

I ILLINOIS

Grainger College of Engineering

Undergraduate Research

2020

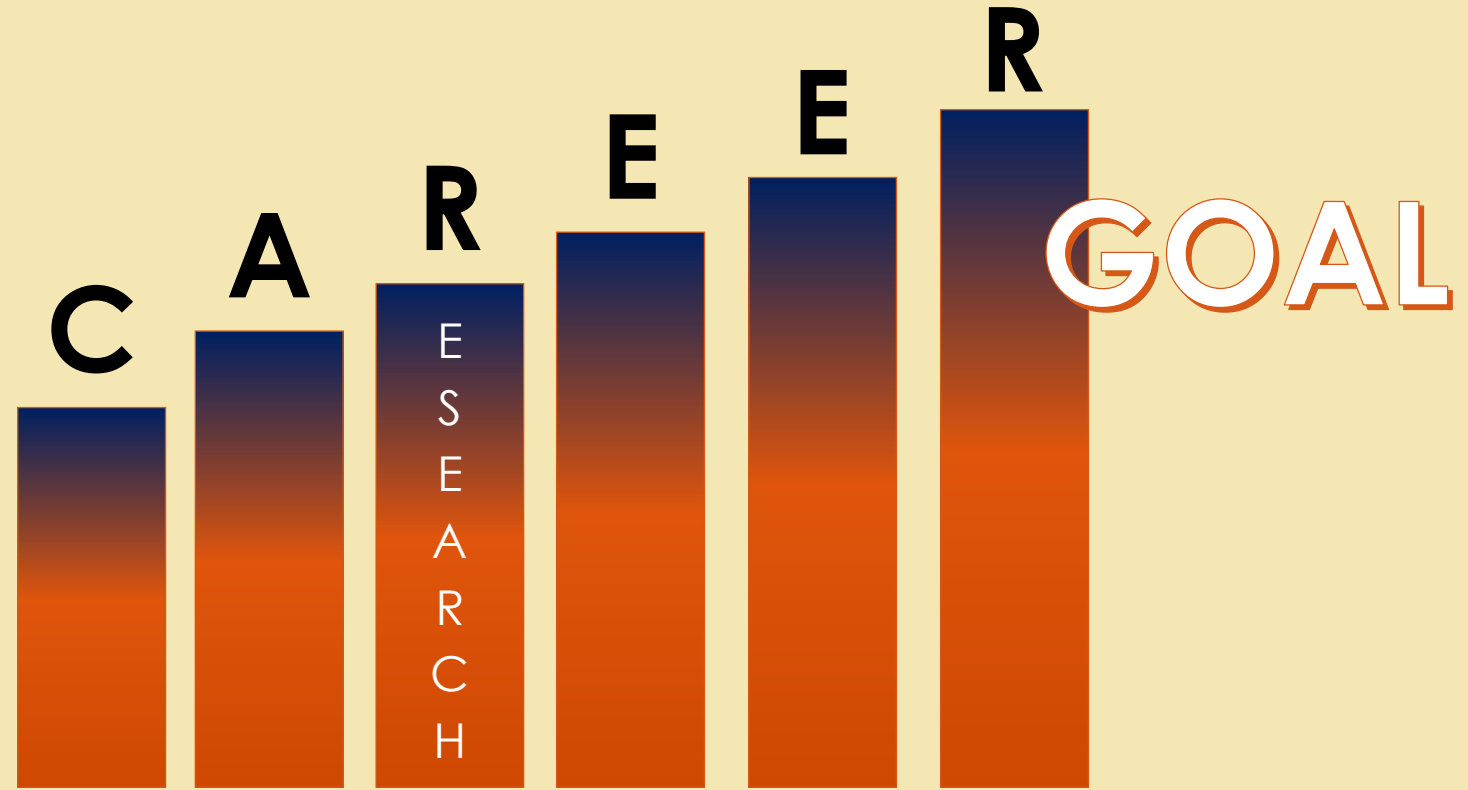
Natasha Mamaril, PhD
Associate Director, Undergraduate Research
Director, Illinois Scholars Undergraduate
Research (ISUR)



WHAT TYPES OF
CAREERS HAVE YOU
EXPLORED?



