

The
Besserer Lab
@ UCLA

Lab Manual

*A short guide of useful resources, expectations,
and living all together in the lab*

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1. Welcome & introduction

i. Personal welcome

Welcome to the Besserer Lab! My goal as a Principal Investigator (PI), Faculty and mentor is to foster an inclusive environment in the lab where everyone can reach their full potential as independent scientists. This document describes how our lab functions in order to ensure that you have everything that you need to be a happy and productive member of our lab. We pride ourselves on being an open and collaborative group and would like you to know that we are happy to answer any questions you may have about life in our lab.

2. Expectations

i. Expectations of PI

It's an honor for Élie to coach and mentor an amazing team of people who together drive our innovation and accomplishments. My commitment to you is to make our lab a welcoming and supportive environment to conduct good science. Importantly, Élie is invested in your success—the ability to graduate and/or follow your desired career path either in or outside of academia. Élie will provide an environment that is emotionally supportive, safe, equitable, intellectually stimulating, and free of harassment. Élie will help guide your research project and give you feedback on your work to ensure our science is of the best quality possible. A two-way feedback culture is critical to a successful lab environment! Thus, any issues, even small things, should be dealt with swiftly. When you have any questions or concerns—Élie's door is always open. You are always welcome to communicate with Élie and Élie will respond to you in a timely fashion. In an emergency, whether that is lab-related or personal, you can call on Élie for assistance. Please also come to Élie if you are having issues with individuals outside our lab. Élie can help guide you to the appropriate resources to deal with this within the Department and University. If Élie is the cause of your concern, please seek help from another PI in the department (such as Dr. Czernin or Dr. Nathanson).

ii. Expectations of All Lab Members

In our lab, we want everyone to be honest, enthusiastic, and happy. You are expected to bring your enthusiasm and curiosity to the lab. We ask everyone to have a proactive attitude and to contribute to the lab, both intellectually and operationally. It is up to you to make the most of all the training and opportunities you are given. Lab members come from diverse personal and academic backgrounds. All lab members should treat each other with respect and dignity. Disrespectful behavior, harassment, and/or scientific misconduct will not be tolerated. Be considerate of others in the lab; it is courteous to keep common spaces clean and organized, and return communal equipment to where you found it. If you use up common supplies and solutions, please refill them or order more. Mistakes and accidents happen in the lab, and that is okay, but if an incident will affect others in the lab please tell them. If you do not know how to fix an issue that has arisen or are having trouble with something in the lab, ask for help. Make smart choices. Be respectful, kind, safe, and proactive!

iii. Expectations of Research Support Staff

Research support staff (e.g. Staff Research Associates / Project Scientists / Research Scientists) are vital players to proper operation of the lab and are valued contributors to research projects. They are expected to contribute to all lab chores. Importantly, research support staff are expected to keep the lab spaces and equipment (including fridges and freezers) clean and organized. The needs of the lab will be constantly evolving as will the responsibilities, opportunities, and skills needed. Our lab will work together to define research support staff's evolving role in the lab, depending on individual skills and preferences. Importantly, research support staff are encouraged to voice their aspirations. Depending on desire and ability, research support staff are often given research projects of their own or assigned to work with others as a team.

iv. Expectations of Graduate Students and Postdocs

We expect graduate students and postdocs to be the driving force behind their projects. We expect that you will be the expert on your project and your research field. Seek out research relevant to your work and keep abreast of the latest tools and research in our field, even if it may not seem directly relevant to your work. Take advantage of the environment and opportunities that may arise and seek mentors both inside and outside of the lab. Graduate and postdoctoral trainees should support each other and collaborate with others inside or outside the lab on research projects. Élie expects you to be an "independent researcher", but independent does not mean alone. Independent means that you take ownership, gather knowledge, formulate ideas, and then bring all of that into dialogue with others who can help. It is never too early to start thinking about your career goals; –please discuss these with me.

v. Expectations of Rotation Students

Rotation students will be paired with a graduate student, postdoc, or research staff as a point of daily contact for any questions. At the start of your rotation, we will discuss your expectations and goals together. During your rotation, we will meet on a regular basis to discuss your data and further steps for your project. Please express your research interests during your rotation and don't be afraid to pitch projects or ideas. Even if it is not a part of the lab currently, academia is very dynamic, and things can change. Conversely, sometimes we have more rigid roles to fill, but it is a good idea to explore different ideas and training opportunities. Do not give yourself excuses to be mediocre. However, the rotation is short and unlikely to be long enough to produce many datasets. Give yourself permission to make minor progress. It is okay to mess up in the lab, and more likely than not, you will. You are still learning but try not to make the same mistake twice. Don't be afraid to ask for help or advice from your daily supervisor or anyone else in the lab! Importantly, use this opportunity to explore what you find fun to do or learn.

vi. Expectations of Undergraduate Students

Undergraduate research assistants are critical contributors to our research. We value the effort you put into the lab and reward it with course credit, training, experience, letters of recommendation, mentoring, and potentially authorship. You will generally work on projects led by others within the lab. However, you should strive, and we encourage you, to make intellectual contributions to the projects you work on and may embark on independent projects as well on an ad hoc basis once you've become familiar with the lab. Undergraduate trainees are expected to commit to a minimum number of hours over a set period of time; please discuss this with me. Please develop your weekly schedule by talking to your individual mentor.

