Session 3: Process of a PhD Application Preparation

Thursday, September 28, 2023 (7pm ET)
Session 3 Learning Objectives

• Session 2
  • Preparing a strong PhD application (general guidelines)
  • Summarize SOW comments made
• Identify what you are looking for in a PhD program
• Identify potentially suitable programs
• Understand the admissions process
Your **SOW comments**

Abstracting top suggestions made

- use assertive, active, and positive language ("I plan to start" is better than "I hope to start")
- introduction paragraph styles vary and are often a personal choice
- don’t bury important messages
- emphasize your strengths, not your weakness
  - address an apparent weakness in your record directly in an informative way (better than have a reader guess)
  - common weaknesses: poor grades, gaps, research ability/potential unclear
- in descriptions of projects, be outcome oriented
  - describing tasks in detail can tempting but is often distracting
• don’t let the reader guess (e.g., “the results of my project were not significant” why?)
• tailoring to each school is good
  • make sure to scrub remnants of other schools
  • keep tailoring to the last paragraph
• more on your writing
  • pay attention to the flow in paragraphs and overall (e.g., limit the number of timeline jumps)
  • spell out abbreviations
  • have someone check for poor language, typos, overly long and awkward sentences, etc.

Reading the comments in the files gives a good perspective on different views and common themes.

Thank you for your contributions!
CDGrad4US Entry survey administered by the external evaluator (Center for Evaluation & Research for STEM Equity @ University of Washington)

email from

From Name: Erin Carll
From Email: noreply@gemailserver.com
Reply Email: ecarll@uw.edu
Subject: CSGrad4US Evaluation Survey

We appreciate your participation!
Please check your spam folder if you have not seen the email.
Identifying PhD Programs: Understanding Your Plans, Goals, Needs, Wants

● What are your research interests?
● What are your post-graduate aspirations?
  ○ An academic career? Teaching or research focused?
  ○ Career in a government research lab?
  ○ Industrial research or entrepreneurial career?
● What is your level of academic/professional preparedness?
  ○ Different CISE PhD programs can have different prerequisites
  ○ How can preparedness/skill gaps be overcome?
● What are other personal or professional commitments?
Identifying Your Research Area

• Stated interests are not a final commitment **BUT** they impact:
  • how the admission committee views your “fit”
  • which faculty will review/see your application
  • which faculty can be your champion

• Identify one to two (at most three) research areas
  • should be a research areas in the department
  • subareas can be indicated; do not list your thesis topic

• What are your interests? What are your strengths?
  • For example, developing systems or methods, experimental design, theoretical or analytical foundations, case studies
How specific should my research interests be?

Depends on the area, popularity of the area, your interests and background. Examples:

• “programming languages” may be specific enough if explained why; not many applicants, not all departments have PL faculty

• “security” is too vague as it includes systems, networking, privacy, crypto, software, data, and more

• “AI/ML” without more resolution may not get much attention
  • Foundational AI/ML research or applications of AI/ML to area X?
Research Interests: Definitive vs Unsure

- Most programs expect applicants to have definitive research interests
  - Students are admitted to work with a specific professor
  - Includes many top programs
  - Students may change area after more research or course exposure

- Some programs accommodate switching areas better than others
  - May admit students more holistically to the program
  - May have infrastructure to support student transitions

- Having a 3-year Fellowship gives you flexibility
  - More time to find your research area/advisor
  - Easier to switch adviser (if need arises)
Career Goals May Impact Your Decisions about Research Areas and Programs of Interest

- **PhD career opportunities** (covered in Session 1)
  - Industrial or national laboratory positions (research, development, or entrepreneurial)
  - Academic positions (research or teaching oriented)

For example:

- If interested in a teaching focused position, favor programs with teaching opportunities for PhD students.
- If interested in a position in a government lab, favor programs with active ties and collaborations with government labs.
Consider Your Career Goals
(A 1-Minute Individual Exercise)

Different PhD programs can provide a different preparation for a career after the PhD.

