Graduate Study Survival Guide

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Survival guide

- Collections of advices and policies in my group
- Intended audience
  - Prospective students
  - Current students
- Any aspect of the policies can be flexibly adjusted
  - Based upon our mutual agreements
- Feedback is highly encouraged
Before you start
Undergraduate vs Graduate

- Undergraduate
  - Learn subjects by textbooks and lectures
  - **Passive** learning

- Graduate
  - Investigate subjects by thinking and experiments
  - **Active** learning
Undergraduate

- Your goal is to learn subjects listed by the school
- Instructors **already paved** your “study highway”
- Fixed set of topics to learn
- Courses end after several weeks
- Answers are clear and usually well-defined
- Your success is measured by **grades**
Graduate

- Your goal is to investigate a topic of your choice
- You **decide how you proceed** your research
- Choose your research theme (with some help)
- No limit on how far you can go
- Answers are unclear and often undefined
- Your success is measured by **academic outputs**
Masters vs PhD

- Likely to have slightly different goals
- After finishing Masters
  - Industry job, but not necessarily in graphics
  - Gain a bit of experience in research
- After finishing PhD
  - Industry job in graphics or academic job
  - Prove that you can independently do research
In general, I prefer to accept students who are willing to continue until PhDs because:

1. The duration of MS is too short for you to be able to complete research by yourself

2. I would like to work on actual research with you, not just helping you to obtain a degree

3. You will actually have more career options with a PhD (especially in computer science)
Think twice and more

- Lots of information available to help you decide whether you should pursue graduate study
- Your life will be hard if your main reason is
  - Only to get a better job (there’s no guarantee)
  - Someone told you to do so (lacking motivation)
  - Learn subjects more (merely a part of research)
  - Only to pass with a degree (not a good fit)
Think twice and more

- **Contact me** before you apply
  - I generally want to accept a student who already has some knowledge of computer graphics (If you haven’t done, what are you waiting for? Why not study computer graphics now?)
  - Show me how you’ve learned computer graphics
  - If you think it doesn’t fit, consider another group
  - **Both** of us can be unhappy due to the mismatch
Personality checklist

- Are you very interested in research?
- Are you moderately ambitious?
- Are you persistent in a good way?
- Are you mentally and physically tough?
- Are you optimistic?

If your answers to the above questions are all yes, one day, you might become a great researcher.
Admission at UWaterloo

- Apply through the official system
- I look for students who has both motivation and proven skills to do be successful at research
- Gain research experience in computer graphics
- Just doing well in courses won’t be enough
- Admission is extremely competitive, but if you demonstrate a strong potential in research, you will have a good chance!
Other ways to work with me

- **If you are a student in another university:** If your advisor knows me, just tell him/her that you’d like to work with me. Otherwise, I generally do not supervise students in other universities.

- **If you are working for a company:** Ask the company if collaboration with me is possible, then we discuss. May involve funding from the company, depending on the terms.
Preparing for graduate study

- Establish **solid and basic** knowledge/skills for what you want to investigate during your study
- Read technical papers and figure out what you need to learn to fully understand them
- No need to have concrete research topics yet (unless you are quite familiar with the latest work)
- If you have a chance to work on a research project, work hard and learn what to do in research
During your study
General goal

- Being able to tackle problems scientifically
- Look at things objectively
- Think logically and critically
- Make hypotheses
- Design experiments
- Communicate your thoughts

http://www.med.upenn.edu/shorterlab/Papers/embor201215a.pdf
General policies

- **Enjoy** your research
- You have **freedom** to work on topics you love
- You are **responsible** for your daily work
- I’ll give you **advice**, not “use” you to do research
- Communication and publication are **important**
- Tasks in your study must be done in **English**
- I’ll help you to achieve **your goal**, not my goal
Enjoy your research

- Work on things that you **really love**
- “Enjoying” does not always mean “playing”
  - Hard work can be **equally** enjoyable
- The key is that you work **hard** because you **love** it
- **Not** because you need to do it, or somebody like your supervisor told you to do so
- Great researchers I know all have this personality
You and your work

- **You are responsible** for your daily work
  - Make a progress toward the deadline
  - Allocate working hours per day
  - Decide where and when you work
  - Regularly report a progress to me
  - Initiate discussion with me