3. Wellness

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

i. Mental and Physical Health Concerns

If you are not feeling well, either physically or mentally, take the time that you need to seek help and take care of yourself. Specifically, if you are contagious, please do not come in, but stay at home to rest and take care of yourself until you are better. If you are struggling with depression or anxiety and wondering what to prioritize – your health is most important. If you have an acute situation that requires help, take the day off with no questions asked. If you are going to be out for an extended time or miss a meeting or a lab meeting, just give Élie a notice so that they know you are okay – no need to give details if you don't want to, it is sufficient to email and say that you have a “personal health absence”. If you need to take more substantial time off, you can discuss with Élie to facilitate this. Being an undergraduate, support staff, graduate student, or postdoc is stressful. We all care about you and are here to support you – just let us know how we can help. If any situation requires you to take time off, ask others in the lab to help cover any essential lab work.

ii. Personal Emergencies

You can share as much or as little detail as you are comfortable sharing with Élie, all our communications remain confidential. These situations are inherently stressful, so make sure you are taking care of yourself.

iii. Work-life Integration

Being ambitious and hard-working are part of our lab culture, and science in general. But it should come from a perspective of driving yourself for the fun of pushing your limits and exploring what you are capable of, while answering the scientific questions. The key is to know your limitations. Managing your motivation and work habits while integrating your interests and commitments outside of work is critical to success.

iv. Imposter Syndrome

Imposter syndrome can be defined as persistent thoughts and feelings of self-doubt and a fear of being unmasked as a fraud, academically or otherwise inferior. Those who suffer from imposter syndrome (which could be any of us) have the inability to value and incorporate their abilities, skills and accomplishments into their mind and perceive themselves as significantly more inferior than others do. First, we tend to see other's successes and not their failures. Second, there will always be someone who has accomplished more than you. Do not compare yourself to others. Everyone is different. More importantly, do not compare yourself to the cumulative successes of multiple people in your cohort. Remember, we are all on our own growth trajectory, and the people we look up to were once where we

are now. All of us are doing the best job we can, which is all we can really hope for. Although we should aim to minimize feelings of self-doubt, such lingering feelings can be channeled into productivity. They can motivate us to strive for more than mediocrity; to get outside of our work and see it from another point of view. Make room for improvements and challenges. Keep a record of your successes, no matter how small. Use it as positive reinforcement when times get tough. While rejections are inevitable, the Besserer Lab is committed to providing opportunities that will challenge you in a constructive way.

v. Intralab Events

Within our lab, we organize occasional events to permit causal and social interactions within the lab. While attendance is not required, we strongly encourage all lab members to attend when possible, and, when applicable, bring significant others/families.

4. Inclusivity

In our pursuit of knowledge, we encourage an environment of collaboration, open communication, and trust, which welcomes diversity and respects differences of opinion. It is these principles that allow us to discover new ways of thinking and behaving, which lead to innovation and scientific success. Division and exclusion based on race, age, color, disability, faith, religion, ancestry, national origin, citizenship, sex, sexual orientation, social class, economic class, ethnicity, gender identity, and gender expression have no place in the pursuit of science. Not only is it imperative to include equity and inclusivity in the lab on a moral level, there is [evidence](#) for synergy in having a diverse research team with different opinions and ideas when doing science. As a lab, our objective is to be inclusive in all our practices, especially in recruiting, training, mentoring, and evaluations. Everyone deserves to be treated equally and fairly.

Expectations - All lab members are expected to strive to create an inclusive and welcoming environment built on fairness and respect. All members are also encouraged to bring up situations when the practices in the lab do not align with this expectation. Less obvious are instances of implicit bias. Implicit bias refers to the attitudes or stereotypes that affect our understanding, actions, and decisions in an unconscious manner. We all have implicit biases. Each person may subconsciously have preconceived notions that affect their view on others, based on one or more of their identity attributes. The first step in promoting inclusion is recognizing this. Once we do, we can take active steps to correct and avoid the negative impact these biases might pose to ourselves and others. We encourage everyone to reflect on their own biases (e.g. through existing [implicit bias tests](#)) to raise self-awareness and move towards a more inclusive perspective. As another helpful practice, we recommend that all members reflect on their own privileges as a way of identifying and acknowledging societal and institutionalized discrimination. The relationship among lab members is expected to be guided by respect for self and others. This may take many forms, but to highlight a few: use pronouns appropriate to the request of each individual, treat others how they want to be treated, and remember that not everyone interprets things the same way you do and you need to be mindful of these differences.

