Session 1: Overview

Thursday, September 16 (7pm ET)
CSGrad4US Program
Management and Mentoring Structure

Why The PhD?
Degree and Program Objectives, Research and Career Paths
Congratulations!

… on deciding to pursue research and a PhD in CS

… on being awarded an NSF CSGrad4US Fellowship

Fellowship Goal:

Increase the number of diverse, domestic graduate students pursuing research careers in the computing fields.
Why is domestic PhD production of national importance?

Domestic PhDs decreased from 69% in 1985 to 37% in 2018

Today, almost 60% of new PhDs in the US take industrial positions
U.S. Need for PhDs, especially *domestic* PhDs

- Academia facing retirements of CS faculty
- Startups rely on PhDs to drive innovation
- CS UG enrollment still booming
- CS courses are increasingly taken by more non-majors
- 3000 openings annually for CS research scientists projected in the next decade
- 37% of PhDs awarded to domestic students is undesirable
- Government labs need domestic PhDs
- International students have increasingly more options for a PhD and jobs in other countries
CSGrad4US Players for YOU

- **Vision & Funding:**
  - National Science Foundation

- **Mentoring:**
  - CRA, CRA-E, CRA-WP, CERP
  - 4 Program Leaders
  - Mentors and Coaches
  - Panelists

- **YOU! The Fellows**
NSF’s Role and Mission

The National Science Foundation (NSF) supports basic research and people to create knowledge that transforms the future.
• Its mission is to promote the progress of science; to advance the national health, prosperity, and welfare.

NSF supports over 85% of all federally-funded academic CS research (Source: NCSES).
CRA, CRA-E, CRA-WP, and CERP

CRA’s mission is to enhance innovation and strengthen research and advanced education in computing.
• CRA has over 200 members representing academia, industry, and governments in North America.

CRA-E focuses on building a pipeline for society’s needs of a continuous supply of talented and well-educated computing researchers.
CRA, CRA-E, CRA-WP, and CERP

**CRA-WP** focuses on increasing participation and improving the access and opportunities of individuals from groups underrepresented in computing research and education.

**CERP** is CRA’s Center for Evaluating the Research Pipeline. CERPs mission is to increase diversity in computing research through evaluation and research.
CSGrad4US Mentoring Goals

• Guide students through the application process towards a successful PhD admission

• Mentor students through the first year in graduate school

• Provide insight into how to be successful in graduate school and research
Why a Mentoring Program?

Students returning from the workforce have different needs from students applying while in school.

- Contact with faculty and grad TAs is not recent
- Prior experiences may not have focused on grad school
- Coursework and exams may no longer feel natural
From the workforce to graduate school: How do departments view us?

Students returning from the workforce to grad school are generally more mature and disciplined, with

- a broader perspective on interests including research areas
- technical and soft skills experience
- experience with real tools, data, project teams
Who is running the mentoring program?

4 Program Leaders
3 Group Mentors
11 Individual Coaches
CRA Staff
Program Leaders

Maria Gini, University of Minnesota

Susanne Hambrusch, Purdue University

Russ Joseph, Northwestern University

Lori Pollock, University of Delaware
Group Mentors

Dorian Arnold, Emory University

Lori Clarke, Univ. of Massachusetts, Amherst

Kelly Shaw, Williams College
Staff & Evaluation

Daniela Cárdenas, CRA-WP, Program Associate

Elyse Okwu, CRA-WP, Program Associate

Erik Russell, CRA, Director of Programs

Kristi Kelly, CERP, Research Associate
Program Evaluation (CERP)

CERP is the data collection partner for CSGrad4US

CERP’s goals
- Learn about your experiences before and during the program
- Identify what works well and what can be improved

Your engagement with CERP
- Online surveys
- Polls and other occasional opportunities for your feedback

Your participation in CERP surveys will lead to a better program!

Email: cerp@cra.org
Introductions:
Meet Fellows in a Breakout

Tell us about yourself

- background
- why graduate school and research
- how did you hear about CSGrad4US
- share something unique about you
Overview: Mentoring Program Structure

Group mentoring sessions
• provide general application, admission, research, PhD programs, grad school, and career information
• prepare fellows for coaching sessions

Individual Coaching
• provide individual conversations, advice, and mentoring
Group Mentoring Sessions

1. Overview (this session)
2. Preparing a Strong PhD Graduate Application
3. Process for PhD Application and Decision
4. Research as the Key PhD Degree Component
5. Succeeding in Graduate School

Panel 1: What I wish I knew when I applied to graduate school
Panel 2: What I wish I knew when I started graduate school
Individual Coaching