Why do research?





Thinking about Research

- How do you view research?

RESEARCH is...



Learning Through Inquiry

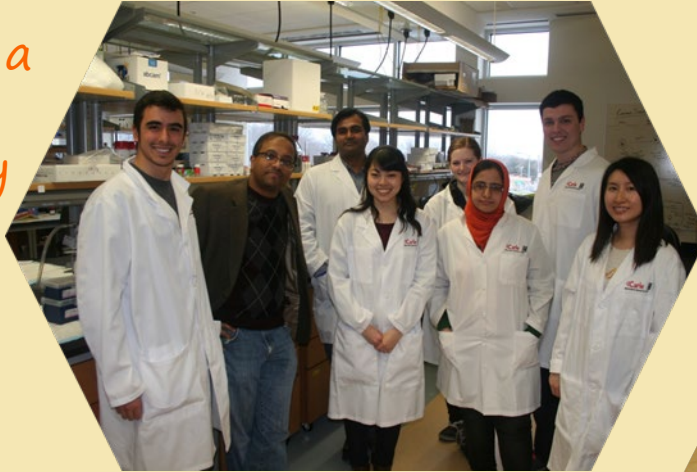
- Case 1: Undergrad works collaboratively with a faculty member on a faculty-determined project and is responsible for a piece of the greater project
- Case 2: Undergrad works as a research assistant to a faculty member to learn discrete skills and advances to more complex tasks
- Case 3: Undergrad researcher works alone on a self-selected project, meeting regularly with a faculty mentor

Benefits of Doing Undergrad Research

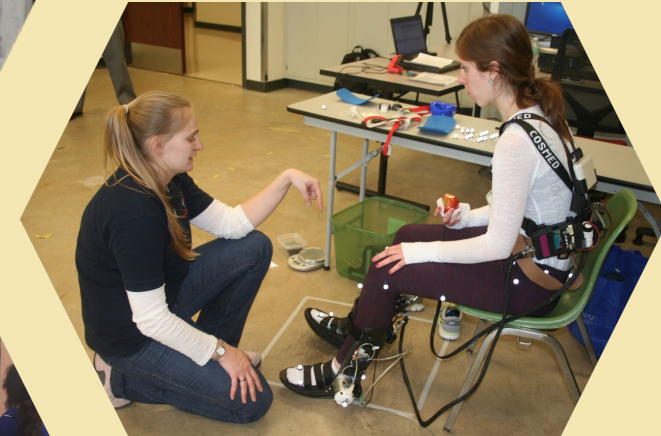
- Apply what you learn in the classroom
- Understand how to conduct research
- Develop confidence in research skills
- Develop interpersonal, communication, and presentation skills
- Build a network in the research community
- See a better picture of STEM careers
- Gain an awareness of what graduate school entails