5. Bullying and Harassment

Bullying and any type of harassment is not tolerated in the group. This includes social and professional isolation, public humiliation, control and manipulation of information, emotional abuse, abusive working conditions, professional discredit and denigration, intimidation, and the devaluation of professional

achievements. These behaviors will not be tolerated, even if they occur outside of working hours or the physical lab environment. Remember that humor is a matter of taste and culture. Please be sensitive about jokes that might be interpreted as sexist, racist, homophobic, political, or regarding religions and beliefs. There is no place for such jokes in our lab. You are expected to be supportive and friendly in all interactions with members of the lab, even if you are not physically at work. Always treat people the way you want to be treated, i.e. with respect. If you do have disagreements or misunderstandings with colleagues, try to see things from their perspective. Recognize that your colleagues have different duties, opinions, wishes, and skills. Like everyone else, they also make mistakes, which sometimes may affect you and your work. In such cases, help them understand how they can improve to avoid mistakes in the future. The work environment must be safe and comfortable for everyone, and free from all harassment, discrimination and bullying.

Where To Get Help

If you feel that you are experiencing bullying or harassment, please talk to someone. That can be Élie, colleagues from our lab or another lab you feel comfortable with, graduate school officer, human resources (HR), or another Faculty member. These people can assist you with resolving the conflict or making an official complaint. Do not be afraid to express your concerns. You are expected to call out inappropriate behavior if you witness it.

6. Research Philosophy

i. Research Integrity

The integrity of our science is of utmost importance. As scientists, we trust other scientists to be honest in reporting their research findings. This assumption allows us to move science forward. Thus, we must be honest in everything we do and report. If you make a mistake that compromises an experiment (no matter the importance/cost), document this and report it to Élie. We would rather accomplish nothing than report illegitimate findings. If you suspect any wrongdoing in the lab, it is essential to report this immediately to Élie and this problem will be investigated accordingly. If you believe that the PI is involved or responsible for the wrongdoing you should speak with either Dr. Czernin or Dr. Nathanson or speak out to the office of research integrity. Talking to the office does not equate to reporting anything officially. Keep in mind that there are different types of misconduct that can compromise research integrity. Sometimes this is outright fraud or fabrication of data, but more subtle misconduct like plagiarism, or knowingly conducting or reporting compromised experiments are also violations of research integrity. Since there are different levels of misconduct it is important to remember that not all of these are fireable offences, and some may be due to ignorance. It's better to be open, know your limits and ask for help when you need it, so that you don't find yourself in a situation where you are unknowingly compromising research integrity. Élie is ultimately responsible for all research in the lab, so being transparent and honest is the only way to ensure integrity. One must also remember we are all biased, so things like blinding samples and treatment groups can make a significant difference in reporting valid findings.

ii. Conflicts of Interest

It is essential to understand what constitutes a conflict of interest and how to properly disclose them. Conflicts of interest can be in regard to having a financial stake in a company that you or a family member

could benefit from. Please see the university/institute policy [here](#). We also must remember that conflicts of interest can be non-financial. Examples include reviewing a paper that “scoops” your work, or reviewing a paper/grant from a close friend whom you cannot give an unbiased opinion about. If you think any of your activities represent a potential conflict of interest, please take the appropriate measures to disclose these interests as described in the above link. If there are questions about whether your situation represents a conflict, please talk to Élie. He can either help you directly or put you in touch with someone who can help.

iii. Competition

The current scientific environment is competitive. We are competing against other labs for funding. Funding is given based on research output and that output’s impact. The impact of work is often reduced if you are not the “first” lab to make a particular discovery. There are almost certainly other labs that are working on the same/similar problems as us and that comes with a risk of being “scooped”. People handle competition differently but try not to let it cause you stress. We cannot control what other labs are doing, so instead let’s focus on doing our best. At times you may feel like there is competition within the lab; for example, you may apply for the same travel grant as another lab member. This sort of competition can be constructive, you can help each other submit the best application possible, or destructive when you refuse to help each other or try to hinder the other person’s application. Destructive competition undermines positive group dynamics and creates a negative working environment, so always try to make competition constructive.

