



**CRA-W**

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## How Do I Successfully Apply to Graduate School?

<b>Deciding Where to Apply</b>	<ol style="list-style-type: none"><li>1. What areas of computing interest me?</li><li>2. What type of degree am I considering? MS? PhD? Why?</li><li>3. What type of academic climate do I want to study in?</li><li>4. Do I have any geographic preferences? Any restrictions?</li><li>5. What are my academic credentials? (GPA, research experience, test scores, communication skills)</li><li>6. Who is on the faculty at the school I am applying to? Who would I like to be my advisor?</li></ol>
<b>Preparing Application Materials (Pay attention to deadlines)</b>	<p>EVERY program is different, but most want:</p> <ul style="list-style-type: none"><li>• application (basic contact info)</li><li>• transcripts</li><li>• letters of recommendation (2-3)</li><li>• statement of purpose (goals/research/intent)</li><li>• resume</li><li>• test scores (GRE, TOEFL / IELTS)</li><li>• fee</li></ul>
<b>Engaging Reference Letter Writers</b>	<p>Ask “Would you be able to provide a positive recommendation?”</p> <p>Give them materials (transcript, resume, statement of purpose, chart of schools, deadlines, how to submit letter) at least 2 -3 weeks before first deadline.</p>
<b>Taking GREs</b>	<p>Take spring junior/fall senior years, retake if needed. If non-native English speaker take TOEFL, TOEIC.</p>
<b>Finalizing Applications</b>	<p>Pay attention to deadlines, follow up with letter writers, report test scores, request official transcripts.</p>
<b>Financing Your Graduate Study</b>	<p>Apply for financing options, such as teaching assistantships, research assistantships, fellowships (NSF Graduate Fellowship), and other grants.</p>
<b>Evaluating Offers</b>	<p>Spend time researching programs, visit the schools, meet faculty in your interest area(s), meet current grad students/alumni and ask about their experiences.</p>
<b>Making the Final Decision</b>	<p>You will likely do well at any of your top choices. Make decision and inform schools, write thank you notes to letter writers, CELEBRATE!</p>

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<b>Master's degree</b>	<b>Ph.D. degree</b>
<b>1-2 years</b>	<b>3-7 years (most often 4-6)</b>
<b>Courses + Project or Thesis</b>	<b>Courses + Research + Dissertation</b>
<b>More attractive for industry/lab</b>	<b>Minimum for industry/lab research</b>
<b>Minimum for academic instructor</b>	<b>Minimum for tenure-track academic position</b>
<b>Some opportunities to specialize</b>	<b>Become expert in a particular research area</b>
<b>Often limited graduate study funding</b>	<b>Easier to obtain RA/TA support</b>

## Additional Resources

Applying to Ph.D. Programs in Computer Science:

<http://www.cs.cmu.edu/~harchol/gradschooltalk.pdf>



Graduate School Tips:

<http://www.gradschooltips.com/>



CRA-W Resources for Graduate Students:

<http://cra.org/cra-w/for-graduate-students/>





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## How Can I Be Successful Post-Bachelor's?

### Many contributors to overall happiness\*

- Loving relationships
- Financial comfort / a reasonable standard of living
- Personal freedom
- Meaningful / satisfying work
- Working toward goals
- Good health

\* The definition of happiness differs from one person to the next and may differ for one person over time.

### How can you set yourself up for career success?

#### Take Courses

**Computing knowledge:** Develop strong computing knowledge and skills.

**Communication:** Develop reading, listening, writing, and speaking abilities. Being a great communicator will serve you well on any career path.

**General knowledge:** Many computing careers involve working with experts in other fields. Be open to learning about new subjects.

#### Participate in Internships and Projects

*(you won't know what you like until you try it)*

**CS Research:** Especially important if you're thinking of grad school / a research career. Also great because employers like to see that students have worked on open-ended problems!

**Industry Jobs:** Gain experience working on problems that companies care about. Explore different types of work environments, if possible (big company, small company, etc.), to learn what you enjoy most.