Fellow <-- Coach matching is complete

Follows a 12-week coaching framework

• builds on the information covered in the mentoring sessions
• ends in fall with a complete application package
• ends in spring with acceptance to graduate school
• may continue into the first year of grad school
<table>
<thead>
<tr>
<th>Time Period</th>
<th>Objectives and Outcomes</th>
<th>Mentee Actions Prior to Meeting</th>
<th>Coach Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Week 1</strong> 9/13/2021</td>
<td>Start relationship building; Gain knowledge of mentor; Establish coaching expectations</td>
<td>Share your submitted fellowship statement (on canvas); Update and upload resume</td>
<td>Introductions; Discuss mentee statement and resume; background &amp; goals; Get an understanding of the research interests; Describe teaching structure &amp; timeline</td>
</tr>
<tr>
<td><strong>Week 2</strong> 9/20/2021</td>
<td>Resume that emphasizes strengths &amp; experience; Key work experiences to highlight in application; Recognition of weaknesses; Plan for test-taking if needed</td>
<td>Revise resume based on discussions; Reflect on strengths and weaknesses</td>
<td>Discuss revised resume, expected strengths and weaknesses of the application; transcript; Discuss test requirements, prep, test-taking times as needed;</td>
</tr>
<tr>
<td><strong>Week 3</strong> 9/27/2021</td>
<td>Knowledge of statement requirements; Understanding of what makes a good statement; Knowledge of how to choose letter writers</td>
<td>Complete any remaining resume revisions; Read/analyze example statements;</td>
<td>Discuss analysis of example statements; Discuss statement requirements and statement outline &amp; key content to include; Discuss factors in choosing letter writers</td>
</tr>
<tr>
<td><strong>Week 4</strong> 10/4/2021</td>
<td>Initial target school list; Final set of potential letter writers; Research schools; Create initial target school list; Draft of email to request letters</td>
<td>Research schools; Create initial target school list; Draft of email to request letters</td>
<td>Discuss selected letter writers and justifications; Discuss email invitation to letter writers; Give an overview on how fellow should research schools; Discuss # schools to apply to, etc.</td>
</tr>
<tr>
<td><strong>Week 5</strong> 10/11/2021</td>
<td>Finalized list of schools and letter writers; Plan for outline of the personal statement</td>
<td>Revise target school list; Revise letter writer list</td>
<td>Discuss target school list and revite; Discuss revised letter writer list; Discuss how to outline statement content</td>
</tr>
<tr>
<td><strong>Week 6</strong> 10/18/2021</td>
<td>First draft of statement outline and topics to include; Email letter writers</td>
<td>Detailed outline of statement;</td>
<td>Discuss first draft outline of statement and potential revisions;</td>
</tr>
<tr>
<td><strong>Week 7</strong> 10/25/2021</td>
<td>First full draft of statement</td>
<td>First draft of statement;</td>
<td>Discuss full draft of statement and ways to strengthen</td>
</tr>
<tr>
<td><strong>Week 8</strong> 11/1/2021</td>
<td>Second draft of statement;</td>
<td>Rewrite statement;</td>
<td>Discuss second draft of statement and ways to strengthen; Discuss any questions on the application</td>
</tr>
<tr>
<td><strong>Week 9</strong> 11/8/2021</td>
<td>Third revision of statement; Analyze and plan for any additional required statements</td>
<td>Third revision of statement if needed; Gather additional statement requirements for target schools</td>
<td>Discuss additional statement requirements; Identify reviewers for additional perspective; Check on letter writer responses; Discuss third draft of statement if needed</td>
</tr>
<tr>
<td><strong>Week 10</strong> 11/15/2021</td>
<td>Drafts of additional statements: finalized conditional letter writers; Start application process at each school so letter writers receive requests</td>
<td>First draft of additional statements; Reminder email to re-response letter writers</td>
<td>Discuss drafts of additional statements; Discuss status of letter writer commitments and possible additional requests; Discuss any questions on application forms themselves</td>
</tr>
<tr>
<td><strong>Week 11</strong> 11/22-29/2021</td>
<td>First revisions of any additional statements; All other application material should be in final form</td>
<td>Revise any additional statements as needed</td>
<td>Discuss statement revisions and any remaining issues; Review status of all application materials</td>
</tr>
<tr>
<td>Thanksgiving</td>
<td>Submit application materials</td>
<td>Review application materials as needed; Follow up with letter writers as needed</td>
<td>Discuss/review finalized materials and uploading of materials</td>
</tr>
<tr>
<td><strong>Week 12</strong> 12/6/2021</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
What we expect from each Fellow

● Attend mentoring sessions whenever possible (recordings will not have breakouts)
● Participate in the mentoring sessions
● Speak up when you have questions or something is unclear
● Complete the weekly “homework”
● Work with your coach and follow the schedule
● Let us know your concerns
Brief Demo of Canvas

To log into Canvas, search for email titled “[CSGrad4US] Access to Canvas and Mentoring Session 1” and follow step-by-step instructions.
Brief Demo of Canvas

Course Homepage

Welcome!
The objective of the Computer and Information Science and Engineering (CISE) Graduate Fellowships (CSGrad4US) is to increase the number of diverse, domestic graduate students pursuing research and innovation careers in the CISE fields: computer science, computer engineering, or information science.