7. Working in the Lab

i. Work Ethic

In our lab, we follow a set of values focused on the importance of scientific work – manifested by determination and desire to achieve our goals. You are expected to be self-motivated to work hard and smart. This means doing your job to the best of your ability and learning the most efficient way to complete your tasks. It is vital to balance persistence with adequate rest to reduce the risk of burnout. An important way to drive your project forward is to work smart. This means being efficient with your time - prioritizing your experiments and other duties. Although you may work on an individual project, you are part of the team. Therefore, you are expected to care about teammates, to maintain a positive attitude and be open to change and improvements in the lab and the working environment. Use your colleagues and mentors as resources. Ask your peers and mentors for advice. Discuss with the lab.

ii. Working Hours

The unique character of scientific work in academia often allows a flexible schedule; thus, you should work the number of hours on a particular day necessary to move your project forward. A schedule that works for others may not work for you. Please also respect others’ time and schedule; we do not judge others by perceived time worked. It should be feasible to do most of the experimental lab work within normal working hours. However, it may happen that you have to work outside these hours, either in the lab or at home, but Élie will never force you to do this. If you have to work outside normal working hours, you may compensate for this another time, and always take care to preserve your personal (physical and

mental) health. If certain tasks (data analysis, coding, writing, etc.) can be done more efficiently outside of the lab, you are more than welcome to do so. In that case, please make yourself available via online communication. If you're working with lab members on a project be respectful of their time and make yourself available to them in person when necessary.

iii. Holidays and Absences

Holidays matter and you are strongly encouraged to take time off. You should let Élie know in advance if you plan to be out of the lab for an extended period of time. Before going on holiday, you should get your experiments to a suitable stopping point by stopping the protocols on an indicated secure step or asking lab members in advance to maintain your procedures. If you are responsible for general tasks in the lab, ensure that these jobs can be covered by colleagues.

iv. Lab Meetings

You are expected to attend and actively participate in the group's lab meetings (so plan your experiments accordingly). Lab meetings are scheduled in advance and everyone must be aware of the schedule. During lab meetings, everyone is encouraged to ask questions. These could be words you don't know or a concept you don't understand. Don't be shy about sharing ideas or questions – others may have the same questions, and all ideas, even when you think it is a 'silly' idea, help the creative process. Likewise, please be mindful that everyone in the room deserves an equal opportunity to talk. Some are more reticent to do so and need some "space" to offer an opinion. Please don't dominate the conversation and feel free to continue giving input after the meeting, one-on-one with the speaker. We will discuss lab business at the beginning of each lab meeting. If you have anything that you think everyone in the lab should be aware of, this is the time to share.

Our lab meetings are intended for sharing your research data and other achievements with lab members and Élie. The most important part of the lab meeting is when an experiment is not working (i.e. when your controls are not working, not when you do not have your expected result) or when you make a mistake that is worth of sharing with other lab members. You are also encouraged to bring any questions to the lab meeting to receive feedback from the entire lab (e.g. a statistical or ethical question). The lab meeting is not the place for sharing your vacation pictures or what you have done during the weekend (while you can sparse some picture of your vacations throughout of your presentation).

Our lab meeting is featuring 2-3 presentations of 10-15 min each plus questions of the lab members. We try to meet at least every week but due to other external factors we can skip a week or two sometimes. You are encouraged to do lab meeting even if Élie cannot make it, the lab meeting is a place of discussion for the entire lab not only between you and Élie (this is covered by individual meetings)

v. Support letters

Recommendation and support letters are important for getting new positions and grants. If it is the first time that Élie is writing you a letter, please try to give him at least two weeks' notice. Élie takes great care in letter-writing and will aim to write the strongest possible letters for everyone. Élie will likely ask for points that you want to be highlighted, and letters for undergraduate trainees will often be prepared in conjunction with the person that they closely worked with in the lab. Do not hesitate to ask Élie to write a letter of recommendation. If you need a letter, notify Élie as soon as possible with the deadline, your curriculum vitae (CV), and any relevant instructions for the content of the letter. If the letter is for a

grant/fellowship/scholarship application, also include your specific aims. Please do not hesitate to send Élie multiple reminders.

vi. Attending Conferences

Conferences are an important part of scientific career development and an avenue for networking with peers as they allow us to increase the lab's and individual researcher's visibility, get feedback on research results, seek new collaborations and update ourselves with what is going on in the field.