UNDERGRADUATE RESEARCH

*Be part of a
research
community*



*Engage in
mentored research*



*Connect with
undergraduate
researchers*



<http://grainger.illinois.edu/research/undergraduate>



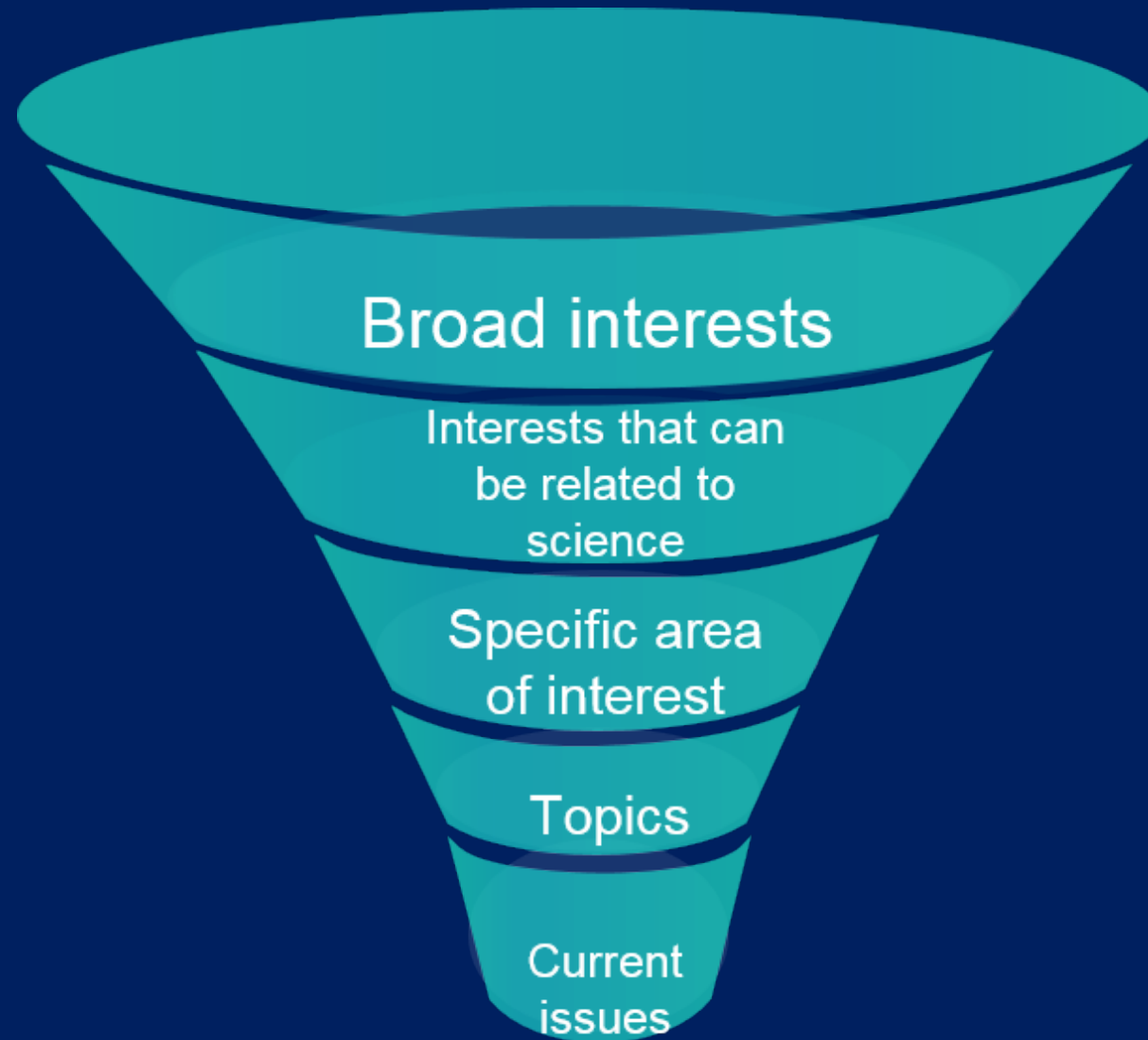
GETTING STARTED WITH RESEARCH



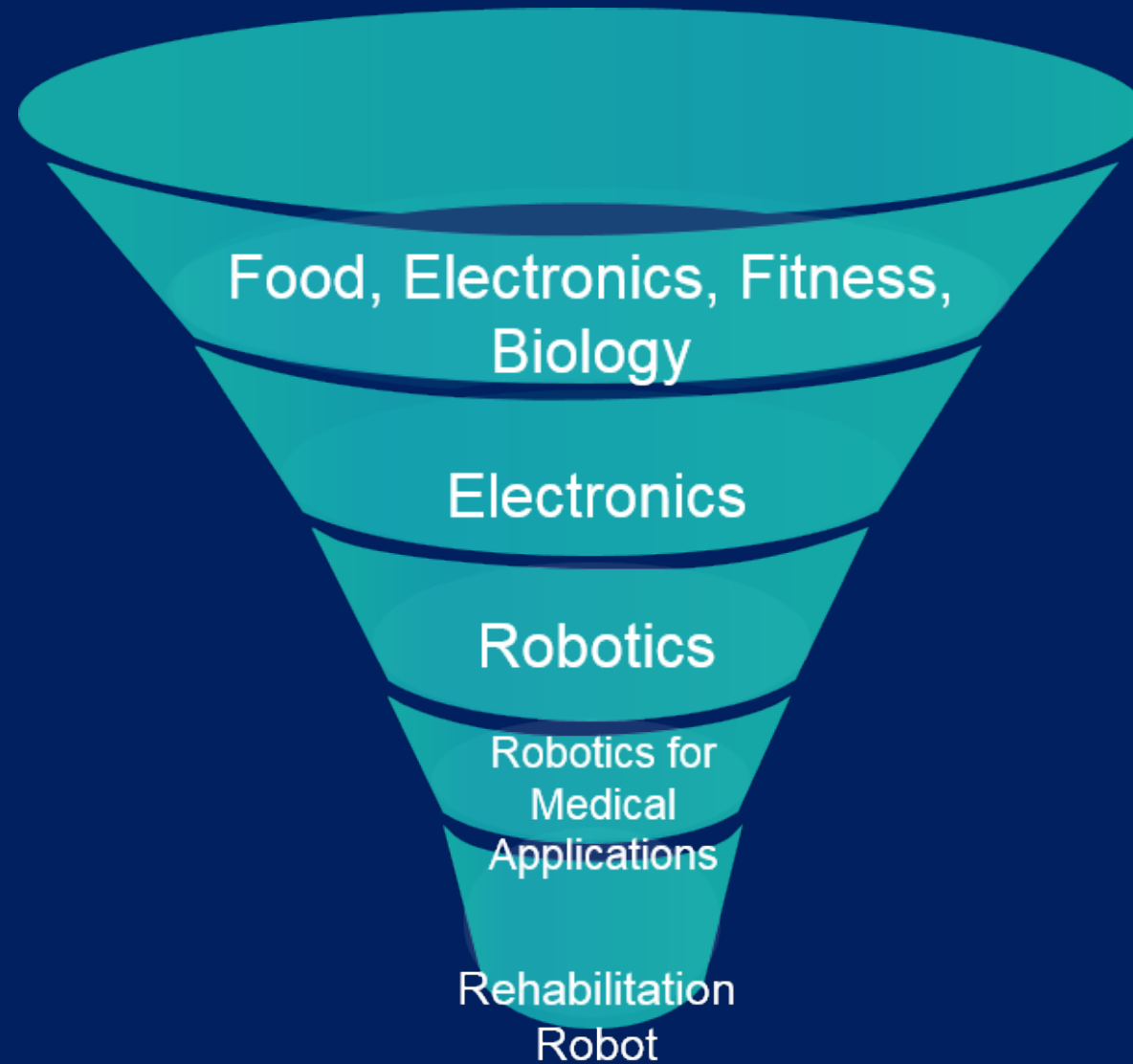
List down 3 things
that you are
passionate about

WHAT ARE YOU PASSIONATE ABOUT?

YOUR INTEREST FUNNEL



YOUR INTEREST FUNNEL



*Do research in
something you are
passionate about
or interested in!*

Getting Started

CHOOSE A TOPIC

- What are you interested in?
- Look at the research literature in your subject area
- Select a topic which is not too big nor too small





Getting Started

DON'T HAVE A TOPIC YET?

- Ask around
- Think of your other interests
- Do some reading in your field or discipline

Check out:

Engineering Faculty Research Matrices

Departmental Research Webpages

Faculty Research Matrix

| | Materials Science | Nuclear Power | Plasma Physics and Fusion | Radiological Science | Reliability and Risk | | |
|--|-------------------|---------------|---------------------------|----------------------|----------------------|-------|------------|
| | | | | | | S. | Abbaszadeh |
| | | | | | | J. P. | Allain |
| | | | | | | C. S. | Brooks |
| | | | | | | D. | Curreli |
| | | | | | | A. | Di Fulvio* |
| | | | | | | B. J. | Heuser |
| | | | | | | K. | Huff |
| | | | | | | T. | Kozlowski |
| | | | | | | L. J. | Meng |
| | | | | | | Z. | Mohaghegh |
| | | | | | | M. | Ragheb |
| | | | | | | D. N. | Ruzic |
| | | | | | | J. F. | Stubbins |
| | | | | | | R. | Uddin |
| | | | | | | Y. | Zhang |

