Lab FAQ

Grid Verification Lab
University of Vermont

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Introduction

This document serves as an internal FAQ for common questions that arise in our lab. This document was written by Sam and sometimes uses his voice (I $\triangleq$ Sam) and sometimes uses your voice (I $\triangleq$ you).

Frequently Asked Questions

Q: Why are we doing any of this?

A: Why do anything at all? Why go to the Moon? Everyone has very different reasons for pursuing academic research: career advancement, travel to the US, solve climate change, explore hard problems. Sam's reason: I like to think deeply and creatively about different applied mathematical problems each day, and I don't think I can have this level of mathematical freedom in industry. I could be wrong.

Q: How long should my BS/MS/PhD thesis be?

A: Famously, John Nash's Princeton PhD thesis was only 26 pages long. David Rector's MIT PhD thesis was only 9 pages long.

So, how long should yours be?

"As long as it needs to be, and no longer," is one guiding philosophy. My MS thesis advisor, Paul Hines, thought of a thesis as representative collection of things that you worked on in graduate school. My PhD advisor, Luca Daniel, thought of a thesis as document which should allow the graduate student who comes behind you to "pick up right where you left off".

My UVM MS thesis was written over 1.25 year and is 149 pages long, and my MIT PhD thesis was written in 4.5 years and is 277 pages long, so thesis length is definitely a nonlinear function of time (and effort). Shorter is generally better, but not too short.

Q: I am funded by project X. Should I spend all of my research hours on project X?

A: Some of my best ideas and most successful papers on topic Y have emerged when I was working on and funded by project X. This is another perk of academia: you get to spend some of your time working on unfunded, interesting ideas with colleagues and lab mates. However, if you are funded by project X, the most important goal is to successfully accomplish project X deliverables.

- ➔ If you are able to do this, I encourage you to explore other problems and new collaborations.
- ➔ If you are unable to accomplish project deliverables, it's important to "get your house in order" before you start branching out.

Q: How many credits should I register for?

A: In the summer, MS and PhD students should register for 5 research credits. During the semester, "full-time GTAs/GRAs are required to be enrolled in a minimum of 9 credits per semester." For first year PhD students, this is typically 6 credits of academic courses, and 3 credits of research. **Note:** Each credit represents 3 hours of commitment per week.

Q: My offer letter says my employment is 20 hours per week. (Hurray! Half time!) How much time am I expected to be working?

A: In the summer, if you pair this with 5 credits of research, then we expect 5*3+20 = 35 hours of effort, at a minimum. In the winter, if you are taking X research credits, then we expect X*3+20 hours of research (so, 38 hours of research, if you are taking 6 research credits).

- Personally, I have never succeeded in a job where I was counting the hours. If you want to succeed in research, but you are watching to clock until 5PM each day, then you might think about why this is the case.

Q: What classes do I need in order to graduate?

A: Generally, I don't know. To find out, I alwasy check here (or, whatever the most recent version of this graduate EE handbook is). Knowing the requirements stated in this hand book are your responsibility. Check it each semester. Are you on track? Are you missing something?

- Don't assume other people are crossing your t's and dotting your i's! In grad school, my advisor left when he didn't get tenure, so I switched to a new advisor in a different department. Through this tumult, I learned my handbook backwards and forwards, since I needed to make sure I was on track to graduate.

Q: How can I get VACC access?

A: Ask Sam, and he will add you to our lab's VACC account.

Q: Should I apply for summer internships?

A: Yes, please do! I will be very support if it aligns, even loosely, with your research. Consult with Sam, though.

Q: I need to buy lab or office supplies (monitor, markers, paper, etc). What should I do?

A: Find items on Amazon, and then send the link to Sam. He will use UVM's Amazon business account to purchase the items, as needed. **Note:** UVM doesn't buy these things for us; Sam uses grant money or startup cash.

Q: I need to register for a conference or a pay a professional society fee. How can I do this?

A: Ask Sam for his UVM credit card (called a "PurCard", like a purring catamount, or a purchase card). If you buy something in the state of Vermont with this card, you cannot pay tax with it! UVM is a tax-exempt organization. We cannot pay tax in the state.

Q: I need to travel for a conference. How can I book my travel? How much money can I spend?

A: UVM must approve all travel. Don't just book on your own! The easiest way to have automatically approved travel is to book through College Travel Partners' (CTP) Lightning tool. You can pay with your own card and get reimbursed, or Sam can pay with his PurCard. Alternatively, CEMS administrators can book group travel for multiple students at once. To set this up, email CEMS Research Support (CEMS.Research@uvm.edu), and Coco Hall will help

book travel arrangements and hotels. Note: hotels can be booked independently (i.e., directly through hotel or AirBnB websites), but flights cannot).

Expenses ($$): Every lab has its own culture. Ours is this: be thrifty. Travel to major cities is very expensive! Big travel budgets drain grant money more quickly. Two $3k trips are better than one $6k trip. Please do look for cheaper accommodations and flight options, when possible. Most important to know is this: when we travel, UVM doesn't pay for the travel costs, WE do (i.e., we use lab grant money or internal lab cash). Please be mindful of this when booking travel and accommodations!

Q: After a conference or trip, can I be reimbursed for meals and petty travel (e.g., Uber, metro, etc)? Do I need to save all receipts?

A: Yes, you can be reimbursed through UVM's per diem policy. Generally, you can receive up to $60 per day for domestic travel, and $75 per day for international travel. See more rules and rates here. You do not need to submit itemized food receipts to receive this reimbursement (Sam never really saves food travel receipts). If you have additional things you need to be reimbursed for (e.g., an expensive taxi ride to get to the airport), do save the receipt.

