Lippmann Lab Onboarding

2020-12-16

Contents

Preface

The purpose of this document is to outline what the Lippmann lab expects from incoming graduate students and postdoctoral fellows in terms of organization, work ethic, and accountability, as well as to help new lab members get integrated as quickly as possible.

Chapter 1

General

1.1 Lab Accounts

1. The lab has a Google Drive Folder that we use for documentation and inventory. It should be kept as up-to-date as possible.

2. The lab has a Slack, which we use more quick messaging.

3. Request to be added to our lab's listserv by emailing Alex Sorets. This is generally used for longer, lab-wide announcements.

4. Email our building manager Ross Denham for access to Olin Hall 004A, 117, 118, 119 and 213A and for afer-hours access to the building. Have Ethan CC'ed on the email so he send his approval to your email.

5. Our lab also has 3 calendars to schedule general lab events, book specific hoods, and to book time on our microscope. Request access to these calendars: Lippmann Lab Calendar, Lippmann Lab Microscope, Lippmann Lab 118 Small Hood.

6. Create an iLabs account. The first time you log into your account, you will need to add "Lippmann, Ethan (VU) Lab" to your groups. You should use the menu on the left side of the screen and click on "Manage My Groups" to request access. {#ilabs}

7. Send an email to the Vanderbilt IT Department asking for access to our lab's shared network drive. Include your VU NetID in this email.

8. Finally, our lab has a Github that we use for code versioning and internal sharing.

1.2 Becoming an effective researcher

There is no set formula to facilitate a productive research career but based on Dr. Lippmann's experiences and the graduate students he's seen crash and burn, he expects that you will:

- **Spend 40-60 hours a week in the lab environment.** This includes actual bench work and time at your desk spent updating your lab notebook, organizing data, writing papers, planning new experiments, etc. Learning and innovation in the laboratory is partly through osmosis and casual conversations, so make an effort to be around your peers during normal working hours. You may choose to spend some time outside the lab if you are in the process of writing a paper, but more work is inevitably done inside the lab and student office compared to at home.
- **Do your work when it needs to be done.** Wet lab work often necessitates experiments at strange hours (e.g. 6 hour time points) or on weekends. My policy is that you do your work on schedule. Then, if your schedule is free during the week or weekend, take your time off then. I often left work at 3pm during graduate school if I knew I'd be pulling a 9-5 on Saturday. Your schedule is your own to set (aside from individual and group meetings) as long as I know you're striving to meet the research goals we set together. Burnout is a real problem, and we try to avoid it at all costs.
- **Preparation, preparation, preparation.** Putting together an experimental design by yourself and together with me can save days or weeks of unnecessay delays by identifying potential pitfalls, proper control conditions, etc. Always think in great detail about the experiment before you do it!
- **Be honest with your data - to Dr. Lippmann and yourself.** Falsifying data is obviously grounds for immediate dismissal from the lab. However, you must also be careful to not bias yourself on what your results actually mean. If you do an experiment three times, and get three different answers, you can't simply report the one that worked the way you thought it should. Always follow the scientific process and determine what you did that gave you these different results. *Your common sense and observational skills are often the most valuable tools in your research.*
- **Read, read, read.** All the knowledge I have has been accumulated from years of reading anything I found interesting. If I saw an editorial on an interesting topic, I read it and then read all the citations associated with it. If I saw an interesting seminar, I looked up the papers written by the seminar speaker. However, I can't be your go-to source on every topic. Your will have to read primary literature and reviews to build your knowledge base. If you are reading a paper and don't understand a

technique, protein, system, etc. that was used, look it up! Wikipedia is a surprisingly helpful for learning biology, and you can find a Youtube video for almost any experimental technique these days.

- **Stay current on the literature.** Set up automatic email alerts from Nature, Science, Cell, and their daughter journals. Then, set up your My NCBI account on PubMed to give you monthly updates on a variety of keywords relevant to your projects. You can use your Vanderbilt account to log into My NCBI by choosing "See more 3rd party sign in options" and searching for Vanderbilt. You also access the Vanderbilt library through Google Scholar by adding all the Vanderbilt Library options to your library links in your Google Scholar settings. The more you know about current findings and techniques that may be relevant to your research, the more novel and innovative you allow yourself to be.