Considering your current post PhD career goals, how will/may these goals influence your program choice?
Factors to Consider: Collective and Individual Enterprises

Collective View: Program, Department & Institution
- Research foci
- Faculty size
- Reputation
- Student life/academic culture
- Financial support
- Location

Individual View: Faculty & Labs
- Student engagement/success
- Publication Impact
- Collaborative network
- Industry engagement
- Research funding
Finding Programs: Using Rankings

Popular reputation-based program rankings

- **US News and World Report** (updated 2023)
- **(National Research Council)** (updated 2010; outdated)

Take all rankings with a grain of salt!
Do your own homework!
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Finding Programs: Using Rankings

Two researcher developed metric-based program rankings

➢ **CSRankings** by Emery Berger (UMass): based on publications in selective venues.

➢ **CS Open Rankings** (Brown); uses US News, CS Rankings, placement rank and best paper awards

➢ Both rankings include [faculty listings](#) with areas (can be outdated)
CSRankings is a metrics-based ranking of top computer science institutions around the world. Click on a triangle (▲) to expand areas or institutions. Click on a name to go to a faculty member's home page. Click on a chart icon (the bar chart after a name or institution) to see the distribution of their publication areas as a bar chart. Click on a Google Scholar icon (□) to see publications, and click on the DBLP logo (•) to go to a DBLP entry. Applying to grad school? Read this first! Do you find CSRankings useful? Sponsor CSRankings on GitHub.

### All Areas [off | on]

| AI [off | on] |
| --- |
| Artificial intelligence |
| Computer vision |
| Machine learning |
| Natural language processing |
| The Web & information retrieval |

| Systems [off | on] |
| --- |
| Computer architecture |
| Computer networks |
| Computer security |
| Databases |
| Design automation |
| Embedded & real-time systems |
| High-performance computing |
| Mobile computing |
| Measurement & perf. analysis |
| Operating systems |
| Programming languages |
| Software engineering |

| Theory [off | on] |
| --- |
| Algorithms & complexity |
| Cryptography |
| Logic & verification |

| Interdisciplinary Areas [off | on] |
| --- |
| Comp. bio & bioinformatics |
| Computer graphics |
| Computer science education |

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Rank institutions in USA by publications from 2013 to 2023

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► Comp. bio & bioinformatics
► Computer graphics
► Computer science education
► Economics & computation

# Institution Count Faculty
1 ► University of Wisconsin - Madison 13.5 10
2 ► Carnegie Mellon University 12.0 20
3 ► Univ. of Illinois at Urbana-Champaign 11.8 19
4 ► Cornell University 9.6 10

Faculty
Justin Hill PL 23 5.7
Dexter Kozen PL 12 3.5
Nate Foster PL 11 2.2
Andrew C. Myers PL 11 3.9
Alexandra Silva 0001 PL 7 1.4
J. Gregory Morsissent [Tech] 3 0.7
Adrian Sampson ARCH 3 0.5
Robert L. Constable LOGIC 2 0.6
G. Edward Suh ARCH 1 0.3
Zhiru Zhang [Tech] 1 0.1

- areas PL and LV selected
- Cornell expanded to show faculty
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areas AI and HCI selected
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Finding Programs: Searching By Faculty

Not all names generated by ranking will be good matches.

Consider:

- Publication activity, especially in high impact venues
- Active external funding (e.g., NSF, DOE, Industry)
- Awards and recognitions, e.g., Best paper and ACM SIG awards, ACM/IEEE Fellows, Industrial Fellowships, Endowed/Named Professorships
- Service on editorial boards or program committees for high impact venues
Computer Science Publishing

- CS researchers primarily target conference publications
- Conference (and journal) quality/selectivity vary greatly
- Learn about publication venues in your areas from
  - Mentors, coaches, letter writers, area advisers, etc.
  - Impact factors, acceptance rates, h-indexes, etc.
  - Conference rankings
Understanding Academic Titles as You Search

● Tenured/Tenure-track Faculty
  ○ Assistant Professor: untenured, typically a 7-year clock
  ○ Associate Professor: tenured
  ○ (Full) Professor: typically 4-12 years after promotion to associate
  ○ Distinguished ranks: Chaired/Distinguished/Endowed Professor

