

NSE Graduate Student Orientation

Todd S. Palmer
Graduate Program Chair

Oregon State University
School of Nuclear Science and Engineering



Oregon State
University

September 18, 2017

Outline

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NSE Grad Handbook

Advisor assignments

② Advice for Making Your Time as a Graduate Student Better

PhD or Masters?

Academia is a business.

Graduate school is a different ballgame.

Traits of successful graduate students.

Choosing an advisor and a committee.

Balance and perspective

Ethical conduct of scientific research

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- T. Palmer, Graduate Program Chair
- Heidi Braly, Graduate Liaison
- Faculty advisors

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Advisor assignments - On Campus Students

Student Name	Advisor
Boozer, David	DMH
Flora, Rigel	HY
McGee, Kacey	CJP
Squillante, Joyce	AP
Uchiyama, Sophia	SRR
Balderrama P., Silvino	WM
Buskirk, John	IG
Grechanuk, Pavel	TP
Haivala, Jacob	DL
Higgins, Anton	WM
Hills, Zachary	TP
Kasperek, Dustin	CJP
Kumar, Ravi	SC
Moussaoui, Musa	WM
Stewart, Ryan	TP
Weiss, Aaron	BGW
Winkle, Tristan	WM

Key	
AF	Abi Farsoni
ACK	Andrew Klein
AP	Alena Paulenova
BGW	Brian Woods
CJP	Camille Palmer
DMH	David Hamby
HY	Haori Yang
KAH	Kathryn Higley
QW	Qiao Wu
SRR	Steven Reese
TP	Todd Palmer
WM	Wade Marcum
IG	Izabela Gutowska
DL	Daniel Labrier
SC	Seth Cadell
GM	Guillaume Mignot

Advisor assignments - Distance Students

Student Name	Advisor	Student Name	Advisor
Broocker, Todd	CJP	Ortiz Morales, Laura	AP
Carson, Carrie	AP	Owensby, Brittany	CJP
Chandler, Dustin	SRR	Peckham, Zachary	TSP
Donahue, Alec J	TSP	Point, Emma	HY
Gomez, John	HY	Popescu, Andreea	WM
Dunleavy, Brendan	WM	Ross, David	CJP
Hebert, Marc	CJP	Scheider, Christopher	AP
Holland, James B	AP	Smathers, Morgan	SRR
Iqbal, Mursaleen	SRR	Smith, Lige E	WM
Jaronski, Rebecca	TSP	Takacs, Nicholas	HY
Johnson, Bonnie	HY	Wacker, Jessica	TSP
Krebs, Jeremy	WM	Wilson, Christi	TSP
Massey, Crystal	SRR		

Key

AP	Alena Paulenova
CJP	Camille Palmer
HY	Haori Yang
SRR	Steven Reese
TP	Todd Palmer
WM	Wade Marcum

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PhD or Masters?

- PhD students should have an answer to the question “*Why am I doing this?*”
 - Get a PhD if it is required for your goals after graduate school (professor or researcher in academic, government or industry).
 - William Lipscomb (Nobel prize in Chemistry): “With a Ph.D. you will have a better chance of spending the rest of your life doing what you want to do, instead of what someone else wants you to do.”
- The PhD is a long, hard road with many potholes and washed out bridges.
- PhDs salaries are higher than BS and MS salaries, but the difference doesnt make up for the income lost in school longer.

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Academia is a business.

- NOT: an “Ivory Tower” free of politics, money problems or real-world concerns
- Most grad students need financial support (TA, RA, fellowship)
- Where does the money for that support come from?
 - Agencies expect something to be accomplished.
 - Professors are on the hook for this, with the help of graduate students.
- Treat an RA like a job. Your compensation:
 - Stipend and tuition.
 - Learn about state-of-the-art in your specialty and conduct cutting edge research.

Academia is a business.

- Bottom line
 - You do your job well, and your needs and your professor's needs will be met.
 - Don't take computers, research equipment, staff members and other resources for granted. They exist because your professors have raised the funds for them. Do great research with them!
 - If you don't do your job well, your funding may be at risk.

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Graduate school is a different ballgame.

- Graduate school is not primarily about taking courses.
 - Courses are deeper and more advanced.
 - Students that do well learn this earlier rather than later and make adjustments.
- People judge the quality of a MS or PhD graduate by their research.
 - Learn from doing independent research, attending conferences, interacting with fellow students
- Success comes from completing a research program
 - Thesis/dissertation
 - Technical presentations
 - Journal articles and conference papers

Graduate school is a different ballgame.

