Undergraduate Research
2019

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Director, Illinois Scholars Undergraduate Research (ISUR)

Than and Jamila from Dobrucki Lab
WHAT TYPES OF CAREERS HAVE YOU EXPLORED?
Why do research?
Thinking about Research

• How do you view research?

RESEARCH is⋯
RESEARCH

ANALYSIS  LEARNING  SCIENCE
FACTS  BUSINESS  EXPLORE  PRODUCT  EXAMINE
MARKET  SYSTEMATIC  METHODS
KNOWLEDGE  RESULTS
PLAN  SUBJECT  DIRECTION
DEVELOPMENT  MARKETING  ANALYZE
SAMPLE  FACTORS

source: www.cityu.edu.hk
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
GRAINGER ENGINEERING

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

- Broad interests
- Interests that can be related to science
- Specific area of interest
- Topics
- Current issues

Diagram featured by [http://slidemodel.com](http://slidemodel.com)
YOUR INTEREST FUNNEL

Food, Electronics, Fitness, Biology

Electronics

Robotics

Robotics for Medical Applications

Rehabilitation Robot

Diagram featured by http://slidemodel.com
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
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

Bioengineering Curriculum Map
Suggested Sequence by Semester

1 (16 hrs)
- MATH 221 (4) Calculus I
- ENG 109 (6) Engineering Lecture
- BIOE 199 (1) Undergraduate Seminar
- RHET 105 (4) Principles of Composition
- CHEM 102 (3) General Chemistry I
- CHEM 103 (1) General Chem Lab I
- SS/Hum (3)

2 (16/18 hrs)
- MATH 231 (3) Calculus II
- PHYS 211 (4) Univ Physics, Mechanics
- MCB 150 (4) Molec&Cellular Basis of Life
- BIOE 120 (1) Introduction to Bioengineering
- CHEM 104 (3) General Chemistry II
- CHEM 105 (1) General Chem Lab II
- SS/Hum (3)

3 (17 hrs)
- MATH 241 (4) Calculus III
- PHYS 212 (4) Univ Physics, Elec & Mag
- CS 101 (3) Intro to Comp
- BIOE 201 (3) Conservation Princ Bioeng
- BIOE 202 (0) Experiences in Bioengineering
- BIOE 203 (2) Quant Human Physiology Lab
- SS/Hum (3)

4 (17 hrs)
- MATH 286 (3) IntroDiff Eq
- PHYS 212 (4) Univ Physics, Elec & Mag
- BIOE 205 (3) Systems in Bioengineering
- BIOE 298 (3) Analytical Tools for BIOE
- CHEM 232 (3) Organic Chemistry I
- SS/Hum (3)

5 (18 hrs)
- BIOE 476 (3) Tissue Eng
- BIOE 220 (4) Bioenergetics
- BIOE 302 (3) Modeling Human Physiology
- BIOE 415 (2) Biomedical Instrumentation
- BIOE 414 (3) Biomedical Instrumentation Lab
- BIOE 430 (3) Comp Tools for Bio Data
- BIOE 436 (2) Sr. Design II

6 (17 hrs)
- BIOE 310 (3) Sr. Design I
- BIOE 435 (2) Sr. Design I
- BIOE 420 (3) Intro Bio Control Systems

7 (14 hrs)

8 (14 hrs)

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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???
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
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 (GRS) – Summer Program

DEADLINE TO APPLY TO GRS: NOVEMBER 15
Get Involved!

RESOURCES
Learn about undergraduate research-related events and opportunities

Engineering Undergraduate Research

December - Week 1
For more information about Undergraduate Research, please visit our website: http://engineering.illinois.edu/research/undergraduate/

For more postings of off-campus undergraduate research opportunities, please check out previous issues of our newsletter in your email inbox.

DECEMBER 2018
Upcoming Events and Dates

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<th>Event</th>
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<tr>
<td>Lecture: Physical and Spatial Interaction with Robotic Displays</td>
<td>December 3 4:00 - 5:00 PM, 205 Siebel Center</td>
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<td>Speaker: Prof. Sean Follmer (Stanford) Department of Computer Science</td>
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<td>Seminar: The Hacker Within - Containerization</td>
<td>December 5 12:00 PM, 2100 NCSA</td>
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<td>Speaker: Yubo “Psy” Yang (UIUC Physics) Compositional Science and Engineering</td>
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<td>Lecture: Frontiers in Miniature Brain Machinery</td>
<td>December 5 4:00 PM, 2259 Beckman Institute</td>
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<td>Speaker: Prof. Diane Beck (UIUC Psychology) Beckman Institute</td>
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Undergraduate Research Website

http://grainger.illinois.edu/research/undergraduate/
Engineering Council - DSAC

- 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
ENGINEERING RESEARCH FAIR

FEBRUARY 6, 2020
4:00-6:00 PM
ILLINI UNION ROOMS ABC
SAVE THE DATE!
Undergraduate Research Workshop (Spring Semester)

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

JANUARY 22, 2020
5:30 – 7:30 PM
ILLINI UNION Rooms ABC
Undergraduate Research Portals

- Pathways to Science
  - https://www.pathwaystoscience.org/

- National Science Foundation Research Experiences for Undergraduates (REU)

- Federal Opportunities for STEM Undergrads
  - https://stemundergrads.science.gov/
THANK YOU!

QUESTIONS?

Contact: 
engr-ugr@illinois.edu

201 Engineering Hall