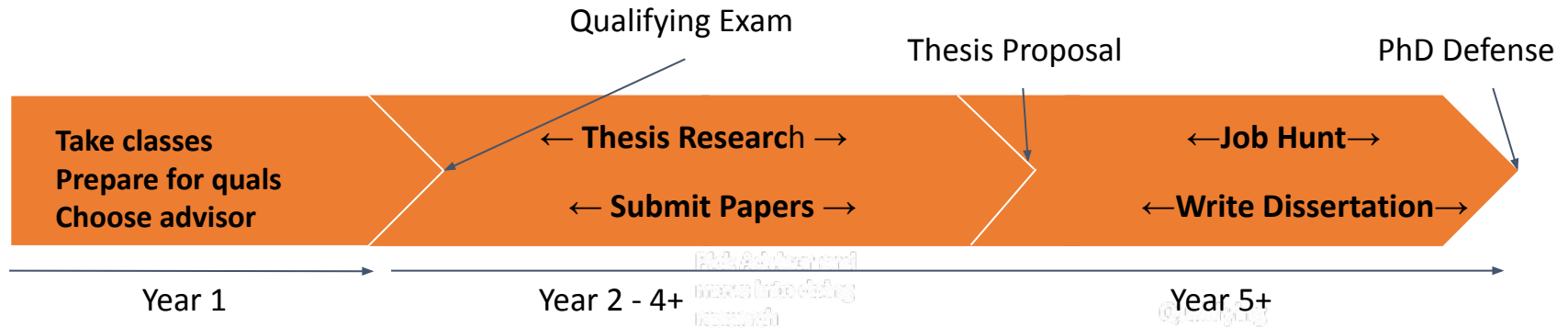# Learning Objectives

- **Completing your Applications**
    - Reminders
    - Common questions

- **Next steps from here until decision time**
    - Prepare for phone/video interviews with potential advisers
    - Understand adviser-advisee relationships
    - Preparing for campus visits
    - Think about
        - Logistics: Moving, housing, health insurance, day care, …
        - Refreshing your background/Developing additional skills

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Completing Your Applications: Reminders

Typical PhD Milestones and Timeline

Qualifying Exam

Thesis Proposal

PhD Defense

Take classes
Prepare for quals
Choose advisor

←**Thesis Research** →

←**Submit Papers** →

←**Job Hunt**→

←**Write Dissertation**→

Year 1

Year 2 - 4+

Year 5+

Many programs define success by ability to achieve milestones:

- Complete course work
- Pass qualifying exam
- Thesis proposal approval
- Pass PhD defense

Milestones are generally fixed and program-wide

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Be Aware that Specifics of PhD Milestones Vary by Program

For example, the qualifying exam may be

- Entirely course-based

- Oral or written examinations in multiple areas

- Writing and presenting a paper that synthesizes research in an area related to several papers provided to you

- Presentation of your own research

Departmental descriptions can be messy to parse.

Research is the focus of your PhD

It is a journey into the unknown.

You will encounter ill-defined problems.

How will you know when you are successful?

Think about: What does success look like to you?

Different ways to measure success in your PhD studies.

Need to satisfy at least three entities:

1. Program requirements

   ■ course work, qualifiers, proposal, defense

2. Your Advisor (and your PhD committee)

   ■ expectations for each student (within PhD and beyond), research deliverables, group-level goals

3. You need to feel good about your work & learned skills

   ■ personally satisfying, aligns with career goals, work/life balance

Agreement Critical

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Completing Your Applications: Common Questions

Common Questions (1)

When to reach out to faculty whose research I am interested in?
- before you apply (send email; some will reply, some may not)
- after you applied, but no decision (send email; an interested faculty will look at your application)
- after you have been accepted (will reply with high probability)
- after you have received a rejection (more complicated; start any questions with grad office staff)

How to decide on potential advisors and prepare for phone/video interviews with them (before being admitted)?
- research their research interests, read some recent papers
- be able to articulate what your interests are and how they align with theirs

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Common Questions (2)

I plan to apply next year.
Will I still have access to the CSGrad4US resources and mentorship next year?

- Yes to resources.
- If you have established a relationship with your current coach, they are most likely willing to continue to help.
- We recommend that all mentees complete an application this year.

Common Questions (3)

I am applying now. What could go wrong?

In spring 2025
- not admitted to a school you want to attend
- no admissions

In graduate school
- not having an adviser in the chosen research area
- not finding a research problem that leads to progress and a dissertation
- realizing that you don't like research
- adviser/advisee problems
- personal challenges that impact being a student

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Common Questions (4)

Tips on how to survive on a PhD student budget?
Any other income/side job opportunities you'd recommend?

