Graduate Study Survival Guide

10 011

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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

Masters vs PhD

- * 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 you 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

- * 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

- * 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

* 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.

* Instead, do the followings:

- You are not sure how to solve a problem, so you explain it 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

Research topic

- * 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

Publication - Ideal World

- * 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...

- * "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.

Webpage

- * 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

- * 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

- 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

- 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.

- 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

- * 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 miraculously 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

- Some 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 aboard 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