We will discuss together who would like to attend these conferences, but Élie will ultimately decide who will attend based on relevance for that project and/or lab member. If you come across another scientific meeting or symposium that is interesting for your project, discuss the possibility of attending and presenting your work with Élie. Once you have obtained interesting results and have a story to tell, we can discuss together the timing and conference to present this (either as a poster or oral presentation). You will then draft an abstract and discuss this with Élie. Make sure that you allow sufficient time for this process before the abstract deadline. When traveling for business, the University policy asks us to pay for all the expenses and apply after your return for reimbursement. Élie knows this can be a lot of expenses and can create a financial burden for any lab members. Do not hesitate to discuss about any financial issues with Élie, together we will find a solution. You are encouraged to apply for travel grants offered by our department/university, the conferences, or any external organization to attend the meeting of your choice. This will look favorably on your CV. Conference organizations, academic societies, and research reagents/equipment companies may have opportunities for travel grants. Additionally, you can seek opportunities on [ECR Central](#).

vi. Environmentally Sustainable Science

We are committed to minimizing the carbon footprint of our laboratory and office spaces, department, and university. The environmental sustainability areas that we can contribute to as researchers are in energy conservation, freezer management, water conservation, chemical waste, waste reduction, recycling, inventory management, and outreach. We recycle all paper used in our office space. We also minimize printing on paper (and if needed, print double-sided) and encourage electronic notetaking and recording of specific experimental steps and calculations taken during your research activities (although some notes on paper may be necessary during experimentation). Before leaving the office and laboratory spaces please ensure that water taps, light switches, and unused instruments are off, especially if you are the last person leaving the lab or office space. Deionized water comes out of a tap, but it is not free, and it requires a huge investment of time, energy, and water to make. Please close the cell culture biosafety cabinets and fume hood (shut the sash) if you are the last person in the lab using it for the day in the lab. Chemicals also impact the environment. We minimize use of chemicals/reagents that are toxic to the environment as much as possible. We encourage you to utilize reusable glass pipettes within the lab and reserve the single use disposable serological pipettes for sensitive experiments. When ordering reagents and other materials for your research, please consider whether the item is in fact needed, do not over-order items in large quantities. Vendors that utilize environmentally sustainable packaging will be prioritized. The most energy-intensive pieces of equipment in most biology labs are the low-temperature (-20°C) and ultra-low temperature (-80°C) freezers. Freezers deliver a double environmental negative: not only are they voracious energy users, they also pump out excessive heat. We will defrost our freezers regularly and you are expected to assist and participate in these activities.

8. Experiments

i. Prioritizing Experiments

It is important to perform the right experiment at the right time to increase your efficiency and reduce waste of reagents and time. Each lab member will take the lead in planning experiments for their own project(s). We will regularly discuss this during individual meetings with Élie and at lab meetings. Please reach out if you want to discuss an experimental idea/design outside these moments. Élie and other lab members will always try their best to make time to advise you. [This flow chart](#) can be very helpful to decide when to do which experiment. Print a copy to hang above your desk!

ii. Reproducibility

We strongly encourage you to use resources available about how to conduct reproducible science (for example [Reproducibility for Everyone](#) and using [RRIDs](#)). We will also have discussions in lab meetings about reproducibility. There is never a wrong time to talk about any concerns or new ways to improve the reproducibility of the science within the lab. Science is very difficult, and it is easy to make mistakes or assumptions. We want to limit both of these, but no one is perfect. In essence, we want to control every variable to the furthest extent feasible and to document the experimental procedures so that they can be repeated by other lab members and research groups. To ensure reproducibility within the lab, we keep all of the standard protocols in the lab workspace of [Labstep](#). If there are deviations from these protocols, please note changes to that protocol and make it accessible to all lab members. In addition, standard protocols should not be changed unless there is sound reasoning and changes are made clear to everyone, including Élie. There are a variety of ways to ensure reproducibility of one's work, like showing a finding in a second system, asking a lab mate to conduct the same experiment and verify findings, including sufficient controls, verifying the reagents you are using, etc. The overall goal is to move science forward. Ensuring you document sufficient and detailed information, making this information available to everyone is essential. Detailed protocols associated with publications will be deposited in [protocols.io](#). Keep in mind, you can also improve the reproducibility of your science, so never settle for your current ways!

iii. Collaborations

Collaborations are an essential aspect of science, but they will not work without clear and constant communication.

a. Intra-lab Collaboration

All lab members are welcome to help one another. In fact, intra-lab collaboration is greatly encouraged. Sometimes this will be formal in that Élie will actively ask for members to work together on a common goal/project. This can also happen informally or organically, though it is important to remember to communicate any plans with Élie and to keep track of relative contributions. Keeping a spreadsheet (or similar) on a shared drive (or on Labstep) noting who participated in a project can be a useful way to track how a project is coming together and who contributed to what extent. This also assures that all contributions to a collaboration are acknowledged correctly. It is also useful to set up formal meetings among people who are collaborating on a semi-regular basis. While there may be informal

communication on a daily basis, it's important to have formal meetings with the whole project team to review aims, problems, and future directions, so that there are not any surprises.