- **Keep a personal library of the papers you read.** Use whatever program you want. I use Zotero because it's free and compatible with Microsoft Word for adding a bibliography to a manuscript. This saves a lot of time when trying to track down things you have read and want to cite.

- **Keep your lab notebook up-to-date.** One of the more annoying events in research is having an experiment fail, then trying to remember what you may have done wrong rather than simply tracing the written details on paper. Your lab notebook should be by your side every day as you work, and you should be writing in it constantly. We buy lab notebooks in bulk from Amazon, so you can get a new one whenever you need it.

- **Attend campus seminars that are relevant to your research, and probably a few that you simply find interesting.** Hearing a prominent researcher talk for 45 minutes is often more productive than reading 10+ of his/her papers. Likewise, a talk may not be releated to your work, but the techniques being used are. Sign up for email alerts on semiar postings in other departments on campus. Commonly attended seminars include the Chemical Engineering Seminar, Biomedical Engineering Seminar, Stem and Progenitor Cell Interest Group (SPRING) meeting, and the Alzheimer's Disease Journal Club.

- **Rely on the experience of others.** I'm here to help and so are the senior members of the lab. The success of the lab depends on effective teamwork and appropriate integration of new members. When you become the senior lab member, be sure to return the favor to your junior colleagues.

- **If you want to build something:** We have a 3D printer and CNC machine. McMaster-Car has an amaing catalogue of parts, fitting, materials, etc. VIIBRE has an excelement machine shop and offers technical advisement, and we have a small machine shop in the basement of Olin. The

Vanderbilt Institute of Nanoscale Science and Engineering (VINSE) in the Engineering and Science Building (ESB) has a variety of instruments and a clearn room. Leon Bellan's lab (Mechanical Egnineering) has built some interesting new microfluidic capabilities and is an excellent technical resource. Basically, if you think you can design and build something to assist your research, I will not discourage you!

1.3 Fellowships

All lab members are expected to apply for external funding. For graduate students, this includes the NSF GRFP, NDSEG, NIH F31 fellowship, and AHA pre-doctoral fellowships. Dr. Lippmann can discuss other opportunities that arise, and he will be cognizant that certain students are not competitive for certain fellowships, but every student-earned fellowship provides more money that can be spent on supplies and equipment. Current and previous students have uploaded their applications to Google Drive for internal sharing.

1.4 Lab Upkeep

Labs are inevitably messy and disorganized, but there are certain steps that need to be taken to ensure safety is maintained and reagents aren't wasted.

- **Label the details on everything you make.** What if you pH a buffer to 7.4, but it should have been 8.4? Will you remember these details if your experiment doesn't work and the bottle wasn't labeled? *Also know the shelf life of the reagents you prepare. Expired reagents can cause similar headaches. It is up to you to know how long a particular solution will be active before needing to prepare a new one!*
- **When a product arrives, label it with the date it was received and then opened.** See above.
- **When the product arrives, make sure it's stored properly.** Fridges, -80 Freezer, -20 Freezers, flammables cabinet, acid/base cabinet, etc.
- **If you buy a new reagent, add it to our lab Chemical Inventory. Print out its MSDS form and add it to the in-lab binder. Last, add the compound to our Vanderbilt Chemtracker Inventory**
- **Treat reagents appropriately.** Does your reagent need to be desiccated? If so, put it in the right place. Is your reagent anhydrous or hygroscopic? If so, wrap the cap in parafilm to prevent moisture accumulation. And so on… If you are unsure how to store, use, or dispose of a reagent, talk to a senior lab member.

