute to science education through participation and organization of groups involved in public outreach. You can read about some of the fun initiatives Barrett lab members are engaged in here. If you are conducting outreach initiatives, please let me know so I can list them on the lab website!

You can find contact information about organizations and initiatives to get involved with here.

Social media

Social media is an increasingly important component of science outreach. If you would like to, you can share your own or any other relevant social media accounts here. In the future, I will have a general policy of not following student's social media accounts unless they list them here or on their 'mentoring plan'. I have no problem with any of you following my social media accounts.

Websites

I encourage everyone to create their own research website. This allows you to publicize your work and will give you more space to describe your research and activities than on the lab website. It also gives you the opportunity to develop your own "public persona" within the academic and wider community. And a website will be absolutely necessary if you wish to continue a career in academia (it is essential when interviewing for postdoctoral and faculty positions). When you have a website ready to share, please let me know so I can link to it from the lab website.

Peer-reviewing

Reviewing papers is an important skill that requires expertise, critical thinking and an ability to communicate constructive feedback in a fair way. Check out this guide to help you determine whether you should review a paper and to help with the writing process. Another useful source is AmNat's Best Practices checklist for reviewers and authors.

Should you agree to review a paper?

1) **Do you have the relevant expertise?** You can critique a paper even if you are not an expert in all the areas of a paper, as long as you are open about which areas you have expertise in. You can focus on specific parts of the paper that you know well.

2) **Do you have the time?** Reviewing papers can be very time-consuming. Ask yourself whether you have the time to write a constructive review, do not say yes just due to obligation. If you agree to review a paper - do it well.

3) **Does the topic interest you?** Reading is usually the most time-consuming part, so if you're going to read the paper anyway, writing a review will not require that much more time and effort.

4) **Is there a conflict of interest?** The editor is unlikely to be aware of potential conflicts of interest, so it is important that you assess this as objectively as possible. Sometimes, in very small specialist fields, people have to review each other's work, even though they may know each other well.

Suggestions for writing a review

- Provide a short summary of the paper. Is it a good fit for the journal? Is the methodology appropriate? Suggest major and minor revisions and ways to improve the paper.

- Do not state what your 'decision' is, i.e. whether you think the paper should be rejected or accepted. Only do this if you are explicitly asked to do so. Sometimes when you submit your review you may be asked to tick a box about whether the paper should be accepted (e.g. accept without further revisions/reject with minor revisions/reject with major revisions etc). This is usually only visible to the editor, so the authors will not know your decision unless you specify it in the review.

- If a paper is rejected, it usually means that it will be bounced around to other journals. Most papers will eventually get published somewhere and you are unlikely to prevent something from being published (i.e. you are not the 'gatekeeper'). However, by providing useful feedback during the peer-review process, you can influence the quality of papers that are published.

- One of the most helpful things you can provide in a review is comments on which parts are unclear. Authors tend to be blind to their own writing, so don't be afraid to point out sections that are not obvious to the general reader.

- Be polite! The authors don't know you, but the editor might remember you. Focus on the science in your review, not the authors.

- In general, it is safer not to sign your reviews. People are more likely to sign positive reviews, but there could potentially be a cost to signing if your comments are misinterpreted. Many people struggle to tolerate criticism and may take your comments personally which can lead to grudges being held against you. There is no harm in staying anonymous.
- Important to point out the positive things in the paper - do not just criticise everything. If you think the paper should be published, you need to defend it and point out to the editors why the paper is good.
- Make sure the data and analysis answer the questions the authors are asking. Whenever a choice is made in a study, check that the authors justify it (e.g. if they are splitting data sets, or choosing a specific type of analysis instead of another). Could the same results have been obtained due to another process than the one the authors suggest? When the writing is really good, you easily miss fundamental flaws.
- Outright acceptance of a manuscript is very rare.
- Check basic things: are sample sizes mentioned? Are the coordinates of field sites given? Is the referencing style consistent (and appropriate for the journal)?
- The harshest reviews often come from suggested reviewers. Keep this in mind when considering whether to request someone specific to review your work.

Professional development & future careers

myIDP

https://www.mcgill.ca/mypath/tools
https://myidp.sciencecareers.org

Applying for postdocs

Detailed blog post on making a successful postdoc application. The blog post is related to this expired postdoc job in macroevolution, but it contains useful general advice. Here's also a useful document listing funding sources for postdoc fellowships.