To file reimbursement, you fill out a travel reimbursement form. See a recent example here. For each day of travel, request a per diem amount. Per's Sam's guidance, this is how you should request per diem.

- Each meal is worth ~$20. If e.g., lunch is provided at the conference and you eat it, but you have to buy your own breakfast and dinner, request $60 - $20 = $40 for that day.
- This is not a hard-and-fast rule, but please try to abide my something similar.

Once you have filled out the per diem request form, send it to Sam for signature. Also, have Sam sign a "Student University Business Certification Form". Email these signed forms, along with a conference itinerary, to travel@uvm.edu, asking for help with filing a per diem expense report.

Q: How much time can I have off?

A: Nominally, please take up to 4 weeks of vacation per year. I recommend you take all of it. I will not formally keep track of how much time you take. If you need more time off, (e.g., a 5th week), please contact Sam. When you are taking time off, please (1) let Sam know at least two weeks in advance, (2) mark it on your Outlook calendar, and (3) keep track of your time.

- When you are not on vacation, I expect that you will generally be reachable by phone, teams, slack, or email Monday through Friday.

Note I: Academia is flexible. That's a perk of the job! Please don't feel like you need to formally take time off to, e.g., go to the dentist, stay home sick with a cold, swim across the lake, or show a friend around town. Also, in academia, learning (reading, studying, watching tutorial videos, etc.) is often times indistinguishable from working.

Note II: Research shows that it takes many days (approximately 8 days) before you really enter relaxation mode. So, taking two days off for a long weekend trip multiple times in a summer isn't necessarily as beneficial as just taking two weeks in a row (16 days!). Opt for more infrequent, longer holidays, when possible. Although, do as I say, not as I do, with this one.

Undergraduate Research

The following FAQs are relevant for students who want to pursue an REU with Sam in his research lab. They are also mostly relevant for students who want to do a HCol thesis with Sam.

Q: Can you be paid for research?

A: Yes! UVM CEMS has a Research Experience for Undergraduates (REU) program. You can also do the REU for credit. Generally, if you want to do undergraduate research with me, we will do it through the REU

Q: Can you do research in any lab you want to? Do you definitely get to work in Sam's lab?

A: No. A professor has to select your REU application from a pool of applicants. There is no guarantee that you will be hired to work in a research lab. UVM is an R1 institution; this means UVM does high caliber research, and faculty members are expected to regularly publish their findings in leading scientific journals. If you do research in my lab, I will expect you to be part of this mission.

Q: You want to work in Sam's lab. What are the expectations?

A: While I would like to work with everyone, I unfortunately cannot. If you do research with me, I have two expectations:

1. First, I expect you to thrive academically. If academics (i.e., classes) are a challenge, research should take a back seat: get your academic work in line before applying to an REU position. I aim to work with students who have a high GPA. GPA is just a number, and once you leave university, it means nothing. However, in the absence of other information, a high GPA gives me a sense that (1) you are doing very well academically, and (2) you are probably well positioned to succeed on hard academic research problems. For example, my work can involve a lot of linear algebra, calculus, and numerical computing. Doing well in classes which hinge on these topics is a good indication that you will be successful in associated research work. Therefore, I try to work with students who have a high GPA.
2. Second, I expect that you produce some sort of tangible outcome (e.g., a conference paper, a project deliverable, a useful codebase, etc). Simply wanting to "learn more" about a research topic (e.g., power systems) is generally a great goal in life, but you don't need to do formal academic research to learn! Youtube, Wikipedia, and textbook reading have you covered.

Q: Those expectations make sense to me, and you would still like to work in Sam's lab. What should you do next?

A: Take the following steps.

1. The first step is to decide on a relevant research question. To do this, peruse Sam's Google scholar and look at his recent research papers; take a look at his recent NSF CAREER grant; look at some of his recent blog posts (this is a recent work-in-progress; scroll to the bottom of the page to see "REU Research Ideas"); chat with ChaptGPT and come up with some relevant research questions that you think may be interesting to work on.
2. Meet with Sam and discuss what sorts of problems you would like to work on, ask him questions about other projects he could include you on, and then come up with a research plan proposal.
3. Finally, apply to the REU for the following semester. If you submit a compelling application on a relevant problem, your CV is strong, and Sam has room in his lab, you will be selected for an REU position.

Q: When I am working with Sam, how much time do I need to spend on research? How often will we have research meetings together?

A: Undergrad life is a roller coaster: some weeks you will have lots of time, and some weeks you will have negative time. On average, I expect that you will spend at least 3-5 hours on research each week. Regarding meetings: we will schedule our first few meetings together, and then after that, you will drive the frequency of our meetings. If you are motivated in your work and you want to keep pushing forward, we can meet frequently. However, if you are not motivated, we might only meet a few times per semester. **Meeting instructions:**

- If we discuss a set of action items in a given meeting, generally, we should only meet once those items have been addressed (or, you are stuck on addressing them).
- If we plan to meet for **X** minutes, I will expect you to have put at least **10X** minutes into your research since our last meeting (i.e., if you want to meet for 30 minutes, please spend at least 5 hours beforehand on the work itself).
- When you are ready to meet with me, please email or slack me, so we can find a suitable meeting time. Please provide a short list of updates in your email.
- I am always available to answer questions over Slack and email; although, highly complex questions should be saved for in-person meetings.

Contributing to this FAQ

Someday, you will be able to open a pull request on our lab's internal GitHub to contribute.