- **Handle antibodies, growth factors, and small molecules appropriately.**
  - *Always use sterile microfuge tubes and work in the biosafety hood when preparing anything that will be added to cells!*
  - If an antibody arrives frozen, thaw it on ice and aliquot into individual tubes before refreezing (typically 5 μL per tube).
  - If you buy a new antibody, add it to our Antibody Inventory.
  - Growth factors will typically arrive as lyophilized powders. Reconstitute them according to their instructions (the product sheet should specify water, PBS, dilute HCL, etc.), add 0.1% human serum albumin, and store as working aliquots in the -80 freezer.
  - *Freeze/thaw of proteins leads to loss of biologyical activity!* Once an antibody or growth factor is thawed, *you should not refreeze it,* but you can store whatever you don't use in the fridge for 1 week. This ensures that these expensive reagents don't get needlessly wasted.
  - Small molecules are typically resuspended in water or DMSO. Check the data sheet before reconstituting and check to see if the reagent is light-sensitive (store in an amber microfuge tube). Then, distribute into microfuge tubes and refreeze. For small molecules in DMSO, if the stock solutions won't be used for >1 month, wrap the cap of each tube in parafilm to prevent water uptake. If a layer of liquid has formed above the frozen sample, discard it for fear that its activity may be compromised. Additionally, small molecules are typically added to the cells' media the day that you will add it to the cells; exceptions will be noted during training or in the protocols.
- **Make sure that the liquid nitrogen tanks are filled and its records are current.** Our cell stocks are virtually irreplacable if the liquid nitrogen tanks fail or run dry. Everyone plays a part in making sure their levels are suitably high. Likewise, when you bank cells or remove a vial, be sure to update either the small tank spreadsheet or the big tank spreadsheet so we know exactly which lines and how many vials we have on hand.
- **Be a good lab citizen and clean up after yourself.** When you leave the cell culture suite or the lab, there should be no traces that you ever did an experiment. If you use the last of a reagent or are planning on using a significant amount of a reagent, make sure you order more so that you do not affect other lab members' experiments.

1.5 Safety

Appropriate personal protection equipment (PPE) should be used. Shorts are fine in the summer, but they must always be accompanied by close-toed shoes.

Protective eyeware is required if you are in lab longer than 10 minutes, and especially if you are using any chemicals or the liquid nitrogen. Lab coats are optional in the main lab for routine work but should be donned for chemical handling. Lab coats are required during cell culture. We provide everyone with their own safety glasses/goggles and cell culture lab coat.

Chapter 2

Lab Values

2.1 Lab Philosophy

2.2 Code of Conduct

The lab should be a fun and safe place for everyone to work. Any issues, personal or professional, that affect the lab environment or the well-being of any of its members should be brought to my attention *immediately.* I will do my best to promote a sense of camaraderie and accountability, but it is the responsibility of every individual to be good lab citizens.

2.3 Responsible Conduct of Research

2.4 University Resources

Chapter 3

Before You Can Work in the Lab

3.1 Logging onto Oracle to Access Training Modules

Everyone is required to take several training modules through Oracle.

1. Log onto Oracle.
2. On the home screen, click on the "Learning" button.
3. Search for the course that you want to take.
4. Click on "enroll" and complete the class.
5. Take a screenshot of the completion screen for each online module and upload it into the lab's training folder. Additionally, add your information to this spreadsheet.

3.2 Required Training Modules for All Lab Members

- Biosafety 101 - renewed annually
- Working Safely with Human Derived Specimens
- Principles and Practices of Biosafety
  - The course schedule can be found here

  - To sign up for a class, send your Biosafety 101 completion screenshot to VUMC Biosafety. Subject your email with "Biosafety training request," and also include information about which date you would like to sign up for.

- Chemical and Physical Safety in the Lab - renewed annually
- Chemical Waste - renewed annually
- Regulated Medical Waste Shipping Training for Lab Researchers USDOT - renewed every 3-4 years

3.3 Required Training for Lab Members Conducting Animal Studies

If you are working with animals, you should also sign up for the following training module:

- Prior to starting animal work, new lab members must be added to the appropriate IACUC protocols.
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Chapter 4

Meetings

At the beginning of each semester, Ethan will send out a email with the meeting schedules and locations. He will take into account graduate students' course schedules when assigning the meeting times (if applicable).

4.1 Group Meeting Research Presentations

Presentations to your lab mates are often the only practice you will get before having to give a presentation at a seminar or conference. Therefore, I expect these presentations to be taken seriously and reasonably polished. There is no fixed length for a group meeting presentation, but it should have a clear introduction and coverage of the research significance, clear data presentation, and your thoughts on future directions for the work. *Imagine that you are presenting on a manuscript that you are writing: the important parts are the introduction, the methods, the results and data presentation, and your concusions from the data.* Remember that even if you are presenting similar data from your last presentation, the group may have new members or outside visitors, so it is your job to make sure they understand what you are talking about.