Other jobs (https://www.nature.com/articles/d41586-019-02586-5)

Settling in Montreal

Finding accommodation

The main website for apartment hunting in Montreal is Kijiji. The are also various facebook groups, such as jte cède mon bail Montréal laval and International Roommates in Montreal. You can also find some apartments on SSMU Marketplace and McGill has some Student Housing available.

The most common moving date is July 1 and this is when the largest turnover of leases occurs, although September 1 is becoming more popular, especially for student apartments. However, moving vans and other services are also considerably more expensive around the most popular moving dates. If you can influence your move in date, it might be best to negotiate a date that's not during the busiest moving weeks.

Although Montreal is an afffordable place to live compared to other major Canadian cities, rents have been increasing significantly in recent years. Finding a reasonably priced apartment in good condition can be challenging in the Plateau and Centre-Ville, so looking at other areas near the green metro line or other public transportation can be worthwhile.

When looking for apartments, keep in mind that **it's illegal for owners to require security deposits in Montreal**. Also, water is always free, so if the owner tries to charge you for water, you might want to look elsewhere. Unfortunately, some areas of Montreal have a bed bug problem. If you suspect bed bugs in your apartment, follow the instructions on this website. There are also various maps available online that show where the highest occurrence of exterminations are carried out. If you are concerned about noise levels from traffic, it's worth checking out the map in this document illustrating noise pollution in the city.

If you are experiencing issues with your landlord or landlady, you can contact Tribunal administratif du logement du Québec (TAL), formerly known as Régie du logement. It's a governmental agency resolving issues between property owners and tenants. Examples of common issues are rental increases, evictions, lease conditions, repairs, noise, heating and pests.

Second hand furniture & more

As with apartments, the best place to look for second hand furniture in your area is Kijiji. There are also many second hand shops, such as Renaissance Fripe-Prix. There are also a tonne of Facebook groups, but the McGill University Free and For Sale group is a good place to look for stuff near campus, especially textbooks. It's also worth checking out SSMU Marketplace. The lab has a relatively high turnover of students and people are frequently looking to donate their old stuff when moving or leaving Montreal.

Learning French

Although Montreal is a relatively bilingual city, most parts outside the island (and even some parts on the island) are 100% francophone, and it can be extremely difficult to get by with English. A good knowledge of French is therefore helpful for integrating in Québec. The Quebec government offers a lot of affordable French courses for all levels. Depending on your status, these courses may be free of charge for you and you might even be eligible for financial compensation for learning French! You can check your eligibility and find available courses near you on Immigration Québec's website.

If you want to learn French at McGill, check out the French Language Centre. In addition to offering French courses, they organise a variety of activities where you can practise your French, such as cultural outings and a cinema club. If you are interested in taking credit courses, French as a Second Language (FRSL) offers a variety of courses given throughout the year to students in any academic program.

If you don't have time for a course and you just want to learn some basics, there are a multitude of online courses and language learning applications available for free.

Transport

Public transport: OPUS card is a rechargeable travel card in the Greater Montreal area. Full-time students can get a reduced fare by applying for an Opus card with a photo. You need to renew your OPUS card by October 31 every year.

Car-sharing: Communauto is a flexible and affordable car-sharing service in Montreal and most major cities in Canada. To activate your communauto account in another province: 1. access the communauto page of the other province 2. set up a new user account 3. use the promocode INTERCO to link your accounts. No additional fees will be charged and your Quebec plan will be valid in the other province.

Cycling in Montreal: You can find the official bike path map for cyclists here. If you don't have your own bike, you can sign up for the Bixi Bikes rental programme operating from April to November with automated pay stations around the city. You can pay with credit card or your OPUS card and it's possible to get weekly, monthly or annual passes.

McGill has a bicycle repair co-op: https://theflat.wordpress.com/. Strava is a great way to learn about popular routes around the city

Bike commuting: McGill has a new Ride & Refresh program for people cycling to campus, offering showers, lockers and on-site bike parking at the McGill Sports Complex.

Other resources

Affordable food & services: check out the student 'Cheap sheet'.