- take advantage of resources and access a student has for free/almost free (gym, library, entertainment, clubs, campus transportation, day care, …)
- students have reduced fees for many activities beyond the university
- internships in summer; teaching in the summer
- 75% RA/TA appointments are possible
- college towns adjust to purchasing power of students (restaurants, services, etc)
- many grad students (re)-assess needs versus wants versus luxury

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Common Questions (5)

- **What does NSF expect?**
  - be a full-time graduate student in a CISE PhD program
  - participate in evaluations throughout your PhD
    - annual progress survey
    - other surveys
  - can get an MS on the way to the PhD
  - funds do not have to be returned if no PhD is received

Your Questions

Next Steps Until Decision Time:
Prepare for phone/video interviews

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Prepare for Phone/Video Interviews

- Be ready to **answer** questions
    - Create & practice a good research elevator pitch
    - What do you see as your strengths and weaknesses?
    - Tell us about a research project and your role in it and what you learned from it
    - Why are you interested in this particular program, research area, and research lab?
    - Only answer technical questions when you feel comfortable with your answer
- Be ready to **ask** questions
    - How does your research group work? structure, dissertation topic choice, meetings, mentoring, expectations of new students, typical time to graduation, …
    - Where are your PhD graduates now?

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Next Steps Until Decision Time: Understanding Adviser-Advisee Relationships

Managing expectations: Advisor's wants

What do advisers expect?
- Research skills growth & output (common: expect k papers in top venues)
- Work hours
  - expect PhD students in lab during core hours
  - expanded hours as needed to meet deadlines
- Meeting/group culture
- Checklist for graduation (accomplishments, skills)

Impact:
- What does my day-to-day look like?
- When do I graduate?

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Managing expectations: Your Needs

What do you expect during your PhD?
- Your career goals
  - R1 Faculty position, 4-year college position, faculty teaching position in R1, industry researcher, government lab, and more
- A mentoring/advising approach that matches your personality and background
- Kind of feedback that you need
- Constraints on time
  - Family responsibilities, health, graduate within g years

Communicate effectively!

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Communicate Your Constraints

- Clearly explain outside commitments/responsibilities
- Alert advisor of disabilities/health challenges if they impact work
- Try to find and propose creative solutions to arising problems/changes
- Exploit flexibilities that arise in academia
  - Example: I am not available from 4pm-8pm, but will get back online once kids are in bed
  - Example: I get migraines so my workspace cannot have bright light

Interacting with your Advisor

- Common to have weekly (or bi-weekly) one-on-one meetings
  - Prepare appropriately
    - May include sending an agenda, maintaining a research notebook, report on progress/reasons for lack of progress
  - Some advisors are more hands off and want to meet once a month or semester.
    - Need to be more self-directed about monitoring progress
- At semester boundaries or after completing a milestone, consider longer term outlook

A Lifelong Relationship

During the PhD, your advisor should
- be a supportive mentor who identifies areas you need to strengthen
- help you develop skills; provides resources, opportunities, and connections
- serve as your advocate, cheerleader, and coach

After the PhD, your advisor should
- view you as respected collaborator and researcher
- remain a sounding board for new research ideas and career plans
- be a professional sponsor, putting your name forward for opportunities

You have a life-long Conflict-of-Interest with your PhD (and post-doc) advisor on professional activities.

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Advisor-Advisee Relationship: Potential Challenges

- Mismatch in styles
  - e.g., micromanager, distracted/absentee advisor, irreconcilable difference
- Lack of communication on expectations and limitations
- Lack or perceived lack of research progress
- Change in your research interests
- Change in the advisor's interests or responsibilities (e.g., becomes chair/head)

How to improve the relationship with an advisor?
- communicate, be honest, propose/ask constructive solutions

Your Questions

Next Steps Until Decision Time: Prepare for Campus Visits

Campus Visits
(Winter/early Spring semester)

Go on Campus Visits!

- Many schools invite applicants for a campus visit (most after admission, some before admission decisions)

- Make use of it (often free) and meet people and see the department!

- If you get too many invitations, prioritize based on your factors. Ask your coach for guidance.

- If you can't make a school's scheduled "visit day", ask if you can visit some other time.

Campus Visit Checklist

☑ Book your accommodations through the university (if possible)

☑ Set up meetings with faculty and grad student staff

☑ Ask to meet with Ph.D. students

☑ If you have special needs, meet with the appropriate campus office

☑ Inform yourself about the department before the visit

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Meetings with Faculty in your Area(s) of Interest

- Explain your NSF Fellowship
    - fellowship support for 3 years
    - expect institution will provide support for remaining 2-3 years (assuming good progress)
- What projects are in their current/near term agenda?
- Do they expect to be taking on new students?
- What is the departmental culture?

