

GETTING STARTED IN RESEARCH

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Northwestern | McCORMICK SCHOOL OF
ENGINEERING

How might you benefit from doing research?

- Learn about and contribute to cutting edge research and technology development
 - NU and our department are at the forefront of research in sustainability, biotechnology, energy, materials, and more
- Build skills you will use in *any* career
 - Self learning
 - Tackling open-ended problems
 - Formulate meaningful and tractable questions and logical approaches to answer them.
 - Project management
 - Technical communication
 - Teamwork, mentorship, collaboration, professional networking (within NU and beyond)
 - Specific technical skills and expertise in special topics
- Improve your competitiveness for jobs & career steps
 - Includes both internships and permanent positions
 - Graduate school (research careers), Med school, more

What to expect from a research experience

- There exist multiple forms of mentorship
 - Often your immediate mentor will be a graduate student or postdoctoral fellow
 - Can seek out additional mentors
 - Opportunities to becoming a mentor
- Research roles and responsibilities evolve over time
 - Often start by shadowing, learning (~1 quarter)
 - Goal is to gradually become more independent (project management, experimental design, analysis of results, oral and written communication, project formulation)
- Leading and conducting research is a team sport
 - It is typically not your responsibility to come up with a project, at least not at first

Finding a lab & research topic

Northwestern University

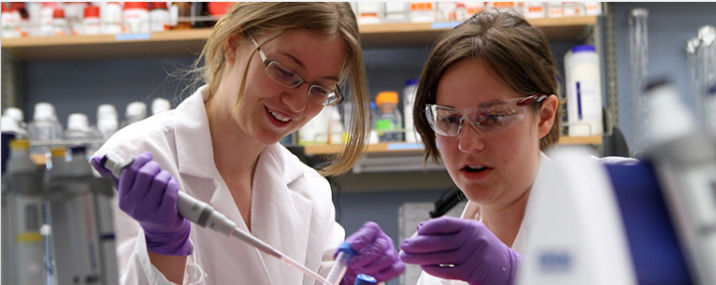
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CHEMICAL & BIOLOGICAL ENGINEERING

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Our award-winning faculty members are transferring their research expertise and passion to students on a daily basis.

RESEARCH

AREAS OF RESEARCH

The ability to integrate knowledge over a broad range of length scales and the detailed knowledge of fundamental physics, chemistry, and biology endows chemical engineers with the ideal training for undertaking pioneering research at the boundaries of traditional disciplines.

Our faculty members' research interests lie at the forefront of chemical engineering research. In these areas, our faculty members strive to seamlessly integrate experimental, computational, and theoretical approaches. The diversity and reach of our research is strengthened by enduring collaborations with departments, as well as our partnerships with research centers both in and outside of Northwestern University.

Learn more about our research areas:

- Biotechnology, bioengineering, and complexity**
- Energy and sustainability**
- Materials and nanoengineering**

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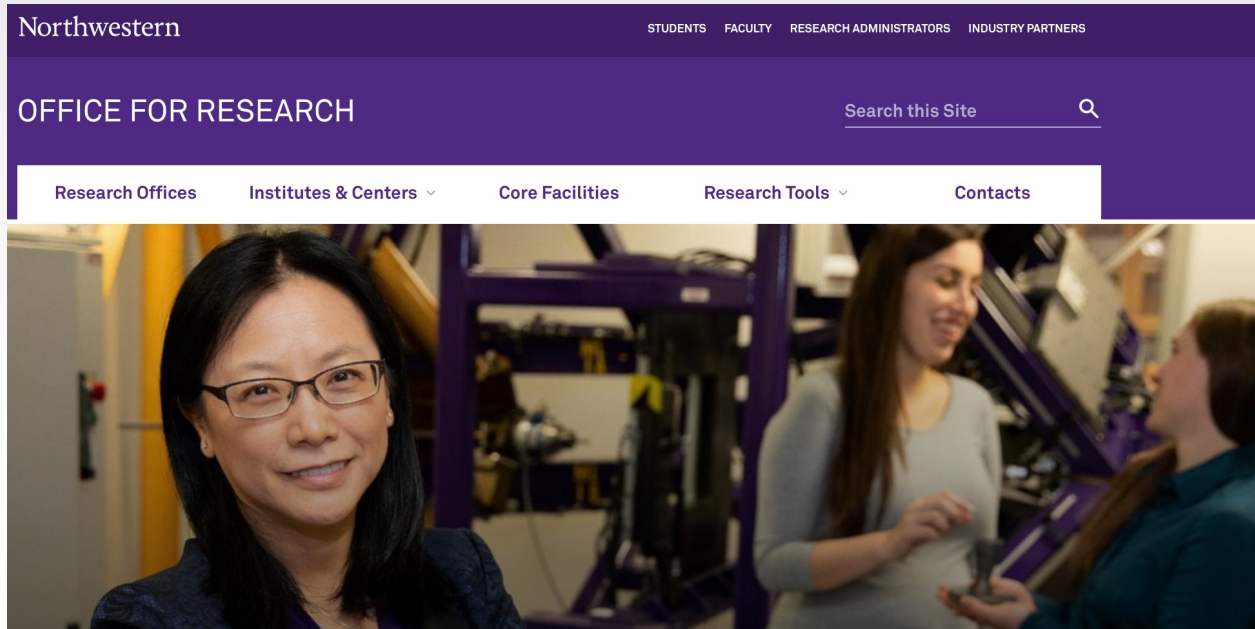
RELATED LINKS