Fitness & recreation
McGill has a gym, swimming pool and a running track close to the Redpath museum with affordable memberships. If you are looking for a private gym, EconoFitness is probably your cheapest option. They have lots of 24/7 locations in Montreal and flexible memberships. Most gyms in Montreal have student discounts, so always ask before you sign up.

Socializing and having fun in Montreal

- Le Festival International de Jazz de Montréal
- Just for laughs festival
- Festival de Films Francophones

Healthcare

Getting a RAMQ card

International students

The McGill International Health Insurance Plan is mandatory for all international students. Please see instructions on how to activate your coverage.

International students can book an appointment in the McGill Health clinic. ALWAYS BRING YOUR MCGILL ID AND UP-TO-DATE INSURANCE CARD.

Pre-booked appointments for the following week are released on Wednesday mornings at 10am. You can book in person by going to one of the two kiosks located on the third floor of the Brown Building, or by phone (514-398-6017).

- Drop-ins are Monday to Friday starting at 8 am. Students can access the kiosk outside the Hub Reception area as of 7am, so it's best to come early to get a drop-in spot.

For off-Campus care, most of these clinics will require you to pay cash up-front (you may be partially reimbursed by the insurance provider by submitting a claim afterwards).

If you are an international student and have the Medavie Blue Cross health insurance you can look for health professionals nearby using your address.

Hospitals

Making a claim

Vaccines

You can get vaccinated through your own physician, at a CLSC (Centre local de services communautaires), or at the Hub. Vaccines covered by the Quebec Immunization Program are available at the Hub. You can book an appointment with a nurse to learn about your eligibility and the availability of vaccines. If you have a prescription, you can purchase a vaccine at a pharmacy and then make an appointment at the Hub to have it administered there. Make sure you have instructions from the pharmacy on how to transport and store the vaccine(s) until your appointment.

Make sure you check what vaccines you need to get in good time before fieldwork, especially if you're doing fieldwork in the tropics!

Out-of-state students

Quebec students

Staff

In Quebec, the public healthcare services are run by Regie de l'Assurance Maladie du Quebec (RAMQ). Foreign workers can qualify for subsidised healthcare under RAMQ, even if they are on a temporary work permit, provided they do not leave the province for more than 21 days at a time. If you will be absent for over 21 days, you need to contact RAMQ to obtain a *Temporary Departure From Québec* form, fill it in

and mail it. You can find more information on eligibility for health insurance during an absence from Quebec on the RAMQ website.

When arriving in Montreal, you need to register with RAMQ. You will need to pay for private health insurance for the first 3 months after arrival until you receive a RAMQ card in the mail. Some countries are exempt from the 3 month waiting period due to healthcare agreements with Quebec. These countries include Belgium, Denmark, Finland, France, Greece, Luxembourg, Norway, Portugal and Sweden. Whether you will be exempt depends on the nationality of the primary work permit holder (i.e. dependents from the countries listed above will not be exempt unless their partner is also from one of the exempt countries).

Prescription drugs are not covered by Quebec's healthcare system. In addition to regular health insurance, every resident of Quebec is required to have prescription drug insurance. Usually you can choose between a private prescription drug insurance (usually arranged by employer) or a public prescription drug insurance through RAMQ.

The above information is adapted mainly from here.

Mental health services

Mental health problems are common in academia as well as the rest of life, and seeking help is important. Below are some resources if you feel that you need support, or you know somebody who is looking for help.

Keep.meSAFE is a counselling service that offers access to comprehensive mental health services to McGill students. They specialise in student mental health support and provide access to in-person counselling appointments in many different languages. All students pay $2.75/semester to access these services and there are no additional costs. Any McGill students can access the services, including undergraduate, graduate, Post-docs, continuing studies, and recent graduates (up to 6 months post-graduation).

If you feel like talking to someone, there is also a McGill Students' Nightline run by student volunteers that offers a confidential, anonymous, and non-judgmental chatline and phone line. The Peer Support Centre at McGill also offers online zoom sessions during the pandemic by well-trained student peer supporters. You can make an appointment or drop-in during their service hours.

The McGill Student Wellness Hub is the place for holistic health and wellness needs. It provides access to basic physical and mental health services, as well as health promotion and peer support programs right on campus.

JED Foundation's programs also has a helpline that you can call or text.