**In-class and out-of-class projects:** Grad schools and employers are interested in all your experiences working on big, challenging projects.

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## Expand Your Network and Find Mentors

**Professors:** Get to know *at least* one professor well.

**Employers:** Be a great employee; whether you decide to stay at a job or not, your boss can be a terrific advocate.

**Develop a network:** Professors, employers, colleagues, classmates, and computing professionals you meet can be valuable resources.

**Obtain advice:** Writing a resume, cover letter, or grad school essay? Preparing for an interview? Search for and be open to advice.

## Collaborate

Computing is an inherently **collaborative** discipline.

Participate in collaborative **group projects**.

Learn how to be part of a **team**.

## Be open...

To **trying new things**: You might discover a passion for something you never knew you loved.

To **learning new things**: Computing is a young and quickly evolving field. That's part of the fun.

To **failing**: If you're doing something challenging and new, failure will happen. Embrace it and learn from it.

**To the idea that developing a great career can take time.**

## For additional information, see our info sheets on:

- Is Graduate School for You?
- Master's or Ph.D.?
- How Do I Successfully Apply to Graduate School?



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## Is Graduate School For You?

### So many career options in computing!

- Software Engineer, Software QA Tester, Software Project Manager, Human-Factors Designer...
- Systems developer, application developer, web developer, game developer...
- Database administrator, network systems administrator ...
- IT sales professional, IT trainer, technical author...
- Teacher, Professor....
- Research scientist, entrepreneur...

### So many contexts!

### Why consider graduate school?

- You want to solve big and important problems
- You love to be creative and want a lot of independence and control over the choice of problems you address
- You want to make important and long-lasting contributions to the field
- You would enjoy being an expert on a particular area in computer science
- Starting salaries for Bachelor's degrees are high; starting salaries for M.S. are often higher
- Your chosen career (e.g., professor or research scientist) requires it

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## How is graduate school different from college?

**Activities:** all CS classes vs. variety of classes in different subjects

**Daily schedule:** flexible hours & open-ended deadlines vs. all course deadlines

**Deliverables:** research contributions, papers, posters, presentations, proposal, & dissertation in addition to exams/class projects

**Modes of working:** innovating, experimenting, presenting, & writing vs. studying, absorbing, & solving known problems

**Evaluation of success:** research contributions & publications in addition to exam scores & project grades

<b>Typical Graduate School Timeline</b>			
<b>Year 1</b>	Take Graduate Level Courses	Identify Research Advisor	Join Research Group
<b>Year 2</b>	Take More Graduate Level Courses	Take Ph.D. Exams	Complete 1st Mentored Research & Paper
<b>Complete M.S. Degree</b>			
<b>Year 3</b>	Identify Specific Ph.D. Topic	Complete Preliminary Ph.D. Research & Paper	Draft Ph.D. Proposal
<b>Year 4</b>	Defend Proposal	Complete More Research	Write Research Papers
<b>Year 5/6</b>	Complete More Research	Write Research Papers	Write & Defend Dissertation
<b>Complete Ph.D. Degree</b>			

## For additional information, see our info sheets on:

- Master's or Ph.D.?
- How Do I Successfully Apply to Graduate School?



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## Master's or Ph.D.?

### What will an advanced degree in CS prepare you to do?

#### Master's degree

- Great (additional) preparation for a career as a computer professional.
- A great way to demonstrate academic potential, possibly to help with a later application for a Ph.D.

#### Ph.D. degree

- Great preparation for a career in CS research.
- An essential if you want to be a (tenured) professor.

### How do the experiences compare?

Master's Degree	Ph.D. Degree
Coursework + Project or Thesis Program may consist entirely of coursework.	Coursework + Research + Dissertation Emphasis on developing research skills
Many different types of programs Some emphasize breadth Some have special focus Some combine both	Develop general knowledge through coursework and/or exams Specialized knowledge through area exams or projects Majority of time spent becoming expert in a particular research area
1-2 years if full-time Can be done part-time	3-7 years (most often 4-6) Programs typically expect a full-time commitment

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## Is funding available?

