Fulton Undergraduate Student Engagement Programs

Undergraduate Research Workshop

Learn about undergraduate research, how to find a mentor and how to apply for FURI!
agenda

Introductions
Why Research?
Research Options
GCSP
FURI
Honors
Independent Study
REUs
Travel Grant
Basics of Applying
Finding a Mentor
Other opportunities
who are you?

name, major, research interest, need-to-know question
who are we?

Engineering Dean’s Office

Academic and Student Affairs

Undergraduate Student Engagement (USE)
Our goals for you...

Find your passion

Promote success

Involve and empower

Shape future plans
what do you think research is?
establishing facts

following systematic steps to prove a hypothesis or answer a question

devolving new theories

research is...

solving problems
why do research?
what’s good about it?
why do research?

solve real-world problems

investigate career paths

faculty mentoring

boost skill set

competitive advantage

may be paid role
to get started…

#1 identify your research interests
#2 seek research opportunities
#3 connect with research investigators
#4 apply for funding (if relevant)
#5 get to work!

Let’s break it down now, shall we?
ask:
what problem do you want to solve? what do you want to learn more about?
write that down!

#1 Identify your research interests
talk about it: with your neighbor today. what ideas do you have for each other?

#1 Identify your research interests

take notes!
other things to consider:

- be **passionate** about the topic
- capitalize your **skills and interests**
- be **bold**. It can be in a different field
Research options

- REU: Research Experience for Undergraduates
- GCSP: Grand Challenge Scholars Program
- volunteering in the lab
- honors thesis
- independent study
- FURI: Fulton Undergraduate Research Initiative
- Senior design/capstone project
volunteer in the lab

you can start shadowing a faculty member’s research team

unpaid volunteer positions are an option

Great way to get started in the lab as a low-key commitment

One of the simplest, easiest ways to get started
senior design/capstone

required for degree program

may be able to use project to meet research requirement

plan in advance – don’t wait until senior year to know what you’re doing!

research: senior year option
independent study/honors

either XXX 499 Independent Study or XXX 492/493 Honors Research and Thesis

instructor consent required

talk to advisor about requirements to enroll, as well as if courses can be used toward degree requirements

you may be able to combine this with any of the following

FURI Volunteering
GCSP Senior Design/Capstone

Get credit for doing research!
REU: Research Experiences for Undergraduates

the National Science Foundation (NSF) funds this nationwide program

REU can be interdisciplinary or multi-department research, anywhere in United States… not just engineers!

can work on research projects throughout the year; summer = more student-scheduling-friendly

eligible students: undergraduates who are U.S. citizens, U.S. nationals or permanent U.S. residents

apply directly to REU-sites / NSF-funded investigators who receive REU supplements… each application is different

Find and apply for REUs here
• National Academy of Engineering
• Curricular and co-curricular program
• 52% Honors students
• Fulton’s Engineering Academy
• Students are invited to apply into the program and choose to apply

• Requirements
  o Research
  o Interdisciplinary coursework
  o Entrepreneurship coursework/experience
  o Global coursework/experience
  o Service learning experience
  o GCSP portfolio

GCSP: Grand Challenge Scholars Program
• conduct research with a Fulton faculty mentor: can be their idea or yours!
  • mentors receive $500 for mentoring each student (up to 5 students/semester)

• two semesters of funding:
  • $1500 stipend/semester;
  • $400 budget/semester

• application period
  • October
  • March
• present at FURI symposium
• professional development

FURI: Fulton Undergraduate Research Initiative
• eligible: Fulton undergraduates who have been accepted to present their research at a conference

• you don’t have to be a FURI student to apply!

• complete the application at least 2 weeks before travelling

• travel grant awardees present their research at the FURI symposium

• applications are competitive and not guaranteed – search for additional funding!

• we’ll tell your story with a published article

Fulton Travel Grant: $700-$1,000
online digging

- review school and faculty research web sites
- check the FURI website: Research Opportunities
- review FURI Abstract books

finding a faculty mentor

talk the talk

- talk to different faculty about their research
- ask current FURI or other research students
- visit faculty during office hours
- make an appointment with faculty to discuss opportunities
Six ways to get a return email
Adam Grant, Wharton Professor
make it easy on faculty

send them your updated resume that highlights your research-friendly skills.

know about their research and what interests you about it.

know what you’re looking for: shadowing experience? grad school skills? etc.

Ask questions! Be prepared to answer questions about yourself, too!
nervous? remember this...

they were once an undergrad, too
they’re passionate about what they do and
really like to talk about it

have questions to ask, such as:

How did you develop your research interests? What do you like about your research?

What are you looking for in an undergraduate researcher?

What should I know about your lab?

A tip about humans: We love to talk about ourselves and our interests. Use that knowledge wisely.
after meeting, do this!

say thank you. they made time for you.

be appreciative.

consider you options. make pro-con lists, if that helps!

follow-up with whoever you contacted with your decision – don’t vanish on them!

Practice those professional skills right now: be prompt and polite from the beginning
Check with your faculty mentor if you need do this:

- take safety training?
- fill out paperwork?
- read research articles?
- take lab training?
- schedule time in the lab?

get to work!