4.2 Journal Club

Every other week, the lab holds a journal club. These meetings consist of presentations on a recent article from the literature that is relevant to our research. When you are in charge of journal club, it is your responsibility to:

1. Choose a manuscript up to a week before the meeting and send it to your lab mates to read and

2. Prepare a presentation on this manuscript.

The presentation should have a small amount of background on the PI whose lab conducted the research, a small amount of background on the topic, and the relevant figures from the manuscript that convey its message. Also, be sure to touch on the quality of teh data and whether or not you agree with the conclusions reached or the claims put forth. Lab members who are not presenting are expected to read the article and come prepared to discuss the findings.

4.2.1 Other Group Meetings

Occasionally, other group meetings will be scheduled on the off-weeks of Journal Club to discuss other topics such as Ordering Demos. This information will be discussed when scheduling these additionally meetings. Additionally, Ethan may request for people to attend other meetings for feedback and collaborations.

4.3 Individual/Subgroup

Every other week, lab members will either meet individually or in subgroups based on overlapping research interests. You should always be prepared with the presentation described in the next session and talking points you want to cover, but you shouldn't be afraid to tell me that you couldn't get everything done that you wanted to accomplish or that your experiments failed. Your preparedness for our meetings will often be the primary determinant of how long they last.

4.3.1 What to Prepare Before Your Individual/Subgroup Meeting

Everyone is expected to use the template of "What I did last time, what I did this current period, and what I plan to do over the next 2 weeks." Data are expected to be worked up and legible to help ensure that progress is being made towards publications, grants, and graduations. Younger students can ask more senior students for examples if unsure what to prepare for individual/subgroup meetings.

4.4 Office hours

Once a week, Ethan has an open "office hour" when anyone can stop by Ethan's office to talk about data or career plans or just to chat.

4.5 Practice Presentations

Oral presentations is an essential part of scientific training. If you have any upcoming oral presentations (graduation requirement or general presentation), you can email or Slack message the lab to try to set a time to practice your presentation. Additionally, senior members are happy to look over documents, presentation slides, or posters and provide feedback.

Chapter 5

Ordering

5.1 On Campus Core Facilities

There are a couple places on campus where reagents and chemicals are stocked and can be purchased for immediate use.

5.1.1 Chemistry Storeroom (aka "Chem Stock")

Chemicals can be purchased for immediate use at the Chemistry Stock Room (located in the Chemistry building of the Stevenson Center Complex) including 200 proof ethanol, bleach, and acetone. This storeroom also has many other useful items such as NMR tubes, beakers/flasks, gloves, lab notebooks, lab coats, safety glasses/goggles, and tubing. Items can be ordered using the iLab Chemistry Storeroom webpage for pick up. Make sure you have the proper secondary container if transferring chemicals like acetone from the storeroom to the lab. Ethanol and bleach do not need secondary containers.

5.1.2 Molecular Cell Biology Resource Core (MCBR, aka "The Core")

Many disposable items that we use are available through MCBR for immediate use including PBS, UltraPure Water, Western Blot secondary antibodies, DMEM/F12, Neurobasal Medium, B27 supplement, N2 supplement, etc. This is the best option if you need a reagent immediately or are not buying in bulk. MCBR is located in rooms 902 and 904 of Light Hall. In addition to stocking supplies, MCBR also provides DNA/RNA oligo and siRNA ordering services, is a instrument facility (rtPCR systems), and a cell culture media preparation service. Purchasing items will be conducted through your iLabs account while

you are in the Core. You can also also check whether items are in stock or request for them to be purchased using the iLab VUMC MCBR Core (Molecular Cell Biology Resource webpage).

5.2 Ordering Training

5.2.1 Departmental Shopper

Departmental shoppers are able to create requisitions in Oracle, but are not able to submit their requisitions for processing. They must reassign their requisitions to a Procurement Requester for the order to be placed. Every lab member should become at least a Departmental Shopper.

1. Access the Introduction to Oracle Cloud Procurement training module in Oracle using the steps listed in the Training Chapter.
2. Open the "Me" section in Oracle.
3. Click the "Roles and Delegations" button.
4. Click the "Add" button to request the role of VU_Departmental Shopper. Click "Save" to confirm.
5. Make sure that VU_Departmental Shopper is included in your Role Requests Section. This role should become active within a business day.