b. Inter-lab Collaboration

The ability to collaborate with labs all over the world is one of the great aspects of our job! If you find a lab that you think would be beneficial to work with and you/we can learn something from, bring this to the attention of the Élie. We will then discuss if we think it is the correct time to reach out (i.e. we may want to convince ourselves of our findings a bit more) and the best approach for contacting the lab of interest. It's important to remember that 1) the other lab may not want to collaborate and 2) after talking with the lab you may not think that it's the best fit. Both of these outcomes are completely fine! Typically, when collaborating with a lab you haven't worked with before, it's advantageous to come up with a small and inexpensive (in terms of time and monetary resources) experiment to determine if the project is worth pursuing. These initial experiments can allow one to understand how working with the other group will be and help to establish the project's foundation. Ideally, collaborations are mutually beneficial. For example, keep in mind that reaching out to a group who has a technology that no one else in the world has, may seem to them like you are asking them to do experiments for you. It is therefore important to discuss expectations, contributions, authorship, and timeline early on in the collaboration, and to confirm this in writing. You don't want another lab to put in a year's worth of work and then add them in the Acknowledgements section of a paper because that was your understanding, while they thought they were going to be co-authors. Also, here it is important to keep track of contributions in a shared document (e.g. a spreadsheet) throughout the project. As with intra-lab collaboration, formal discussions on a semi-regular basis are essential for updates on project progress. Keep in mind that some aspects of a project can be performed very rapidly with intense work, while others may take long periods of time with intermittent work. Both of these may end up being equal contributions.

c. Travel Grants for Lab Visits

If (inter)national collaborations require substantial amounts of money for travel/accommodation/reagents/supplies/etc, you will have to apply for a travel grant. You can find travel grant sources on [ECRcentral](#).

iv. Mistakes

Make mistakes, it's okay! If you do not make mistakes, especially in a new lab, you are probably not trying or working very hard. However, mistakes can often be avoided by being careful. Efficiency is important, but it is okay to be slow, especially when you are learning. Do not rush your work. Think about everything. Run through a procedure ahead of time to make sure everything is working and in place. To focus on the experiment at hand, it may be useful to organize/make reagents or label tubes the day before a big/new experiment. Plan ahead to avoid mistakes. Determine how you can make an experiment easier to avoid common potential mistakes. Élie and senior lab members can provide advice in this regard; you can learn from our prior mistakes. Double and triple check all your analyses and data. Incorporate sanity checks. Ask others to look at your data. It is always better to catch a mistake immediately instead of months down the line! We admit our mistakes, then we correct them, and then we move on. What matters is how you deal with errors and what you learn from them. Furthermore, it is an excellent opportunity for you to identify the supportive people in the lab who will help you succeed during your research career. Utilize your environment, work hard, and ask lots of questions. Never

hesitate to ask a question regarding experimental design, execution, or interpretation. Do not try to cover up or deny a mistake. If you have made an error in experimental execution, make sure to record it in your lab notebook in detail and bring it up at lab meetings so we can all learn from each other's mistakes. If you do make a mistake, tell your collaborators if they have already seen the results, and especially if the paper is being written up, already submitted or accepted.

9. Data Management

i. Lab Data

Each lab member should back up raw data as well as any metadata needed to reproduce all processing/analyses. Lab data should be stored in at least two (preferably all three) of the following places: 1) local hard drive, 2) external hard drive, and 3) computer cluster server (<http://uclahs.box.com/>). It is mandatory to have raw and analyzed data files as well as result figure (if applicable) in the experiment page of the Labstep workbench. The directory in which these data are stored should have a README.txt file with details/metadata/updates about the experiment/data ([Data Management](#)). You should not manipulate master datasets. All data should be named as per lab standard [YYYYMMDD_Project_Experiment#_Run#_YourInitials (e.g., 20200220_Motility_Ex1_Run1_HFL.xls)]. Please make a local copy on your computer or your personal server space, and work from that. Whenever possible, avoid proprietary file formats when storing data, since future access is not guaranteed. Your experimental notes and analysis codes are crucial resources for the lab. They must be available and usable for verifying data in any publication. Code/analysis should be well annotated and able to be reproduced by another lab member without your input. Before you leave the lab, or upon completion of a project, you must archive old datasets and back them up. Any datasets hosted on an external location (such as <http://uclahs.box.com/>) counts as one back-up of raw data.

ii. Notebooks

In the Besserer lab, we keep Electronic Lab Notebooks (ELNs) through [Labstep](#) as well as keeping paper notebooks during experimentation. Never discard paper notebooks, and make sure your Electronic Notebook is 100% accurate, up to date, and complete at all times. To facilitate openness and collaboration within the lab, please make all your documents and data viewable (not editable!) to all members of the lab. It is important to record notes as soon as possible as extended delay in note-taking results in lost information. The paper notebooks are meant to supplement ELNs and be used during experimentation. The electronic notebook is meant to be your legal, binding document of your faithful work. We back up the ELNs regularly and put it on the shared <http://uclahs.box.com/> drive.