*New faculty

NUCLEAR, PLASMA, AND RADIOLOGICAL ENGINEERING

<https://grainger.illinois.edu/research/undergraduate/get-involved/how-to>



Getting Started

GROUP RESEARCH

- Shared responsibility
- Specialize in best suited aspect of work
- Experience of teamwork
- Tackle large-scale topics
- Ready-made support network

INDIVIDUAL RESEARCH

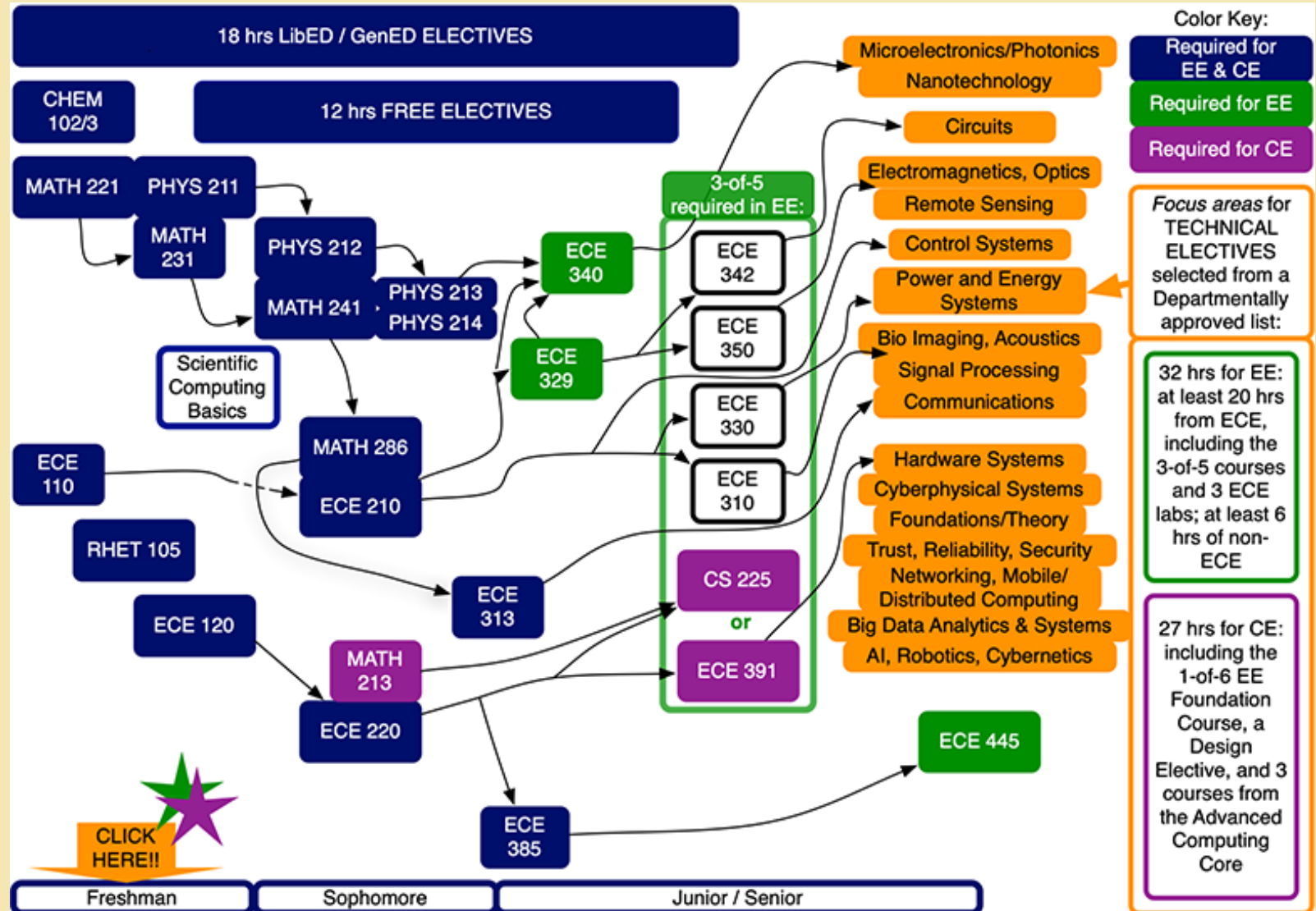
- Sole ownership
- Sole responsibility
- More focused project
- You determine overall quality
- Carry out entire research process on your own