This link describes instructions listed above with images.

5.2.2 Procurement Requester

Procurement Requester are able to create and submit requisitions in Oracle.

1. Email Felisha to ask her to put you on the list for the purchasing training course in Oracle. Let her know if you are already a Departmental Shopper and that you would like to become a Procurement Requester. At least a few lab members should become a Procurement Requester.
2. Complete the online training, which includes meeting with Felisha or the FUM.
3. Attend a training session conducted by Purchasing Services.
4. Have someone in the lab review your first catalog and non-catalog orders.

5.3 How to place orders

Commonly purchased items are listed in this spreadsheet. This Purchasing Folder also stores additional useful ordering information.

5.3.1 Prior to Creating a Requisition in Oracle

1. Download and fill out the Purchase Request Form.
    - Required information includes: Vendor, Justification, POET Numbers, Item Quantity, Unit, Model/Catalog #, Description, Unit Cost, and Total Cost , Quote Number (if applicable).
    - If splitting order among many grants, list this information in the in the COA/POET number(s) section.
    - Justification should include information about what you are purchasing and how it will be used for the grant you are charging it to.
    - General lab items can have a justification such as "[Item] will be used for general lab procedures/cell culture for [grant name]."
        - Amazon orders must also include this statement : "These items could not be found with these specifications or this price from any other vendor."
    - Save a copy of this file for your records. The recommended naming format is "Lippmann lab purchase request form - YearMonthDay - Vendor.xlsx." Make sure to save your quotes too for future reference.
    - One purchase request form should be filled out for each vendor you are purchasing from.
2. Send the PO request forms (and quotes if applicable) to Ethan for approval. Make any edits that he lists and resend for final approval. Save his approval emails for later.
3. Once you have Ethan's approval, you can proceed to creating a requisition in Oracle by selecting the "Purchase Requisitions" button in the Procurement tab.

5.3.2 Catalog Orders

Catalog orders refer to any vendor that can be found on the Acquire catalog. These vendors include Abcam, Cell Signaling Technology, Fisher, Guy Brown, McMaster, Sigma, and VWR.

1. Click on the down button next to "Shop by Category" and select "Acquire."

2. Select the vendor you are ordering from.

    - Make sure that the vendor is linked to your Oracle Cloud account before proceeding. The page usually lists your email or notes the Vanderbilt Purchasing Department on the home page.
    - If you are not linked, simply return to the Acquire catalog page and reselect the vendor.

3. Add the items you have been approved to purchase.

4. Go to your cart and checkout. This should return you to the Acquire Catalog.

5. Click the "Check Out" button on the Acquire Catalog page, which will create the beginning of your requisition.

6. For the "Description" section, include this information at the minimum: Your Last Name - Lippmann - Vendor. You can also include information about what you are ordering in this requisition if you want.

7. Copy and paste your justification from your purchase request form to the "Justification" section.

8. Under attachments, include a copy of Ethan's approval. Make sure the Category is set to "Approver." Click "OK" to save. See the "Information to Include When Reassigning to a Procurement Requester" section for additional attachments to include if you are a Departmental Shopper.

9. Make sure your "Deliver-to Location" is set to Olin Hall 107.

    - The exception is AL Gas Orders.
    - You can make this your default by ***fill in***.

10. Each item needs to have the Billing information filled out. You can edit multiple items by selecting all the items that go on the same grant, clicking the down arrow by "Actions," and selecting "Edit."

    - Under "Project Number," put the grant number before the period (ex: 601413 for CZI).
    - Under "Task Number," put the grant number after the period (ex: 1 for CZI or 10 for Start-Up).
    - The "Expenditure Type" should be "SuppLab" for almost every requisition you make.
    - The "Expenditure Organization" is 15220 - Chemical Engineering. This is true for all requisitions you make no matter what your home department is since Ethan's primary appointment is in the Chemical Engineering Department.