- Research at McCormick
- Meet our Faculty
- Northwestern Research Overview

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Finding a lab & research topic



Northwestern engineers power futuristic propulsion

Posted October 20, 2020 by [jrc411](#)

Army-funded project to develop versatile technologies that lets drones use any kind of fuel more reliably and remain operational longer

Jian Cao, mechanical engineering, in her research space with PhD students Jennifer Bennett (left) and Samantha Webster. Photo: Eileen Molony

Emailing a Professor

Emailing a Professor LOTS of Professors

- Your name, seniority/major
- Why you are interested in THIS lab (brief)
 - Communicate the desire to learn & contribute
- When you'd like to start (this/next quarter), how long you'd like to do research (open to doing at least a year)
- Attach your resume/CV
- Mention, if applicable, interest in pursuing URG (will discuss today)
- Have a specific request – meeting? Connect with grad student?
- Follow up (~1 week, then next quarter)

Research Advice

- Communicate your goals early & clearly
 - I would like to earn authorship on a paper
 - Useful for careers in academia and industry
 - I would like to work with a mentor to secure a summer research grant
 - Support yourself and gain crucial experience
- Remember that mentored relationships are bi-directional
 - Communicate expectations (and ask about them)
- Plans change
 - This is the rule, not the exception
 - Good plans accommodate change (revisit ~quarterly)
 - Murphy docs (e.g., prospectus) can help provide a mission statement to guide planning

Research Advice

[Northwestern](#)

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FINDING A FACULTY/LAB WORKSHOP

Looking to get started in research? Have no idea what to do first? Know you need to reach out to faculty but find them a tad bit scary? Never fear! OUR is here!

In both the **Finding a Faculty Mentor** and **Finding a Lab Mentor** workshops, you will learn how to search for faculty, how to identify potential research mentors, and how to communicate effectively with the mentors you identify. We hold one of the workshops every week of the academic year, so it should be easy to find one that fits your schedule! Finding a Faculty Mentor workshops are appropriate for anyone considering doing any type of research, whereas Finding a Lab Mentor workshops are most appropriate for people interested in lab-based disciplines. No need to attend both! There is significant overlap.

The only things you need to bring are your own interests/ideas about what you might want to explore and something to take notes! If you find that you want to take your learning a step further after you've attended either the Finding a Faculty Mentor and Finding a Lab Mentor workshops, consider enrolling in one of our winter quarter programs, the [Arts, Humanities, and Social Sciences Research Workshop](#) or in the [Science Research Workshop](#), to get further in the process of entering research.

SUMMER RESEARCH OPPORTUNITIES

Last updated Oct 4, 2021

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At Northwestern

Summer Undergraduate Research Grants

Summer Undergraduate Research Grants (Summer URGs) provide a \$3,500 stipend to cover living and research expenses for full-time eight week independent academic and creative work in all fields of study. (Supplemental funds are available for projects requiring international travel.) Under faculty supervision, URG winners immerse themselves in projects in the laboratory, the library, or the studio, on campus and around the world. All Northwestern undergraduates are eligible for these grants.

These are distinct from the Academic Year Research grants, which provide \$1000 for research reagents. You may receive both summer and academic year grants, and indeed this is common.

<http://undergradresearch.northwestern.edu/summerurg>

At Northwestern

Summer Undergraduate Research Grants

For summer 2022, the application deadline is **March 11, 2022**.