Time You Have Available



Time You Have Available

Electrical Engineering Curriculum Map



Time You Have Available

| | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|---------|---------|---------|-----------|----------|---------|----------|--------|
| 8:00am | | | | | | | |
| 9:00am | | | Lecture | | | | |
| 10:00am | Lecture | | Lecture | Lecture | | Sport | |
| 11:00am | Lecture | Lecture | | | | Sport | |
| 12:00am | | | Library | | Lecture | Sport | |
| 1:00pm | | Library | Study | | | Sport | Study |
| 2:00pm | Lecture | Study | Study | Lecture | | Sport | Study |
| 3:00pm | Lecture | Study | | Lecture | | Sport | Study |
| 4:00pm | | | | | Lecture | Sport | Study |
| 5:00pm | | | Lecture | | | | |
| 6:00pm | | | Training | | | | |
| 7:00pm | Study | Study | Training | Study | Study | | |
| 8:00pm | Study | Study | | Study | Study | | |



Additional Benefits of Undergrad Research

- Learn to manage your time/attention
- Potential to co-author a poster or paper for a conference
- Perhaps co-author an article for publication
- Gain work experience in a research environment
- Establish work history worthy of a recommendation to a graduate program



Research On- and Off-Campus

UNDERGRADUATE RESEARCH OPPORTUNITIES

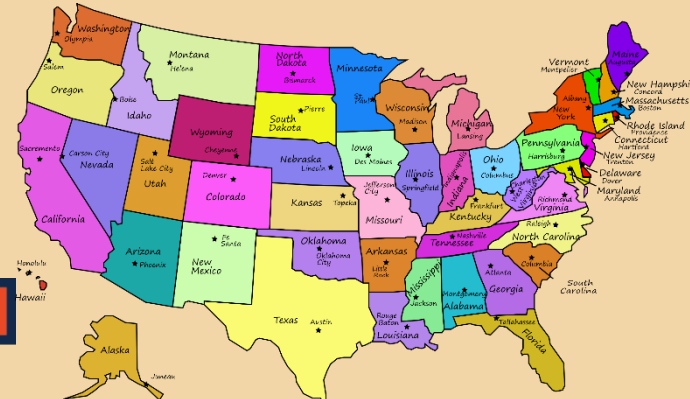
UNDERGRADUATE RESEARCH



RESEARCH
FOR
CREDIT



RESEARCH
FOR PAY



Independent Research

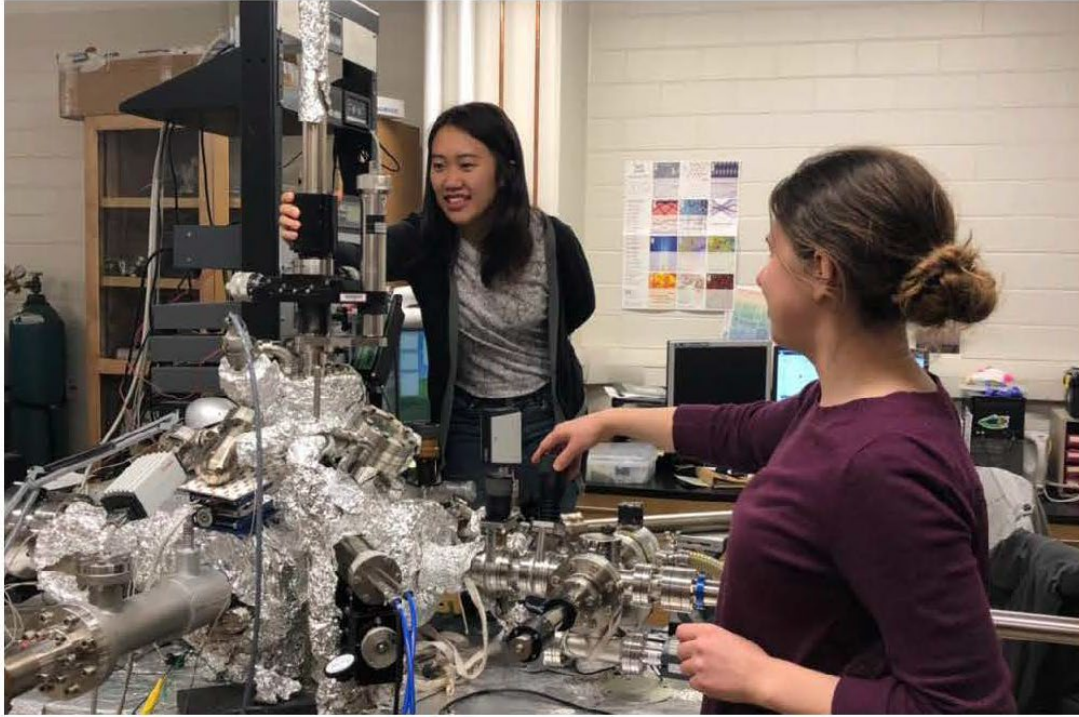
- Receive course credit for the research work you do
- Independent or Individual Study courses
- Work directly with a professor on solving advance engineering problems

Promoting Undergraduate Research in Engineering(PURE)

- Student-run organization
- Created for first- and second-year students interested in research
- Pairs students with graduate students to work on semester long research projects

Illinois Scholars Undergraduate Research (ISUR) Program

- Offers a two-semester research experience with scholarship and optional course credit
- Undergraduate Research Seminar (ENG 199 UGR/ISR)
- Work closely with graduate and faculty mentors