- You should fill out the "Charge Account" with the following information. You can edit this section by clicking the button directly to the right of the text box.
  - Entity: 150 - School of Engineering
  - NetAssetClass: 15 - Sponsored Contract and Grants (except Start Up which is 10 - Unrestricted Faculty and Student Organization Funds)
  - FinancialUnit: 15220 - Chemical Engineering
  - Account: 6105 - Supplies Expense - Lab
  - All other section should be kept at the default (000 or 0). These are just potential future labeling numbers that are not currently in use.

  -Click "OK" when done filling out.
- "Budget Date" should be the date you are submitting the requisition.
- If adding multiple items to the same billing information, put 100% in the "Percentage" section. If splitting the same item across multiple grants, send to a Purchase Requester to fill out as this can get slightly complicated.

11. You can save your requisition by hitting the "Save" button. It is recommended that you do this often. If you want to save the requisition to work on later, you can click the down arrow next to "Save" and click on "Save and Close."

12. If you are a Purchase Requester, you can hit the "Submit" button when you are done editing a requisition. If you are a Departmental Shopper, you can reassign your requisition to a Purchase Requester by ***fill in***.

5.3.2.1 AL Gas Orders

5.3.2.2 IDT Orders

5.3.3 Non-Catalog Orders

Non-catalog orders refer to vendors that are not on the Acquire catalog. This includes Peprotech, Genscript, Ted Pella, and Addgene. We typically

1.

5.3.3.1 Addgene Orders

5.3.4 Amazon and Captial Equipment Orders

Send your Amazon order purchase request form and Ethan's approval email to the Chemical Engineering Department. The subject of the email should be "Your Last Name - Lippmann - Vendor." Make sure your justification includes this statement in your purchase request form: "These items could not be found with these specifications or this price from any other vendor." Capital equipment is when at least one component is greater than $5,000. If you are unsure, talk to Purchasing Services. ### Information to Include When Reassigning to a Procurement Requester {#reassign} When you are reassigning your requisition to a Procurement Requester, please include the following information:

- Purchase request spreadsheet
- A copy of Ethan's approval
- Quote (if applicable)

Additionally, please check the box to send a notification to the Procurement Requester so that they know it has been reassigned to them. Procurement Requesters will approve it as quickly as they can so that the order gets placed.

5.3.5 Information to Include When Asking a Lab Member to Order Your Supplies

Sometimes lab members will send out a Slack message to see if anyone wants to add items to their orders. If you want them to order something for you, please include the following information:

- Name of item
- Catalog number
- Vendor (if asking them to create a new requisition for your supplies)
- Quote (if applicable)
- Quantity of item you want ordered
- Link to website (optional, but helpful if not a commonly purchased item)

5.4 Commonly Used Grants

These are commonly used grants to purchase lab supplies. Ethan may direct you towards more project specific grants depending on your work.

- Start Up: FF_220114.10
  - Generally don't use unless buying capital equipment or Ethan instructs you to use it.
- CZI: 601413.1
- R01: SFP_300234.1
- R21: 600799.1
- NSF (uF, microformulator): GC_404654.1

5.5 General Ordering Notes

- **Pay attention to the available amount of disposables.** Many orders take several days for the shipment to arrive. If you use the last pipette or culture plate and we can't get any more for a week, everybody's work suffers! When in doubt, just order multiple boxes of things like pipettes or reorder immediately after you open the last box.
- **Get quotes on kits or biologics exceeding $300.** If we buy in bulk, we will almost always get a discount off the website price. All you have to do is email or call the sales department for a company and they will provide a quote to be used on your order. Names, contact information for sales reps, and updated product quotes should be recorded in the Google Drive Purchasing Folder. If you are ordering from a new vendor that is not in the Vanderbilt system, you must get a quote and fill in the company information in the purchase request form.
- **Purchase from Chem Stock whenever possible.** Chemicals can be purchased from Fisher but typically the Chem Stock has the same ones at cheaper prices (especially 200 proof ethanol), and if the items are in stock, you can get them right away. You will need to make sure you have the proper secondary container for transferring the chemicals back to lab.
- **When purchasing from Fisher or VWR, we do not pay shipping.**
- **Many disposable items that we use are avaliable through the Molecular Cell Biology Resource Core (MCBR) - if stocked, these items are avaliable immediately and we do not pay shipping costs.** If not purchasing in bulk, always buy from MCBR if possible.