Note that this does take a fair amount of preparation, so **start early!**

The URG website has a Getting Started Guide, but for engineering the best way to get started is to find a professor who is interested in hosting you in his or her lab over the summer. In most cases, these conversations begin months or quarters before the application deadline, so **plan ahead!**

Developing a successful URG project and proposal is a **process**. The staff at the Office for Undergraduate Research are available to help in this process, and historically, **students who work with this office to develop their proposals have a high chance of receiving funding.**

<https://undergradresearch.northwestern.edu/funding/surg/>

At Northwestern

Other Summer Research Programs at Northwestern

PAID RESEARCH OPPORTUNITIES AT NU PHYSICAL SCIENCES-ONCOLOGY CENTER

- The NU Physical Sciences-Oncology Center is funded by the National Cancer Institute and uses physical sciences-based approaches to understand the molecular changes leading to cancer. The 8-week program includes hands-on laboratory research, weekly seminars in tumor biology, and two two-day workshops.

SUMMER RESEARCH OPPORTUNITY (SROP)

- The mission of SROP has been to increase diversity among students pursuing graduate education and to provide a valuable academic research experience for many students who might not otherwise have access to such opportunities. Each student selected to participate in the program will work with a faculty member in the student's area of interest.

CONTINUING UMBRELLA OF RESEARCH EXPERIENCE (CURE)

- CURE gives underserved college students the opportunity to work alongside top cancer researchers at the Lurie Comprehensive Research Center in downtown Chicago.

McCORMICK SUMMER RESEARCH AWARDS

- McCormick recognizes and encourages excellence in undergraduate research by holding a competition for awards of \$5,000 each for qualifying undergraduate summer research.

For more information on the above programs see:

<http://www.mccormick.northwestern.edu/students/undergraduate/research-opportunities/summer-programs.html>

UNDERGRADUATE RESEARCH ASSISTANT PROGRAM

- URAP offers faculty the opportunity to hire an undergraduate student to work with them on their research or creative projects.
<http://undergradresearch.northwestern.edu/urap>

REU Programs

REU = Research Experience for Undergraduates

Many research centers sponsored by the National Science Foundation (NSF) have summer research programs for undergraduates, which go by the name of REU.

For example, the Materials Research Science and Engineering Center (MRSEC) at Northwestern sponsors an REU program every summer.

The deadline for 2022 is February 19, 2022.

<http://mrsec.northwestern.edu/undergraduate-opportunities/>

Another REU program at NU is run by the International Institute for Nanotechnology.

The deadline for 2022 is February 18, 2022.

<http://www.iinano.org/northwestern-university-nanotechnology-reu>

Another REU program at NU is run by the Center for Synthetic Biology

The deadline is typically in January each year.

<https://syntheticbiology.northwestern.edu/education/nsf-undergraduate-research-experience-reu.html>

These programs are usually open to students at the host institution or any other college or university.

REU Programs

Programs are usually 9 or 10 weeks (full time) and pay a nice stipend, for example \$5,750 plus on-campus housing and a travel allowance for the Northwestern SynBREU in 2021.

Students are typically paired up with a graduate student for the project and become a member of the professor's research team.

These programs have become increasingly popular, and therefore admission is increasingly competitive. For example, the Northwestern MRSEC REU web site says, "While there is no strict GPA requirement, the average GPA of admitted students is typically above 3.5. However, we do look favorably upon students who can work through adversity. Most accepted students are rising junior and seniors, though we encourage exceptional younger students who have some independent research experience to apply."

You must be a U.S. citizen or permanent resident for most (all?) of these REU programs.

Other Summer Research Programs

Naval Research Enterprise Internship Program

<https://navalsteminterns.us/nreip/>

2022 deadline Nov 1, 2021

DAAD - Summer Research Internship in Germany

<http://www.daad.de/rise/en/>

2022 deadline is Dec 15, 2021

Amgen Scholars Program

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

February 1, 2022 deadline – most hosts (see website)

American Chemical Society ACS

<https://global.acs.org/global-programs/global-undergraduate-programs/international-research-experience-for-undergrads-ireu/>

Typically due ~Dec (see website)

Finding REU and Related Programs

There are lists of REU and related programs available on-line:

NSF Engineering REUs

http://www.nsf.gov/crssprgm/reu/list_result.cfm?unitid=10006

Talk to someone at the Office for Undergraduate Research

<https://undergradresearch.northwestern.edu>