**Note:** I am supervising many students, not just you
Advisor-Student relationship

- The relationship is not symmetric
- I am the only advisor for you
- You are **not** my only student
- In a certain sense, you need to **grab my attention**
- Initiate discussion and communicate with me!
- Remind me periodically what you are trying to solve, what we discussed, problems, plan, etc.
Advisor-Student relationship

- You are an (inexperienced) junior researcher, not my servant or my people, which means that
  - I don’t force you to work on a specific topic
  - I don’t micromanage your daily work
  - I expect you to be self-motivating
  - I expect you to have your own opinions
  - I expect you to be critical on me when necessary
Advisor-Student relationship

- Balance between having your own opinions and following what your advisor told you to do

- You do not want to blindly follow what your advisor told you. Digest it by yourself first.

- However, do not just ignore what your advisor told you. Your advisor want you to be successful, and ignoring what they say won’t be a good idea in general. Ask your advisor if you are not sure.
Three rules of questions

1. Ask **any question**
   - No question is bad. Asking no question is bad.

2. Ask **any time**
   - No need to try “finding” a good time for me

3. **Don’t** speculate
   - What I tell you is what I think; no hidden words
   - Negative answer doesn’t mean that I hate you
Communication

- Very important that you **initiate** communication
- Report your status and progress
- Notify me anything that needs my attention
- Schedule a meeting when you want
- Do not wait until I ask you “how’s things going?”
- If you are asked, then you’d better not next time
- Many troubles are caused by miscommunication
Communication

- Good communication skill **doesn’t** mean you become a party boy/girl or good at jokes
- Common (funny) misunderstanding in Japan
- Don’t need to change your personality
- Instead, good communication skill means
  - Being able to convey your own ideas/thoughts
  - Being able to listen to and work with other people
Communication

Don’t do the followings:

- You are not sure what to do or how to solve a problem, but you **do not talk to anyone**.

- You **haven’t talked to** me for a month because there has been no meeting (whatever the reason).

- You **do not listen to** what other people say just because you do not feel like doing so.
Communication

Instead, do the followings:

- You are not sure how to solve a problem, so you explain it to other people to see what they think.
- You initiate communication with me to tell me you have been working on.
- You listen to what other people say and try both what you think and what other people suggested.
Lectures and grades

- As I mentioned, your success is not measured based on how well you did in lectures.
- Use lectures to bootstrap your study in some relevant fields to your research.
- Don’t focus on getting a good grade.
- Instead, focus learning some good ideas that might be related to your research.
Research topic

- You don’t need to have a concrete research topic ready when you enter the Master’s program.
- I will support you to come up with one.
- For PhD students, I expect something concrete.
- Can take long time (e.g., six months) to choose a topic if you are not sure what you want to do.
You are free to work a topic you like, but since I want your work to be meaningful, your research topic has to satisfy the two important criteria:

- You are interested in solving it
- People (including me - as one of those people) are interested in seeing a solution on it
- If you really have no idea at all, I’ll give you ideas
- Are you sure that you really have no idea?
Research topic

- Can you do what you want to do?
- Bad news: you have a limited amount of time in your graduate study, but you still need to do it.
- Working on something that you don’t know at all might be very risky.
- Good news: you will learn a lot and might be able to do what you couldn’t do.
- It’s a tough question, but don’t ignore this aspect.
Publication

- Most **important** but **stressful** aspect
- I expect you to **publish** papers in English
- I will help you to write papers, but **don’t** make me write a whole paper for you
- Posters/talks, and papers in Japanese don’t count
- Useful for job hunting (must have for academic)
- Very good way to hone logical thinking skills
- Solid proof of your skills and knowledge
In an ideal academic world...