Keeping a complete and accurate record of experimental methods is a vital part of science. Your laboratory notebook is a permanent record of what you did and what you observed in the laboratory. Learning to keep a good notebook now will establish good habits that will serve you throughout your career. Your notebook should be as detailed as possible, recording what you do, and why you did it. Keep in mind that pictures (or videos!) can be very helpful in explaining what you did or saw. A good test of your work is the following questions: 1) could someone else, with an equivalent technical background to your own, use your notebook to repeat your work, and obtain the same results? 2) could you or another lab member come back six months later, read your notes, and make sense of them? If you can answer

yes to these two questions, you are keeping a good notebook. You should also record your mistakes and difficulties performing the experiment – you will frequently learn more from these failures, and your attempts to correct them, than from an experiment that works perfectly the first time. If you make a mistake, do NOT obliterate it! You and others may need to read your mistakes later – perhaps you were right the first time! Use a single cross out in your paper notebook and EXPLAIN why it was an error. It is extremely important that your notebook accurately records everything you did. Keep in mind that your ELN is version controlled, so you can return to a previous version of your entry.

General guidelines for lab notebooks are:

1. All entries should be in the working language of the lab (i.e. English).
2. Use a separate folder for each project.
3. Date and number every experiment.
4. Indicate the overall purpose of the experiment.
5. Record full details of materials and methods.
6. Include all “back of the envelope” calculations (i.e., don’t use the back of an envelope, paper towel, etc.) so that these can be checked if there is a problem (ranging from how you made a 10 mM stock of some reagent to how you made a reaction mix).
7. Present the key results and/or refer to any electronic database with the results. Include all original data (e.g., gel photos, plots, etc.).
8. Describe your conclusions – write this for your own, Elie’s, and future lab-workers’ benefit. Talk to us! State lessons learned, even if negative.

OVERALL: Your notebook should be so clear that anyone in the lab (today or in five years) could go into your notes and replicate your experiment exactly, clearly understanding what you did and why. Notebooks are extremely important. You should be writing in them every day.

iii. Open Science

We are all for open science, so lab members are encouraged (well, required) to share their code and data with others, whether they are in the lab or outside of it. Within the lab, you can share your code and data whenever you like. However, do not share your data with the outside world until Élie agrees. This gives us an opportunity to work with the data to meet our needs (including publication and grant needs!) before releasing it for other people to use. We will make our data and code publicly available at time of peer-reviewed publication, and as stated above this code should be able to be reproduced by others’ independently of the original experimenter’s input. We will also share our work with the world as soon as we are ready, which means preprints! The lab will have a policy to upload a preprint of a manuscript simultaneously with initial submission to a journal. Currently, the preferred preprint server is [bioRxiv](#) for primary research and [Preprints](#) for reviews/opinions. We have also been putting PDFs of all our papers on the lab website, and you are more than welcome to share PDFs of your preprints or published papers with whomever asks. It is important to remember that after publication you may find errors or misleading aspects of your publicly available data or code. In an effort to make everything as open as possible you should be open to spending some time updating/clarifying metadata or code annotation to facilitate data re-use. There may also be new repositories available post-publication (i.e. a repository for your data type that allows easy browsing/re-use) where it may be worthwhile making your data available.

10. Authorship

i. General Principle and Responsibilities

Authorship is the primary mechanism for determining the allocation of credit to scholars. Authorship assigns ownership, responsibility, and accountability for the content and integrity of the scholarly work and intellectual products. Authorship should be limited to those who have made a significant scientific contribution to conceptualization, design, execution, and/or interpretation of the research study. Authors should ensure that care and effort have been taken to determine that all the data are complete, truthful, accurate, reasonably interpreted, and retrievable for re-analysis. Authors should ensure that in-house developed reagents and codes are fully tested and in a distributable/publishable format. Our lab is dedicated to producing robust and reproducible science. Data manipulation of any kind will not be tolerated (see also section on [Research Integrity](#)). If you notice/suspect someone doing this, please contact Élie immediately.