The goals of the CSGrad4US Mentoring Program are:
1. To guide returning students through the application process towards a successful CS PhD admission and school selection.
2. To mentor them through the transition to PhD graduate study in the first year towards high retention.

Navigation Tips
The left-side navigation menu includes:
- Modules: A gateway to the Course Overview.
- Assignments: Student action items with due dates.
- Discussions: A way to interact with your peers.

New to Canvas? Please take some time to review the following resources:
- Resources for Students
- Resources for Instructors

Mobile Guides - Canvas Student

Research - Journal En... Sep 26 at 11:59pm
Reflection - Journal En... Sep 23 at 7pm
Group Mentoring Sess... Sep 16 at 7pm
Create Journal Sep 19 at 11:59pm
Fellowship Statement Sep 19 at 11:59pm
Resume Sep 19 at 11:59pm
Group Mentoring Sess... Sep 11 at 7pm

Recent Feedback
Nothing for now
Brief Demo of Canvas

Calendar

“Calendars” allows you to filter visibility by course.
Brief Demo of Canvas

Modules

Organized by week, “Modules” allows you to access assignments, files and other content.

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Assignment</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>09/13/21</td>
<td>Attend Mentoring Session 1</td>
<td>0 pts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fellowship Statement</td>
<td>0 pts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resumes</td>
<td>0 pts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Create Journal</td>
<td>0 pts</td>
</tr>
<tr>
<td>2</td>
<td>09/20/21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>09/27/21</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Brief Demo of Canvas

Discussions
Start discussions with other participants, post questions, etc.
Brief Demo of Canvas

Having issues?
Report a problem through Canvas.

Help
File a ticket for a personal response from our support team.
For an instant answer, see if your issue is addressed in the Canvas Guides.

Subject
Description
Include a link to a screen cast/screenshot using something like Jing.

How is this affecting you?
Please select one

Cancel
Submit Ticket
QUESTIONS?
Why The PhD
Degree and Program Objectives, Research and Career Paths
PhD Students Are a Key Driver of Research and Innovation
CS Researchers Pursue Many Areas

Security / Privacy / Information Assurance

Human-Computer Interaction

Software Engineering

Operating Systems

Scientific / Numerical Computing

Information Systems

Informatics: Bioinformatics / Other Science

Social Computing / Social Informatics

Artificial Intelligence / Machine Learning

Theory and Algorithms

Quantum Computing

High-Performance Computing

Programming Languages / Compilers

Information Science

Hardware / Architecture

Networks

Graphics / Visualization

Computing Education

Databases / Information Retrieval
CS Research Happens in Many Places

- Historically, in **CS departments**
  - in *Engineering Colleges*, e.g., Illinois, Michigan, NC State, Virginia Tech, U. of New Mexico
  - in *Arts/Sciences Colleges*, e.g., Purdue, Iowa, Maryland

- Also in **Colleges and Schools of**
  - *Computing*, e.g. Georgia Tech, CMU, MIT, Clemson
  - *Computer and Information Sciences*, e.g Cornell, UMass, Pitt, UC Irvine, IU, Wisconsin
  - *Information*, e.g. Penn State (IST), UW, Michigan

Note: CSGrad4US Fellows need to enroll in CS, IS, or ECE departments. While other departments may have computational programs (e.g., Statistics, Computational Sciences, Information Technology, Bioinformatics), they may not be in scope. Always ask!
CS Research Happens in Many Places

• Historically, CS departments in College of Engineering or College of Science

• Computing research also happens in:
  Information Sciences, Statistics, Biology,
  Information Technology, Computer Engineering, ...

• Now, in many Colleges/Schools of Computing, I-schools
Some Examples

College of Engineering
UIUC, NC State, Virginia Tech, Penn State, UW, Michigan

College of Computing
Georgia Tech, CMU, MIT, Clemson

College of Science/Arts and Sciences
Purdue, U of Iowa, U of Maryland

College of Information
Penn State (IST), UW, Michigan

College of Information and Computer Science
Cornell, UMass, Pitt, UC Irvine, IU, Wisconsin, Northeastern
The PhD in Perspective

● **Undergraduate Programs**
  ○ Preparation for entry-level industry and government jobs, e.g. software engineer, data analyst, tester
  ○ Foundation for graduate school
  ○ Learn fundamental concepts and tools; critical thinking and problem solving