Where you publish your paper doesn’t matter

How many you published doesn’t matter, because one paper might be extremely good

People respect your work regardless of those

Let’s face it: in reality, where you publish and how many papers you have do matter.
Publication - Real World

- Not all publication venues are the same
- Some are highly regarded, many are not
- Publication in very little known venues can actually **damage** your work
- Top-tier: SIGGRAPH (Asia), TOG, Eurographics
- Second-tier: I3D, HPG, EGSR, CGF, etc.
- Aim for top-tier to **max.** the benefit/effort ratio
- I’d say, “Why not?”
My expectation on a MS student

- One paper should be submitted (hopefully accepted)
- Encouraged to submit to a best venue
- Second-tier venues are acceptable
- Aim to complete your project in one year
- Your submission becomes the basis of your thesis
My expectation on a PhD student

- At least three full papers should be published
- At least one paper published in a best venue
  - SIGGRAPH (Asia), TOG, Eurographics
- Other two can be at a second-tier venue
- Aim to submit one or two papers per year
- Acceptance can be a bit random, so review scores above the average can be counted “published”
“What if I couldn’t pass your expectation?”

Asking this question is already wrong.

You are not working for me.

Nobody (including myself) forces you to do so.

Failure is a natural part of any research, so I personally understand even if you couldn’t make it.

Job hunting will be a different question since I don’t give you a job offer. Yes, the reality sucks.
Go (way) beyond my expectation

- Satisfying my expectation **should not** be your goal
- Your research is yours
- It’s not me who decides your success
- Other people judge how well you did
- Check how your peers (internationally) do
- In my opinion, my expectation is bare minimum
  - I want you to be internationally competitive
Case study: My PhD Study

- You can totally do (or better than) this:
  - Five years of a PhD study (right after undergrad)
  - Six papers and a few talks, all in top venues
  - Two fellowships awarded (NVIDIA and AMD)
  - Two internships (Weta Digital and NVIDIA)

- **No need** for overnight work, always working during weekends, or death march. I **didn’t** do any.
You **MUST** have your professional webpage

- Extremely important for job hunting
- Recruiters might look at your webpage
- Consider it as an online CV and be professional
- See my webpage to find out what to list
- Do not put an internal research report
- Someone can steal your ideas and publish papers
Authorship

- Your paper will most likely be coauthored
  - Unless you literally did everything by yourself
- In general, your papers will be coauthored with me
- Again, above “Unless...” is always applicable
- Gift authorship is strictly prohibited in my lab
- Talk to me when in doubt
Authorship matters and can raise conflicts

How people perceive you in general

First author - “this person did all the dirty work”

Last author - “probably the advisor”

The rest - “maybe they did something”

Your thesis should include only first-authored work

Including non-first-authored work can be tricky
Authorship

- Multiple students in the same paper can be tricky
  - Order **matters** (i.e., who should be the first?)
  - **Dilution** effect of contributions (who did what?)
  - Who puts the resulting work into her/his **thesis**?
- In general, I avoid “multiple students per paper”
- Discussion among students is highly **encouraged**
- Exceptions do happen with everyone’s consensus
Authorship

- My preferred style
  - You - first author
  - Others (if any), probably not your peer
  - Me - last author

- Benefits are twofold
  - You have **full** ownership of your project
  - **No conflict** on authorship with your peer
For non-native English speakers

- Face it: it is disadvantage in academia, but remember: many researchers are non-native
- Use available tools like machine translation and editing service to cover your disadvantage.

For native English speakers

- My English is not perfect, but don’t ignore my suggestions on your English just because I am non-native, especially on academic writing.
English or not

- Why papers should be published in English?
  - Many academics in the world can read English
  - Latest research results are published in English
  - Your future job might need English anyway
  - Maximize the accessibility of your work
English or not

- Things that need to be done in **English**
  - Writing progress reports and papers
  - Reading papers and books (don’t read translation)
  - Presentation slides
  - Discussion including your non-native peers
  - I encourage you to discuss in English even when you can discuss in your native language
  - Other people can then overhear your discussion
Often times, bad writing is not just a problem of your language, but also a problem of your logic.

Check every single sentence you wrote to see if it is logically making sense.

Smooth flow of logic is very important.