ii. Arrangements and Expectations

The team member (besides Élie) most familiar with the project details and with the deepest and broadest perspective will be the lead author and listed as first author on the manuscript. The first author is not the same as the corresponding author, which is in most cases Élie. The lead author is expected to commit to completion of this project, including assisting in response(s) to the reviewers/editor which may span beyond their time in the lab. It is most effective if the same person serves as lead author from the project's launch to publication. While the first author is expected to guide the paper to completion, it may not be possible for one person to oversee the whole project. If the original lead author must step down, a replacement will have to be assigned or elected. The project/manuscript should be '(co-)owned' by that person going forward, and first authorship will be shared. First author(s) are responsible for the bulk of data acquisition, analysis, figure preparation, and writing (main text including figure legends, cover letter, and response to reviewers/editor). To reflect our commitment to teamwork, all lab members are encouraged to collaborate and have the opportunity to receive co-authorship that reflects their contributions. Authorship will be discussed on the outset and throughout project development. The lead and corresponding author should keep track of everyone's contributions, potentially in a document accessible to view for the whole lab (i.e. shared spreadsheet). Each of our research papers should ultimately tell a story, and this story is the principal, tangible result of the group's work. Co-authors are expected to contribute scientifically and participate actively in helping the lead author in the writing, editing, and proofing of the manuscript at all stages. While we generally err on the side of generosity, gift authorship will not be considered. Negotiation of authorship (both inclusion and order) should be open, professional, and respectful. We encourage team member to discuss this way before the time of submission, if an agreement cannot be achieved then Élie will step in. Any changes in authorship should be approved by all original authors. If you need clarification on authorship issues, please talk to Élie. Anyone who fails to fulfill the minimal requirements (see below) will be taken off the author list. We follow the [CreDiT](#) method of contributions.

iii. Examples of Authorship Assignments

Deciding: Collection of vital data (e.g. key and initial observations, traces/images for figures), conceptualizing, designing, and refining research, provision of resources necessary for the study.

Sufficient: the conception of the study, processing and interpretation of data, designs of the study, provision of specialized expertise, novel reagents and analyses.

Necessary but Insufficient: discussing the results and implications, reviewing, editing, and critiquing the manuscript at all stages, final approval of the version to be submitted/published.

Insufficient: technical services, editorial assistance, formatting of manuscript, preparation of research result (e.g. figures), performing basic statistical analyses, literature search, general training/supervision of junior researchers, gifting of store-bought reagents.

11. Departing/End of Contract

Leaving a lab can be difficult for a variety of reasons. Sometimes lab funding dictates when a lab member must leave, and any kind of changes in lab funding that may affect your position will be communicated as far in advance as possible. Your well-being is the primary concern, and Élie will make every effort to communicate if funding changes will affect your employment or if performance is becoming an issue (see [Expectations section](#) for more information on what Élie expects from you and what you can expect from him). Most likely, you're moving on to an exciting next stage of your career and we want to make that as easy as possible. If this is the case, to ensure a smooth transition, please let Élie know as soon as possible when you will be moving on. Ideally, if we communicate well and organize things properly you should not worry about having to answer questions from us about where things are or how you did a certain experiment. In addition, we want to make sure that all your work here is properly acknowledged, that we do not waste any samples or reagents, and that we go through all the proper administrative items that need to be addressed. Ideally, you are handing over your project(s) to a current lab member. In this case, Élie and all parties of interest should sit down and discuss the status of each project, the location of any relevant supplies/samples/resources, and the current state of contributions to the project.

i. Notebook

You should ensure that all your ELN/lab notebooks are accessible to everyone in the lab and are up-to-date and organized. This includes having detailed protocols that you developed/pioneered, or protocols that were developed by others, but you are the sole user, written and deposited in the ELN for everyone to access. You must leave original paper notebooks in the lab, but you are welcome to make copies of these and to take a PDF copy of your ELN. After you leave the lab, you will not have free access to the lab's ELN, so if you want to have protocols or certain items stored there, make sure to take them prior to leaving the lab. We are happy to send information in the future, but it's easiest for you to organize that prior to leaving.

ii. Reagents

If you have boxes in the freezers/fridges, please consolidate these down to what is essential going forward for the project. Please discuss this with Élie and/or lab members who will continue on your project(s). It is also your responsibility to make sure all your bench and desk space is organized and cleaned. If you have solutions or consumables that are half used, please first ask if someone in the lab wants them and, if not, then discard them appropriately. If you have any questions about if something should be thrown away, feel free to ask. In addition, please catalog what you are leaving behind and

make sure that tubes are labeled appropriately (i.e. coherent identifying information, dates, etc.). This information should be available either in your ELN or on a shared drive.

iii. Contact after leaving

If you feel comfortable doing so, provide the lab with your personal/new contact information going forward. This allows us to stay in touch and ensure that your data/previous work goes to good use and is properly acknowledged. After leaving the lab you are always welcome to contact Élie about the status of a project, how your contributions have changed over time, and when you can expect to see a finished product from your non-complete work. Lastly, we are interested to see where all trainees end up in life. Please stay in touch; we would love to hear from you!

12. Credits

This document is based on the Lab Manual published by the eLife Community Ambassadors.