- Research Scholarship



DARIN BUTZ FOUNDATION RESEARCH SCHOLARS

CLARE BOOTHE LUCE PROGRAM

Supporting women in science, mathematics and engineering



CLARE BOOTHE LUCE

Playwright, journalist, Ambassador, and member of Congress, Clare Boothe Luce was one of the most accomplished women of the twentieth century. She appreciated, however, that many women face obstacles in their chosen profession. With her brilliant bequest establishing this program, she sought "to encourage women to enter, study, graduate and teach" in fields where there have been barriers to their advancement: the sciences, mathematics and engineering.



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Luce Research
Scholars](#)

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Research in Artificial
Intelligence](#)

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center for
cognitive computing
systems research

IBM | I ILLINOIS

The IBM-ILLINOIS Center for Cognitive Computing Systems Research (C3SR) is partnering with the ISUR program to launch Undergraduate Research in Artificial Intelligence (URAI). The new initiative, ISUR C3SR-URAI, will provide **two-semester research experiences to domestic and international students**. C3SR-URAI scholars will be assigned to research projects focusing on fundamental cognitive computing and AI science, applied AI engineering and technologies, and practical AI solutions and systems. They will receive the same benefits as any ISUR scholar, such as \$1000 research scholarship for the academic year



Mentoring Undergraduates in Science and Engineering (MUSE) Program

- Facilitates and fosters mentoring relationships between undergraduate students and grad students based on a common research interest
- Participants define own goals and direction of mentoring relationship



Research Abroad

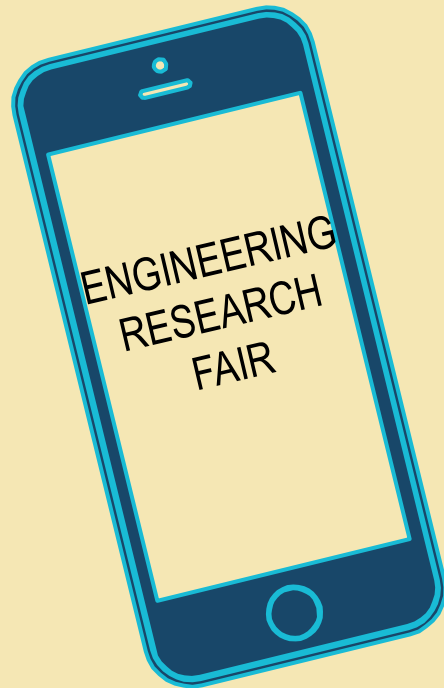
- Through the International Programs in Engineering (IPENG)
- Increase global awareness
- Expand your engineering education
- Global Research Scholars – Summer Program



Get Involved!