In my opinion, for academic papers, it is not so important how your sentences sound natural in English. Focus on logic, if you are non-native.
Management (or lack of)

- I won’t micromanage your work
- You manage your time (no fixed working hours)
- You report your progress (take initiative)
- You ask questions if needed (I am not a psychic)
- You keep deadlines (your deadlines are yours)

- Be self-motivated and independent
- Ask for my support if you need help to be one
Weekly group meeting (or lack of)

- Weekly group meeting is a waste of time
- Research progress can be highly nonlinear
- Hearing what other people are doing is interesting, but doing so weekly is too much
- Wasted effort on preparing reports for others
- I simply don’t find it efficient
Weekly group meeting (or lack of)

- “No group meeting” means **neither**
  “no work” **nor** “no communication”

- I recommend you to have a weekly meeting with me

- **Use** **online communication tools effectively**

- Report your progress **regularly** to me

- Setup an in-person meeting **when you want**
Your schedule

- Your schedule is driven by paper **deadlines**
- **Select** the publication venue
- Think about **milestones** toward the deadline
- Aim to have a submittable paper **one or two weeks** before the deadline
- **Adjust** milestones as you go
- I’ll help you to make and adjust your schedule
“Lack of planning on your part does not constitute an emergency on my part!”

- Don’t expect me to miraculous save you right before the deadline - instead, discuss with me regularly to adjust the plan.
- Many people procrastinate and do a lot of last minutes work, but that doesn’t mean it’s good.
- If you assume that I will be less and less likely to be available toward the deadline (which is indeed true), you probably don’t procrastinate.
Working hours

- I don’t care how many hours you work
- Manage your working hours
- I generally recommend that you
  - Don’t work overnight (I’ve never done it)
  - Don’t come to the lab during weekends
  - Be in the lab during “normal” hours (like 10-6)
- Always think about your research
Social events

- Not really planned as a group
- I don’t discourage you to do one if you want
- You can invite me if you want
- I might occasionally ask if people are interested in having lunch/dinner together
- I might plan a welcome/farewell party
Social events

- Seminars on your project/meta-research
- Talks by visitors
- Some random seminars
- Reading latest papers
- Practice talks, demonstration etc.

In general, we don’t have (semi-)mandatory events (which is rather typical in Japan, but I don’t like it)
Internships/Research visits

- Could be arranged if you are doing well
- I know some people to talk to
- Decision is made by your host, not me
- You are also encouraged to find it by yourself
- International ones are recommended
- I’ve done two (Weta Digital and NVIDIA) and they were both fantastic!
Research fellowship

✧ I encourage you to apply for any of them that you are eligible (never think “I am not good enough”)

✧ Provides you three great benefits

✧ Opportunity to step back (what is a big picture of your research and why it’s interesting?)

✧ Financial security (money!)

✧ Network with external people (potential jobs)
Managing your data

- Use a version control system (I use git)
- For your future job (coding with many people)
- For collaboration with external researchers
- To share data with me and colleagues
- Backup
- Put everything there (papers, data, code)
- Don’t open source your data before publication
Scientific misconduct

- You as a researcher will **DIE** if you do any of them
- Plagiarism - steal someone’s (incl. your own) work
- Falsification - modify results (e.g., photoshopping)
- Fabrication - make up results that you don’t have
- Zero tolerance (no degree is considered fine)
- If I found out that you did any one of them in your work, I will urge you to leave my group
Harassment

- Communicate **before things get serious**
  - **Anyone** can be a harasser or/and a victim
  - Unintentional ones can happen
- If you think I am harassing you
  - Talk to someone you trust or the univ.
- If you think someone in the lab is harassing you
  - Talk to me, someone you trust, or the univ.
Harassment

- Sometimes lines are unclear...
- When someone is criticizing your work
  - Can be a valid criticism based on facts
  - Can be a personal attack without any evidence
- When in doubt, talk to someone you trust
- Remember: your advisor is not always right
- Consider changing the advisor if it doesn’t work
Mental issues

- Unfortunately, research can be mentally harsh and you can suffer from mental issues due to
  - Rejections of papers you worked for years
  - Couldn’t get a job you like
  - Interpersonal troubles
- Remember: “Graduate study is not all of your life”
- Leaving your study can be the best option
Mental issues

 sedan potential sign of mental issues

 You haven’t communicated with me (be it online or offline) more than a month

 You are facing difficult problems but never discussed with anyone including colleagues

 You are not sure what to do now/next, but you haven’t asked help from anyone

 In general, ask for help - I am available for you
Use of SNS (Twitter, Facebook etc.)

- Be careful what you say on any SNS
- You never know who is reading it
- Don’t mention your research in progress
- Don’t criticize anyone; leads to miscommunication
- Don’t complain on lectures; tell them to lectures
- Don’t reveal anything that is confidential
- Like anything else, use it wisely or it can hurt you
Toward graduation
Recommendation letters

✈️ I will write an honest evaluation of your work

✈️ **Ask early!** If it’s too late, like a day before the deadline, I might need to decline your request.