● Teaching-focused Faculty
  ○ Promotion pathway: Assistant/Associate/Full Teaching Professor
  ○ Typically not tenure-track (long-term contracts)
  ○ Lecturer, Instructor terminology used by some institutions
  ○ Some teaching faculty have research programs and advise PhD students
Understanding Academic Titles (cont’d)

- **Post Doc**
  - 1-3 year research position with a Faculty Advisor
  - Externally funds to the individual or funded by the faculty advisor
  - Post docs often work with and mentor PhD students; cannot be PhD adviser

- **Research Faculty**
  - Research Scientist, Research Professor (with academic rank)
  - Grant-funded, no tenure
  - in some schools, research faculty can serve as Ph.D. advisers

- **Courtesy Faculty**
  - Tenured/Tenure-track faculty in another department
  - has collaboration with CS faculty
  - generally not involved in admission; adviser or co-adviser possible
Small Group Breakout: Help Alice and Bob!

ALICE is interested in secure software systems and a PhD program with few course requirements.
Consider: Columbia, U of Florida, Rutgers, Penn State, BU

BOB: Bob is interested in NLP and a program with NLP related graduate courses.
Consider: UC Santa Cruz, U of Michigan, Wisconsin, UC San Diego, U of Utah

1. Recommend two schools in each set to explore further
2. Optional: Identify 1-2 possible advisers in a recommended school
3. Reflect upon lessons learned about the process of “finding a program” from this brief exercise.

Your Breakout Group name will indicate Alice (A) or Bob (B)
If your group really want to switch, you can do so
Secure software systems at Columbia, U of Florida, Rutgers, Penn State, BU

Columbia:
Breadth requirement of 10 courses (4 from core areas AI, systems, theory, 6 other); plus 6 electives. This is on the high side of course requirements. Possible advisers: Suman Jana, Jason Nieh, Dan Rubenstein,

U of Florida
2 systems and 2 theory courses required + 4 more courses. Possible advisers:

Rutgers (CS)
breadth requirement is 4 courses; depth requirement is 5 courses (seems flexible); faculty is harder to identify

Penn State (CS)
requirements hard to find (seems like 10 courses with 2 required); systems faculty seem to have little security interest; strong security group and some have systems interest.

Boston University
breadth requirement is 6 courses; look at faculty in both systems and security
NLP at UC Santa Cruz, U of Michigan - CS+I-school, Wisconsin, UC San Diego, U of Utah

UC Santa Cruz
strong AI/ML group and six of its members are in NLP. Offers an MS in NLP and lists quite a number of NLP courses.

U of Michigan (CSE, IS)
CSE lists many faculty under AI, but hard to identify NLP researchers. Use a ranking site.
I-school does not list NLP as an arena but has 2 NLP courses (561, 630); requires more digging

Wisconsin
courses easy to find; two NLP grad courses; good-size ML group (theory leaning), but NLP is not listed.

UC San Diego
Taylor Berg-Kirkpatrick and some faculty with partial interest; okay ML group overall.
good listing of courses offered last/current 3 semesters

U of Utah
well done overview of research areas listing faculty by area. two core NLP faculty; where are the courses?
Report Back

Alice: Columbia, U of Florida, Rutgers, Penn State, BU

Bob: UC Santa Cruz, U of Michigan, Wisconsin, UC San Diego, U of Utah
The PhD Admissions Process
Typical Admission Processes

❖ **Undergraduates** admitted by School’s Admissions Office

❖ **Graduate students** admitted by program/department (graduate school oversight)

❖ **Departmental Graduate Admissions Committee**

➢ Committee compiles and reviews applicant portfolios

➢ Asks areas and faculty to provide further evaluation

➢ Faculty often champion strong students in their areas
  ■ Faculty may conduct remote or in-person interviews
  ■ Most departments invite applicants to visit after making decisions

❖ Admitted applicant decisions typically expected by April 15th
Common Applicant Review Procedures