- Similar to an apprenticeship
 - Each student has their own project.
 - Master (advisor) may or may not be helpful.
 - Being taught how to swim by getting thrown into the deep end of the pool.
- Different skills are required
 - Undergrad: class projects, essays, midterms, finals, homework
 - Grad: select and complete a long-term research program, work closely with professors, staff and fellow students, communicate results, find your way around obstacles, deal with politics ...
- Most important personality traits of a successful grad student are being
 - Inquisitive, disciplined, obsessive and delusional

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Initiative

- Thesis/dissertation is a focused, personal research effort where you **take the lead** on your own, unique project.
 - No hand holding or step-by-step instructions.
 - Guidance from professors is important, but is at a fairly high level (no micromanaging)
 - You will need to perform tasks beyond those asked of you.
 - Forgiveness vs. permission: senior graduate students get good at this.
 - “Can do” attitude leads to more assertive and productive behaviors.
 - A privilege that is earned by demonstrating the ability to independently initiate and complete appropriate tasks.

Tenacity

- You don't need to be a genius to earn a graduate degree
 - Though it doesn't hurt...
- It can take a while (especially the PhD)
 - No one can tell you in advance how long it will take
 - There will be unexpected problems.
 - Its easy to become depressed or unmotivated.
- Tenacity means sticking with things even when they arent going well.
 - Build a thick skin so that you arent so fragile that you give up at the first sign of difficulty.
 - Suggestion: do something every day that gets you closer to being done. Dont work only when you are in the mood or feeling productive discipline.

Flexibility

- Flexibility means taking advantage of opportunities and synergies, working around problems, and being willing to change plans as required.
 - Grad students are at the bottom of the academic totem pole.
 - You will be in the position of reacting to events rather than controlling them.
 - Example: suppose access to a piece of research equipment you need is suddenly cut off...
 - Replacement?
 - Reduce time needed on that equipment?
 - Come in at odd hours?
 - Change the direction of the project so the equipment isn't needed?

Interpersonal skills

- Engineers and scientists are not, in general, known for their interpersonal skills.
 - Machines/science/math are logical, people often are not.
 - Success in grad school depends on building and maintaining interpersonal relationships with your advisor, committee, research and support staff, and fellow students.
 - You dont need to change your personality.
 - You do need to learn and practice interpersonal skills.

Interpersonal skills

- Politics
 - Most everyone finds political machinations to be distasteful; top performers find a way to master the social aspects
 - The art of getting things done!
 - Who is allowed to do what and who gets the resources
 - You will need resources
 - Interpersonal or soft skills will help you exert influence
 - Without them, your potential is limited.
 - Very important example: Which group of people should you try hardest to avoid offending in graduate school?
 - Advisor/committee?
 - Fellow students?
 - Research and support staff?

Interpersonal skills

- How do you cultivate interpersonal skills?
 - Treat people with respect and determine their different work styles.
 - Give credit where credit is due.
 - Acknowledge and thank people for their help.
 - Return favors.
 - Respect the expertise, advice and time of others.
 - Apologize if you are at fault.
 - Realize that different people are motivated by different things.

Organizational skills

- You will have responsibilities as a graduate student.
 - Talk with visitors.
 - Give demonstrations.
 - Show up to meetings.
 - Get projects done on time.
- Being organized will be very helpful meeting these obligations.
- Examples:
 - Organize your tasks as if you were juggling them.
 - One task at a time; order tasks, get enough done so you can ignore it for a while
 - Kill your television (prioritize and allocate time accordingly)

Communication skills

- Oral and written communication skills are vital for making a good impression as a grad student and researcher
 - Oral defense of your thesis/dissertation.
 - Write technical papers and reports.
 - Presentations at conferences.
 - Demonstrations to groups of visitors
 - Often, a distinguishing feature
- Poor communication skills can limit career opportunities
 - Professors: teaching, fundraising, guiding graduate students, documenting results
 - Industry: work in teams, learn what businesses and customers need, present results, raise funds, transition to leadership roles

Communication skills

- A few basic points
 - Organization counts. Within the first few paragraphs or first few minutes, tell me why I should read your paper or listen to your talk.
 - Make text in slides large enough to see from the
 - Variety retains interest.
 - Dont stand in front of the screen.
 - Point out the limitations of your work.
 - Credit others where appropriate.
- Confidence is the key to giving a good presentation.
- Writing and publishing papers is vital.
 - A paper that you read and dont understand is just as likely the authors fault as yours.
 - Professors will help you figure out where to send your papers.

Communication skills

- Communicate with your professors and teammates
 - Idea: weekly status reports (1 screenful)
 - Helpful for progress reports on grants.
 - When you reach a milestone or achieve a result, let people know about it!

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Choosing an advisor and committee

- The choice of an appropriate advisor is crucial
 - Covers your area of specialization.
 - Gets along with you.
 - Relationships exist on a spectrum.
 - Junior or senior faculty member?
 - Availability
 - Resources
 - Experience
 - Personal involvement with research
 - Professors have reputations amongst graduate students.
 - Time to graduate
 - Ease of communication
 - Level of control
 - Changing, if you think it best, can be accommodated

Choosing an advisor and committee

- Choosing a committee
 - Cover all areas of your thesis
 - Availability! (Travel)
 - Grad council representative
 - Schedule the tough-to-reach profs first

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- Being focused on your goal is good.
- There is more to life than graduate school.
 - Keep your health and sanity intact!
- Earning a graduate degree is like running a marathon
 - Pace yourself
 - Eat correctly, exercise, take time to recharge
- Don't lose perspective
 - The grad student population is not representative of humanity in general.
 - You do have what it takes to get this degree, whether or not you feel like you are at the top, in the middle, or at the bottom of your class.
 - Don't forget: we admitted you based on your performance.