They stock many items from Thermo Fisher Scientific (Life Technologies), Sigma Aldrich, Promega, Qiagen, and Bio-Rad that we use frequently. You can also order non-stocked items through the Core that will NOT include a shipping charge, but you will have to wait for them to ship (a useful option if you don't need these items immediately).

Chapter 6

Manuscript Preparation

Your papes are your currency from your time in the lab - peer-reviewed proof that you are are highly skilled and successful researcher. As such, the final versions should be clear and concise but thorough and polished. Read a few papers Ethan published during graduate school and his postdoctoral fellowship (Lippmann et al, *Stem Cells,* 2014; Lippmann et al, *Nat Biotechnol,* 2012) to get an idea of the style he prefers. Additionally you can see a list of the papers that have been published by members of the lab here.

6.1 The Process

1. **Outline the paper.** In general, Ethan prefers that you meet with him to discuss an outline of the paper, most notably the general message of the introduction and how the data/figures will support the claims made, prior to initiating the writing process.

2. **Pick a target journal.** For obvious reason, not everything gets submitted to Nature or Science. Have a good idea for what you think the significance of your work is, whether it belongs in a broad journal versus a specialty journal, and how quickly you want to get it published.

3. **Read the journal's author guidelines.** Most journals have their own specific figure guidelines and word limits. Unless you want to tear your hair out reformatting, check the journal requirements first.

4. **You will write the first draft - Ethan will be heavily involved in your first paper-writing attempt but preferably less so therafter.** Some re-writes by Ethan is inevitable, but he will try to be constructive if he doesn't agree with the language you've used or the conclusions you've drawn.

5. **Track changes as best you can between versions.** If you don't agree with a change Ethan has made, make a comment in the document so he doesn't think you're just ignoring his opinion. Save each version as a different file in case you need to go back to something written in an earlier version.

6. **Assemble your figures in Photoshop or Illustrator.** Most journals require a certain resolution and may have their own requirements on fonts and sizes. Ethan typically does all his figure preparations, including labels, in PowerPoint and then assembles these parts in Photoshop at the desired figure resolution (typically 300-400 dpi). After assembly, images can be compressed by flattening the layers into one final plane. Most journals also require images to be below a certain size (usually 10MB).

    - The lab has a Biorender license, so you can ask Ethan to get access to the program in order to make figures.
    - Vanderbilt IT Software Store provides free software to students, staff, and faculty including Microsoft Office 365 ProPlus and ChemBio-Draw as well as discounted subscriptions such as Adobe Photoshop and Prism. If you think a program would be broadly beneficial for the lab to purchase a license for, discuss it with Ethan.

7. **After assembling the figures and submitting the paper, provide Ethan with the figures *minus* their lettering (a, b, c, etc.).** This makes it easier to use these figures for presentations.

8. **Any data used to compile a graph of some sort should be provided to Ethan in an Excel spreadsheet.** This ensures that he has a copy of the original numbers after you leave, complying with RCR practices. Many students choose to set a folder for their manuscripts in Box that contains raw and processed data.

9. **Celebrate when the paper is accepted.** First round for the entire lab is always on Ethan!

6.2 Tips from Senior Lab Members

- Getting started is the hardest part - just start writing once you are ready and get words on the paper. Things can be edited down afterwards before sending it to Ethan.
- The university has a few writing accountability
- CZI/Katja

Chapter 7

Data Management and Shared Resources

7.1 Storage and Documentation

7.2 Reference Management

How to download, how to install add-ins for citation managers

7.3 Communication

How to present scientific work Journal club templates - how you present a journal club article Advice on creating posters, present virtually - better poster movement

7.4 Streamlining

Streamlining and Consolidating storage and docs - when do things go where (servers, GitHub, Google drive, Dropbox, hard drives, …) - could start with rules: manuscripts here, data there - or raw data goes on server, intermediate data/what could be presented and shared goes to Dropbox

7.5 Computation/Data Analysis

- software, norms for analysis
- scripting (language), version control
- documentation

Chapter 8

Frequently Asked Questions

These are topics that are commonly asked about when new members join the lab.