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More questions to consider asking (read on your own)

- Do you consider yourself more of a 'hands-on' or 'hands-off' advisor?
- How is the lab structured? Are there research collaborations between students in your group?
- How often do you meet your students? Individually or in in groups? What is typically discussed?
- What progress do you generally expect from a student in the course of a semester?
- What projects are in your current/near term agenda?
- What do you do when students are struggling?
- Do you expect to be taking on new students? What factors will affect whether or not you take a student?
- How do you integrate new students into the lab?
- Do you think our research interests are a good match?
- In general, do you tend to give your students projects/topics or have them select their own?
- Are there any specific courses that students in your lab take?
- What do your students do during summers?
- Are there other faculty in the department you think I'd be a good match for?

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Meetings with Graduate Program Director and Support Staff

- What are the PhD requirements and expected timeline?
  - qualifying exams, proposal defense, portfolio reviews, thesis defense, teaching expectations

- What is the typical semester course load?
  - first year? later years?

- What happens when a student has difficulty finding an advisor?

- Funding beyond the Fellowship?

Meetings with Graduate Students

Find out about the culture within the department and their labs

- Academic environment
- Support for interdisciplinary work
- Mentoring styles
- Professional development
- Career support (internships and initial positions)
- Social environment

Living situation

- Cost of living
- Quality of life

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Thank You's and Regrets

- Send a note of appreciation to every person (faculty, staff or student) who **notably** interacted with you

- Ask faculty any outstanding questions
  - When will they expect to know if they are interested and able to accept you into their lab?
  - Provide feedback if you have made some firm decisions
    - would definitely accept if you receive an offer
    - would be very interested if you receive an offer
    - enjoyed your visit and look forward to hearing from them
    - enjoyed your visit, but have decided to accept another offer
  - Always be honest!
    - It is a small world. You will see many of these people again and again
- Once you accept an offer, let other departments know asap

What to do between now and decision time?

Logistics Between Now and Acceptances

- Moving, housing, transportation
- Daycare/schools
- Health insurance
- Course registrations
- …

Setting up and getting oriented takes longer than you expect!

Refreshing your Background & Developing Additional Skills

Refreshing your Background

- If your research is more theoretical
  - review UG material from linear algebra, discrete math, calculus
  - review common proof methods
  - review analysis of algorithms basics
- For research in AI, ML, and theory
  - review UG probability and statistics material (includes hypothesis testing, confidence intervals, p-values, linear regression, correlations, probability distributions, Bayesian statistics)
- If your research is more systems-oriented
  - review UG OS, networking, architecture material
  - review quantitative experimental evaluation research methods
- If your research is more human-oriented
  - review qualitative and quantitative research methods
- good free online resources exist (e.g., Coursera)

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Essential Research Skills to Develop

Background & related work
- Performing literature search
- Reading papers critically
- Summarizing existing work

Data collection, analysis, and vis
- Mathematical argumentation
- Experimental design and data collection, including validation
- Generating and processing data
- Performing *appropriate* analysis and visualization of data

Tools & techniques
- Finding and learning needed technical material
- Discovering appropriate tools and techniques for topic
- Use of specific tools and techniques

Communication
- Paper writing
- Presentation creation and delivery
- Research conversations, including asking/answering questions
- Managing advisor interactions
- Managing group dynamics

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Ways of Developing Research Skills

Basic skills to improve efficiency

- [Missing Semester of Your CS Education](#)
    - Shell
    - Shell tools and scripting
    - Editors (vim)
    - Data wrangling
    - Command-line environment
    - Version control (git)
    - Debugging and profiling
    - Metaprogramming
    - Security and cryptography
- Master LaTex beyond essential features and use Overleaf for collaborations

Ways of Developing Research Skills

- **Improve Communication**
  - Attend talks by outside speakers and critique
  - Attend practice talks to hear improvement suggestions
  - Practice elevator talk with peers
  - Join public speaking group (e.g., Toastmasters)
  - Present posters of your work
  - Try approaches for planning agenda for advisor meetings (e.g., topics, analyzed data, etc.) and establishing next steps

Your questions and concerns

Please type one question or concern into the chat

Do not send until we tell you to

Final Thoughts

Grad school can be a transformative experience which opens many new possibilities.

- Go in with an open mind and do great work!

Thank you for your participation, questions, and comments throughout the mentoring program.

Relationships you have built through the CSGrad4US program are part of your professional network.

Good luck!

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Coming up…

Panel Session 3 — Next Thursday, Nov. 14th 7-8:30pm ET

Next group session:

Thursday, March 6th, 2025 - 7-8:30pm ET

Note: office hours will continue through February - check schedule for exact dates