✈️ Clarify where you apply, what you want me to cover in the letter, and when/where to send one

✈️ When you ask a letter from someone, if you are asked to write a whole letter by yourself and this person says that s/he signs it, then don’t trust her/him - s/he is not serious
**Job hunting**

- **Note that I cannot control your job hunting**
  - It’s a matter between you and your employer
  - I can however recommend you only if
    - Employer directly contacted me
    - You have done excellent work
    - The job fits you well
Job hunting

- Successful job hunting requires
  - **Preparation** (good record of publication etc.)
  - **Action** (apply to anywhere you see you work)
  - **Luck** (may not have opening that fits you)

- You can do your best on the first two, but be prepared and think flexibly when you are unlucky

- Let’s face it: best ones might not land best jobs
Career options

- Masters
  - Industry (generally not involving research)
    - Video game companies, movie production, or completely different things
- PhD
- Startup
- International options if you do well
Career options

- PhD
  - Academia
    - Very competitive
  - Industry (may or may not involve research)
    - International jobs are more available
- Postdoc
- Startup
Industry

- Potentially a good option salary-wise
- Some bad exceptions exist (be aware)
- Usually less flexible
- Your boss might decide what you need to do
- Hard deadlines (missing ones = losing money)
- Collaborative work (your work is not yours)
- Might be unrelated to graphics
Industry research lab

- Might be a good mix of industry and academia
- Disney, Microsoft, Nvidia, Intel etc...
- Sometimes flexible, sometimes not
- Salary can be quite good
- Historically, they do not last very long...
- Change of the policies, sudden budget cut, etc.
- Patenting hell (what you’ve done is not yours)
National research lab

- Similar to industry lab
- Just not profit-oriented
- No (or less) teaching
- Long term job security compared to industry lab
- Research topic and publication might not be flexible
- Strategic goals might be already there
- Might be forced to work on things you don’t care
Startup

- Usually, buyout by a big company is the goal
  - Google, Facebook, Intel etc.
- High risk, high return (money and recognition)
- Do it if you have a vision and necessary resources:
  - Tough mind and body
  - Help from other people
  - Have network
Academia

- Most flexible with less monetary benefit
- Can work on what you want (up to funding)
- Your work is yours and you are your boss
- Many different kinds of tasks in one job
- Teaching, mentoring, advising, researching, fund raising, and managing - yes, it’s chaotic
- Extremely competitive job market
Academia

- Tenure (permanent position)
- Tenure evaluation comes after several years
- May or may not happen in the same university
- Criteria vary a lot, but “publish or perish”
- Not so much job security until you get tenure
- Be prepared and open for other career options
- Non-permanent post is increasingly typical
Postdoc

- Temporary research job toward a faculty position
- Usually a few years of fixed term contract
- No guarantee of a “better” next job
- Not well paid (depending on the lab)
- Increasingly typical for a PhD student who wants to ultimately land on a faculty job
- Be prepared and open for other career options
PhD in another lab

- Moving to a different group widens your view
- You might want to work on a different topic
- Be aware of the cost involved
  - Money (if you move to a distant location)
  - Time (you often start from scratch)
- Study abroad is highly encouraged if you want, but it’s far better if you do so right after your undergraduate study, just like I did.
After graduation
For those in industry

- In general, you shouldn’t ask me to be a consultant
- To avoid any conflict of financial interest
- Any hiring decisions shouldn’t be **directly** influenced by me
- Even if you contacted me to introduce someone (“directly” is the key)
- Any information about opening positions is however welcome and circulated in the lab
For those in academia

- For your own sake, publish papers **without** me
- Important to show your independence
- Prove to other people that you did your work
- Not applicable to on-going projects from your graduate study - we can continue until it’s done
- I’ll be happy to write recommendation letters when you need ones. Just ask me in advance.
Last, but not least

- I’ll be happy to continue to be your peer
- Visit us when you have a chance
- Enlighten current students with your experience
- I will be happy to give you advice as your peer
- Your success = My happiness
- Tell me what you have recently achieved, even if you think it is a small thing