Master's Degree	Ph.D. Degree
Limited funding available RA/TA support sometimes available Employers may provide partial or full support for continuing education	Easier to obtain RA/TA support RA or TA support provides stipend Tuition/Fees typically waived Opportunities to apply for competitive national and other fellowships

## How to decide?

You might choose not to pursue an advanced degree. In many computing professions, experience is as valuable as a degree.

Remember that Master's and Ph.D. degrees are designed to prepare you for different career paths.

Decide based on your career goals.

## Additional Resources



More on Master's vs Ph.D. programs on the CRA Conquer website:

<http://conquer.cra.org/students/why-go-to-graduate-school>



Slides from a CRA-W Grad Cohort talk on Master's vs Ph.D.

<http://craorg.c.presscdn.com/cra-w/wp-content/uploads/sites/5/2015/05/Masters-vs.-Ph.D.pdf>





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## What is Computing Research? How Can I Participate?

### Why participate in research opportunities?

- Earn stipend, scholarship, or credit
- Think through (and even solve!) challenging problems
- Gain knowledge and expertise
- Work with accomplished researchers
- Prepare for graduate school
- Learn life-long skills
- Build professional relationships
- Apply and discover new ideas and methodologies
- Improve your communication abilities
- Contribute to a specific area of knowledge

### How do you find research opportunities?

CRA-W/CDC Undergraduate Research Programs: CREU and DREU, see back of this page  
<http://cra.org/cra-w/>

CRA Conquer (COmputer ScieNce UndErgraduate Research) website:  
<http://cra-ccc.org/ugresearchchopps/>

NSF: Research Experiences for Undergraduates (REU):  
[http://www.nsf.gov/crssprgm/reu/reu\\_search.cfm](http://www.nsf.gov/crssprgm/reu/reu_search.cfm)

Office of Naval Research: <http://nreip.asee.org/> (Online application typically opens Oct. 1)

NSERC USRA in Canada (inquire with your department to find out how it works at your university)

Research internships at INRIA (the French Institute for Research in Computer Science):

<http://www.inria.fr/en/institute/recruitment/join-us/doing-a-research-internship>

Research internships in Germany (CS is not explicitly included, but see the FAQ for finding projects that include significant computing components.): <https://www.daad.de/rise/en/index.html>

Ask your professors, advisor for opportunities. Visit research groups in your department.

Search for “Undergraduate Research Experience” on the web.

### When to apply?

NSF Summer REUs (including CRA-W/CDC DREU):  
Mid February to mid March

CRA-W/CDC CREU: Mid May

Private companies and government labs:  
Early January to February

Your own college/university:  
Often early in the calendar year as well

**Start Early!** These dates are typical final due dates – many places start accepting applications and awarding positions much sooner.

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## CRA-W/CDC Research Programs

(For more comparison information: <http://cra.org/cra-w/creu/#compare-to-dreu>)

	<b>DREU</b>	<b>CREU</b>
Time	<b>Summer (10 weeks)</b>	<b>Academic year plus optional summer</b>
Stipend per student	<b>\$7000 per summer; relocation travel assistance when appropriate</b>	<b>\$1500 per semester and \$4000 during optional summer extension</b>
Location	<b>Mentor's institution</b>	<b>Student's institution</b>
Deadline to apply	<b>February 15</b>	<b>May 15</b>

## What to include in your Undergraduate Research Resume

- Relevant courses
- GPA - You'll also typically need to submit a transcript
- Major projects
- Publications (if you have them; most undergraduates don't)
- Work experience
- Languages, tools, etc. including level of proficiency

**Be careful, neat, and honest**

## Additional Resources:



CRA-W resources for undergraduates:  
<http://cra.org/cra-w/for-undergraduates/>



Virtual Undergraduate Town Hall Series:  
<http://cra.org/cra-w/undergrad-town-hall-series/>

Visit us at [CRA-W.org](http://CRA-W.org)  
Follow us @CRAWomen