● **MS Programs**
  ○ Preparation for jobs in industry/government with deeper foundations
  ○ Academic programs may include research
  ○ Professional programs may focus on area specialization, e.g., data science, security

● **PhD Programs**
  ○ Preparation for job opportunities in academia (faculty), industry and government research labs; leadership and management positions
  ○ Learn and practice research (and possibly teaching) skills
PhD Learning Outcomes

- Typically also in Bachelor’s Outcomes
  - Fundamental knowledge appropriate for the discipline
  - Ability to communicate effectively orally and in written form
  - Commitment to moral, ethical and service-oriented conduct

- Typically also in Master’s Outcomes:
  - Fundamental and deep knowledge in specialization

- PhD Outcomes beyond typical Bachelor’s and Master’s Programs:
  - Ability to perform critical review of scholarly work
  - Ability to formulate, develop, conduct, publish and present original research
PhD Learning Outcomes

- Fundamental knowledge appropriate for the discipline and specialization
- Depth of knowledge in specialization
- Ability to perform critical review of scholarly work
- Ability to formulate, develop, conduct, publish and present original research
- Ability to communicate effectively orally and in written form
- Commitment to professional conduct that reflects our moral, ethical and service responsibilities
Pursuing a PhD

Your undergraduate education = foundations + breadth in CS through shared classroom experiences

Your PhD = research apprenticeship with research expert (advisor) + other mentors
= deep dive into research problems to advance knowledge
  + training in research process
  + background courses
  + milestones
Why Pursue a PhD?

- Pursue your own intellectual research interests
  - Acquire depth of knowledge in the chosen research area
  - Unique opportunities to teach and mentor
  - Develop a habit of lifelong learning

- New career opportunities and options
  - Typically more autonomous, “selfpreneur” opportunities
  - Being the determinant of the questions/problems/areas you explore
  - Wide range of career options from research and teaching faculty positions to leadership and management positions

Finding the right research area and advisor(s) are important!
Typical PhD Career Options

Academic

• Tenure-track faculty (R1/R2, MS, 4-years institution)
• Teaching or research faculty at R1/R2 institution

Non-academic Research

• Scientist in a research lab (industry, government, national labs)
• Applied research positions

Research-driven Leadership

• Entrepreneur, start-up, consulting, technical leadership
Basic classification done by the Carnegie Commission on Higher Education

- R1: Doctoral Universities – Very high research activity
- R2: Doctoral Universities – High research activity
- D/PU: Doctoral/Professional Universities
- M1: Master's Colleges and Universities – Larger programs
- M2: Master's Colleges and Universities – Medium programs
- M3: Master's Colleges and Universities – Smaller programs
- Baccalaureate Colleges
- Associate's Colleges
CSGrad4US Is Here to Make It Happen for YOU!
School Admissions Timeline

- Departments identify admissions goals (qualitative and quantitative targets)
- Dec-Jan:
  - Assemble applicant portfolios
  - Comprehensive and holistic portfolio reviews
- Feb-Mar:
  - Down selection processes may be strictly based on portfolio or may be supplemented by interviews
  - In-person campus visits (may occur before or after admission decisions)
- Apr: Admitted applicant decision (typically April 15th deadline)
  - Admitted students are supported as TAs or RAs or by Fellowships
CSGrad4US Fellows Timeline

**Before being selected as a Fellow**
- Undergrad degree in CS or related area
- Industrial experiences
- Interest in a PhD

**Early Fall 2021**
- Select schools to apply to
- Identify letter writers
- Update your resume
- Draft personal statement
- If needed, study for and take GREs

**Late Fall of 2021**
- Ask letter writers
- Give them resume, personal statement & transcripts
- Finalize application materials and get feedback
- Submit applications

**Spring 2022**
- Hear from schools
- Visit schools
- Make a decision!
Early Fall 2021
- Select schools to apply to
- Narrow down list of letter writers
- Update your Resume
- Draft Personal Statement
- If needed, study for and take GREs

Late Fall of 2021
- Ask letter writers
- Give them resume, personal statement & transcripts
- Finalize application materials and get feedback
- Submit applications

Spring 2022
- Hear from schools
- Campus visits
- Make a decision!

Before being selected as a Fellow
- Undergrad degree in CS or related area
- Industrial experiences
- Interest in a PhD

Group Mentoring and Individual Coaching
- Work with your coach
Reflective Journal Activity

• Think back to when you graduated from college.
  • How did you view getting a PhD then?
  • What changed your view (if it did)?
• Where do you see yourself in 7 years?
QUESTIONS?

Next group mentoring session:
Thursday, September 23, 7:00-8:30 pm ET
Session 2: Preparing a Strong PhD Graduate Application