Things to keep in mind

- Metrics of success in graduate school (in order of importance...
 - ① The quality and number of your publications (thesis, papers, etc.)
 - ② The quality and number of your conference presentations.
 - ③ Fellowships, honors, and awards received.
 - ④ Summer research experiences.
 - ⑤ GPA.
- In essence, you are building an academic curriculum vitae (CV). What happens to you after grad school is a strong function of:
 - Your advisor
 - Your research area
 - The letters of recommendation you receive
 - How well you interview

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- Science is about the pursuit of objective truth.
- Good science is ethical science.
- Areas of scientific ethics
 - Data collection and storage
 - Confidentiality
 - Communication
 - Authorship
 - Collaboration
 - The peer review system
 - Rules for dealing with ethical complaints

Data collection and storage

- Careful recording of observations and notes is one of the oldest and most important cornerstones of the scientific method.
- Important legal documents - patent claims, misconduct...
- Notebook basics: bound, numbered pages, dated entries, neat and complete, use pen, stored in a secure location.
- Ownership of research data
 - Responsibility for collecting and preserving data is with the grad student...
 - Ownership of the data resides with the advisor – data stays with the lab after the student leaves.
 - Case History: A student does research with Dr. Smith, but changes to work with Dr. Jones. Can the student take the original data to the new advisor?

Confidentiality

- Excessive secrecy runs counter to the established principle of sharing ideas, information and techniques that is fundamental to the spirit of the international scientific community.
- In the early stages of a project, though, a certain degree of confidentiality is usually practiced.
- Ownership of an idea is established via publication or presentation.
- Reasons for confidentiality
 - Competition
 - Avoid embarrassment of claiming a result prematurely
 - Avoid inappropriate publicity
 - Allow proper notification of concerned individuals (other members of research groups, collaborators at other institutions, granting agencies)

Communication

- Informal and formal avenues for communication exist
 - Publication of results
 - Formal presentation of data at scientific meetings and conferences
 - Audio/video calls between collaborators
 - Electronic sharing of materials
 - Seminar programs, invited talks
- The difficult balance between open communication and confidentiality requires junior researchers to get specific guidance from mentors
- Many serious cases of scientific fraud involve senior scientists communicating poorly with junior colleagues

Authorship

- Productivity and quality of scientists are largely measured by number and quality of publications
- Inclusion as an author depends on a significant contribution to the work.
 - Ideas and concepts are weighted more heavily than technical work.
 - Technicians are more often given acknowledgment than authorship.
 - Collaborators are always included in authorship.
 - Every paper has a senior or corresponding author.
- Philosophies of authorship differ.
 - Increasing the number of authors dilutes the contribution of each – conservative.
 - Liberal authors include contributions from folks who were technically, morally or financially supportive.
 - Every author must approve a manuscript before it is sent to the journal.

Authorship and Collaboration

- Ordering of authors is even more subjective.
 - Historical – first author writes the paper and is senior author, group leader, PI, etc. Other authors are listed in decreasing order of importance of contributions.
 - Current convention – Grad student most closely connected with the work should write the paper and be first author. Senior author is then the last author. Others are in between...
- It is important to follow clear guidelines in establishing collaborative relationships to avoid ethical disputes.
- Establish formal collaborations in advance (invitations, agreements...)

Peer review

- Grant review panels and reviewers of journal papers come from a set of qualified peer scientists
- It is considered an honor and a duty to participate – manuscript review is unpaid and grant panel participation involves a very modest honorarium.
- Ethical ground rules
 - Confidentiality
 - Conflict of interest
 - Anonymity
 - Appeals are handled within the process

Complaints of unethical conduct

- As in the legal system, we don't believe in guilt by accusation.
- Aspects of the system for judging complaints of ethical misconduct.
 - Confidentiality
 - Fairness
 - Rapidity
 - Objectivity
- Charges of unethical conduct are very serious, and should be made only when solid supporting evidence is in hand.
- False accusations of misconduct are just as unethical...

Summary

- *The Parable of the Black Belt*, “Built to Last: Successful Habits of Visionary Companies” by James C. Collins and Jerry I Porras

For Further Reading I



R.T. Azuma.

"So long, and thanks for the Ph.D.!".

<https://www.cs.unc.edu/azuma/hitch4.html>



S.J. Garte

Guidelines for Training in the Ethical Conduct of Scientific Research
Science and Engineering Ethics, 1:59-70, 1995.