Individual faculty selectively review applications
- Who reviews often depends on who has space in lab and has funding
- Faculty look at applicants interested in their research area
  - Good match with my needs?
- Possibility that few faculty look at a given application
- Higher supply of applicants in an area means faculty can be more selective
  - expect more experience/knowledge of an applicant
- If multiple faculty are interested in an applicant, they may coordinate interviews/outreach to applicant

Program admits an applicant if all the following are true
- applicant has the potential to succeed in the program
- a faculty wants to work with them
- funding: RA (through adviser), TA, fellowship
Admissions Process Demands: An Example

University of Washington, Computer Science

• Per applicant materials to review:
  • Transcripts
  • 3 Recommendation letters
  • Résumé or CV
  • Personal statement

• 2023 Statistics:
  • 3,000 applications
  • 150 offers
  • Expectation of 50-60 enrollees

https://www.cs.washington.edu/academics/phd/admissions/faq#chances

CS Rankings: 8
US News: 5
CS Open Rankings: 6
How many Applications to Submit?

- Acceptance depends on many factors, including
  - Capacity: program’s faculty and funding capacity for new students
  - Overall strength of your application
    - uniqueness of your background
    - your research record
  - Competition
    - number of competitive applicants (in the particular area)
    - popularity of your target research area (e.g., 60% of applicants interested in ML/AI)
  - Serendipity: who reads your application
How many Applications to Submit? (cont’d)

- Top applicants do **not** always get an admission
  - acceptance rates are generally not public
  - for domestic students, expect
    - single digits for top 10 programs
    - about 20-25% for next 10
    - then about 30%+

- **Apply to 8-12 programs as a minimum**
  - maybe fewer if you already have the support of a faculty member
How many Applications to Submit? (cont’d)

• Discuss number of programs with your coach (area adviser, if you have one)
• General recommendation:
  • 3-4 "Very Good" chance programs
  • 3-4 “Good” chance programs
  • 3-4 “Reach” programs
• Programs have an application fee
  • CSGrad4US will cover up to $750 of your application fees
  • fee waiver exists (apply early)
What happened in cohorts 1 and 2?

Reasons for no acceptance
1. not listening to the coach
2. applying to only 3-4 programs with narrow research interests
3. applying to only 3 programs with significant geographical constraints
4. applying to 8 or more programs, with programs rated as highly selective
5. mixed up faculty in CS with faculty in other I-school departments
6. narrow interests in highly competitive research areas (e.g., AI, ML, quantum)

Having an admission and applying again
- none in cohort 1
- about 3 in cohort 2
Our advice

Communicate with your coach
• If there seems to be a lack of communication, let us know
• Ask at least two experience people about your school choices

Broaden research interests
• Be broader research-wise and apply to more programs

Minimize geographical constraints
• Take a broader view and apply to schools that could be possible
Our advice

Applying to programs rated as highly selective

- Understand which programs are highly selective in what areas.
- Ask. Don’t assume.

Interested in AI, ML, quantum?

- Understand that there is more competition.
- Have the best application material possible.
- Few departments have a strong presence in quantum.
- For AI, apply to 12+ programs

Pay attention to faculty in multiple departments

- It can be confusing. In case of doubt, ask.
- Being listed under faculty may not mean access to admission files.
Contacting Potential Advisors

Very common: Applicants are accepted if a faculty commits to advise

• Before reaching out to faculty: Do your homework!
  • Are you familiar with their recent research activities?
  • Have you reviewed samples of their papers or presentations?
  • What related work might you like to do?
  • **Not:** Dear X, I am very interested in your research area …

• Send an email (include your CV) and (briefly) introduce yourself
  • State that you have a fellowship (include a 1-pager about CSGrad4US)
  • If you graduated 5+ years ago, consider highlighting relevant working experience
  • Talk to your coach on what to highlight in the email
Contacting Potential Advisors

After your email …

• If a positive response:
  • Request a meeting (call or Zoom)

• If no response, send a follow up email (email gets buried)

• If your letter writers (or coach or area adviser) know faculty of interest, ask whether they would make contact and advocate for you
Questions?
Next Week ... 

Panel 1:
What I Wish I Would Have Known Before Applying
(advanced PhD students share their experiences)
Thursday, October 5, 2023 @ 7PM EST