8.1 Scheduling Vacations

Taking time off is necessary to avoid burn-out during graduate school. While iPSC culture requires daily maintenance, it is still possible to take vacations and rest. Short trips over the weekend do not need to be cleared with Ethan, but Ethan should be aware if you are planning on taking longer periods of time off.

If you are asking another lab member to cover your work while you are out of lab, you should ask that lab member at least a week before you are gone (unless it's a personal health or family emergency). Before you leave you should provide the following information:

- How long you'll be out of lab
- What cells need their media changed each day you are gone and what media to use following this template.
- Where the cells are located
- Where media and other necessary reagents are located
- How to make more media if the lab mate is not used to maintaining the cell types
- How to operate devices (if needed)

- If you want more iPSCs when you come back and if you are leaving Matrigel plates

You should not:

- Ask your lab mate to run experiments for you while you are gone
- Maintain short term differentations (ex: BMECs) or common iPSCs (ex: CC3s) if you'll be gone for a week or more

Typically, first year students will get Thanksgiving break off. More senior students will rotate who covers this holiday. The lab generally shuts down for the holidays in December/January, although a couple of lab members may stay behind for maintaining long-term cultures (like neurons or organoids) or animals. Holidays such as the 4th of July or Labor Day are usually treated as half days where many people usually choose to do their bare minimum work and take the rest of the day off. If lab meetings fall on the U.S. Election Day, Ethan will cancel those meetings in order to allow lab members to vote if they have not already.

It is up to you to make sure that you are getting the necessary work done in order to graduate on time.

8.2 Registering for Courses in the YES Portal

Graduate students register for courses on the Vanderbilt YES Portal. You can register for courses using the "Student Registration" tab. All graduate students are required to enroll in 9 credit hours every semester.

- Enrolling in Classes:
  - Search for the courses you are required to take/interested in taking
  - Click on the course and click the "Add to Cart" button at the bottom of the pop up screen.
  - Move the to "In Cart" tab.
  - Click the down arrow at the left side of the course. Click on "Enroll."
  - You can see how many courses/credit hours you are enrolled in for each semester by moving to the "Enrolled" tab.
- Enrolling in Research Credit:
  - Search your home department in the search bar.
  - If you have not passed your qualifying exam yet, select Ethan's course in the Non-Candidate Research offerings. If you have passed your qualifying exam, select Ethan's course in the Ph.D. Dissertation Research offerings.

  - Enroll in the course using the instructions listed in the "Enrolling in Classes" bullet point.
  - Move to the "Enrolled" tab. On the right side of the course, there is an edit button (looks like a pencil and paper). Click the edit button.
  - Select the number of research credit hours you need to enroll in, and click the "Save" button.
  - This needs to be done every semester even after you are done taking classes for Vanderbilt tuition purposes (Ph.D. students do not pay for tuition themselves).

8.3 Recommended Elective Courses

Graduate students are expected to take courses that are required by their specific department. Some training grants such as the T32 in Environmental Toxicology also have course requirements that appointees must take. The number of elective classes you can take varies by department, but here's a list of common elective courses that Lippmann Lab graduate students take to finish their course requirements:

- NURO 8345: Fundamentals of Neuroscience I (offered every Spring)
- NURO 8365: Neurobiology of Disease (offered every Spring)
- CHBE 5890: Special Topics - Biomolecular Engineering and Design (Ethan's elective course that is offered every other Spring)
- BME 8901: Special Topics - Mol,Cellular,&TissueMechanobio (offered every Fall)
- BME 7410: Quantitive Methods in Biomedical Engineering (offered every Fall)
- CHBE 5820: Immunoengineering (offered every Spring)
- BME 8901: Computational Genomics (offering variable)

BME students can take 1 Chemical Engineering Course as as BME Course requirement with no questions asked. Additional courses must be cleared by Dr. Reinhart-King.

8.4 Core Facilities on Campus

8.5 Training Grants

8.6 Common Conferences

8.7 Two Factor Authentification

Vanderbilt uses Duo Security for extra protection when logging onto Vanderbilt website and to access files remotely. Use this link to set up Duo with your computer or phone.

8.8 Mentoring Opportunities

There are many opportunities to mentor younger students in the Lippmann lab.

- High school
- Undergraduate
- Senior students

8.9 Outreach Opportunities