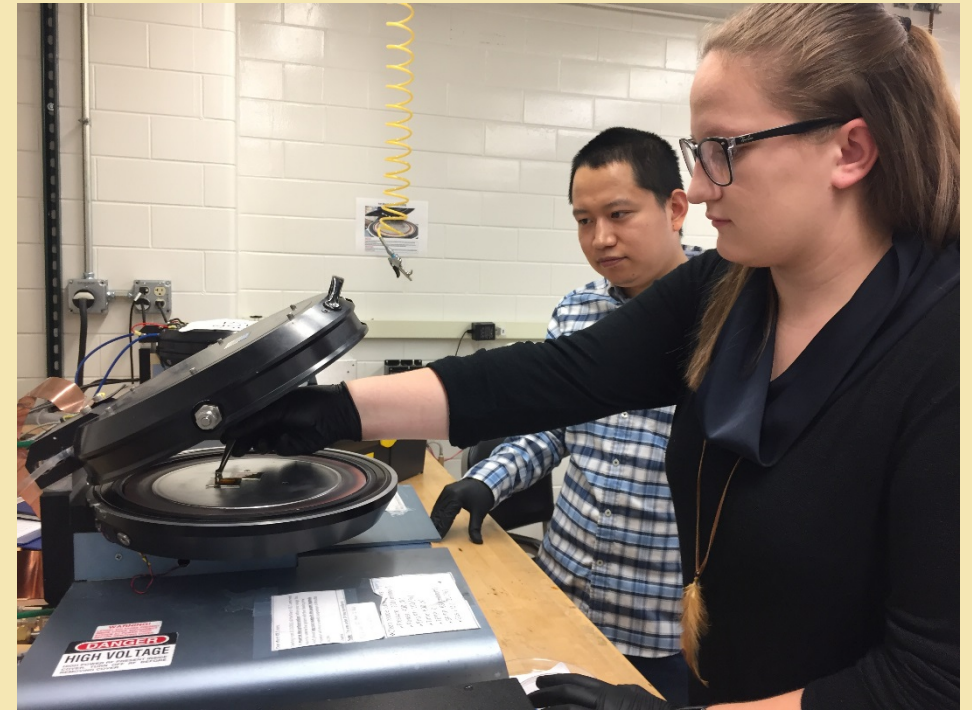
RESOURCES

Learn about undergraduate research-related events and opportunities



Undergraduate Research Website

<http://grainger.illinois.edu/research/undergraduate/>



College Relations Committee (CRC)

- Watch out for event announcements
- Attend meetings for updates
- Participate in sponsored activities to know about research across the college



Engineering Research Fair (Fall and Spring)

- Learn more about research in the various research groups, centers, and institutes
- Connect with representatives from the different research groups and programs
- Inquire about openings and application periods
- Know what resources are available



VIRTUAL

FALL 2020
ENGINEERING
RESEARCH
FAIR

SEPTEMBER 24 and 25
With LIVE Q&A 4 – 6 PM



Undergraduate Research Workshop (Spring Semester)

- Learn more about participating in research from undergraduate researchers
- Panel discussion format
- Ask your questions



Undergraduate Research Portals

- Pathways to Science
 - <https://www.pathwaystoscience.org/>
- National Science Foundation Research Experiences for Undergraduates (REU)
 - https://www.nsf.gov/crssprgm/reu/reu_search.jsp
- Federal Opportunities for STEM Undergrads
 - <https://stemundergrads.science.gov/>



FOR INQUIRIES OR TO SCHEDULE A VIRTUAL APPOINTMENT

Contact:

enr-ugr@Illinois.edu