Check with your mentor on other to-do’s
applying for funding? here’s the FURI lowdown
FURI is not the only option. It is Fulton’s top application program.
Mr. Fulton gave an endowment to start FURI back in Spring 2005.
FURI’s goals for you
provide hands-on lab experience
develop public speaking skills
provide support for professional travel
prepare for career/graduate school

We hope some of these goals fit what you’re seeking to gain from conducting undergraduate research!
FURI eligible students are

2\textsuperscript{nd} semester-senior student

an Ira A. Fulton Schools of Engineering undergraduate student

in good academic standing (not on probation)

In a nutshell: be a Fulton undergrad and be cool in school.
FURY eligible mentors are faculty in the Ira. A Fulton Schools of Engineering not graduate students, not alumni must not be on sabbatical, leave or vacation during the majority of the FURI mentoring period.

In a nutshell: mentors are Fulton faculty who make themselves available to mentor students.
what do FURI students do?

regularly meet with their mentor

present at the FURI symposium

submit 8 deliverables each semester

1 page mid-semester summary
100-word abstract
Get their FURI portrait taken
Design a research poster

2 page end-of-semester summary
2 professional development events
Submit their FURI evaluation form

The deliverables are spaced out throughout the semester. The FURI office communicates with students on a weekly basis about FURI events and deadlines. You will be supported along the way!
what is a research symposium?

for presenters: opportunity to present your research findings with peers, experts and community

for attendees: opportunity to learn about research and get connected with researchers

What the heck are we talking about?
FURI application overview

update/create your resume

prepare your proposal (2 page max, 1 addt’l page for references)

create a timeline of activities for each semester

create a budget with estimated research supplies/semester

include a copy of your academic transcript

prepare your personal statement (1 page)

review it with your faculty mentor

ensure your faculty mentor submits their support letter

Submit the full package online by the deadline
what is on your resume? do you have one?
what goes on a resume?

- volunteer experience
- relevant classwork
- internships
- team projects
- student org experience
- role-friendly skills
- supervisory experience
- leadership experience

highlight transferrable skills

Do you have what it takes? Show it on your resume!
use action verbs. “I did this.” none of the “participated in” – take ownership for your work!

how do you say…?

analyzed  diagnosed  compiled  evaluated  formulated

hypothesized  observed  investigated  measured

evaluated  published
Tempe Centerpoint (CTRPT)
Suite 107
Engineering.careers@asu.edu
480.965.2966
Tempe Student Services Building (SSV) Suite 329
careerservices@asu.edu
480.965.2350
Cortney's tip: keep a master resume with everything you’ve done. Add to it over time.

Pull the relevant content to customize your resume for different positions. It’ll help you remember all the cool things you’ve done!
what’s with all the writing?

researchers write. a lot. for example...

lab reports
research reports
grant proposals
policies, procedures, protocols
white papers
professional journal articles

professional journal articles
textbooks
conference papers
speeches
articles for the popular press and company newsletters

It comes with the gig. Develop those writing skills now.
Tip! be persuasive and maximize the 2 pages to clearly tell the committee what your research is and why it matters.
proposal development:

be sure you understand the project - ask questions!

read related literature

think about what you plan to work on, why it’s important and how you plan to conduct your research. talk with your faculty mentor.
who am I writing to?

Fulton faculty from multiple disciplines review the proposals.

your proposal will be assigned to 2 faculty committee members

remember- they may not be in your research’s unique discipline. write clearly.

the FURI Faculty Committee
A+ proposals include:

- **objective statement** – the big picture of your research, the core question you’re addressing
- **background/literature review** – what’s been done before in this field, citations in proposal included
- **Fulton research theme(s) highlighted** – which one?
- **research plan** – what will you do to conduct the research?
- **impact of research** – who benefits from the research?

**Tip!** Be sure you hit these key areas. It’ll also help you have a plan when you get to work on the research.
what’s a goal?

The purpose for doing what you’re doing.

Think big picture. Generic actions. Long term.

“I want to cure brain cancer in my lifetime.”

May be more difficult to measure and not as easily tangible.

Know what you’re talking about
what’s an objective?

Something that you do to reach your goals

Think of steps. Specific actions. Short term.

“I want to complete my thesis on brain cancer influencers by the end of this semester.”

You can measure your progress. It’s tangible.
objective statement

states the overall objective of the research project, including a research question or hypothesis to be investigated.

Be sure your research question isn’t so large that you can’t do it or so small that you miss out on a full research experience during the semester(s) requested.

Ask your faculty mentor for help with framing the question. Start the mentorship relationship now.

Tip! Work on the proposal with your faculty mentor. Touch base with them frequently. This helps you both understand your goals.
background/literature review
describes the importance of the proposed work, previous research already conducted on this topic (include citations to prior research in this area)

What has been done in the field? What gaps need to be filled? Talk about it here.

Is this a continuation of research in progress? Describe your progress.

Tip! Do the research about the research now. Know your stuff. Plus, it makes your research way more fun!
cite your references!

use at least 5 references

use primary sources, examples:
  - Google Scholar
  - PubMed
  - ASU Library
    - ASU Library Research Database

use consistent formatting in citations

use relevant research references

Tip! The committee has no preference on citation style, but be consistent with whichever format you choose.
Fulton research themes

the Fulton 5:

Education
Energy
Health
Security
Sustainability

your research may fit more than 1 theme!

Tip! In your proposal say which theme your research aligns with. Ex: My research is in the Fulton health research theme.
research plan

tasks that will be conducted during the research project.

Talk about what role you play in the project. Who else is involved in the project? How will you define roles?

Are human subjects involved? Include IRB information.

IRB: Institutional Review Board. They make sure we don’t use and abuse humans and animals in the pursuit of research.

Tip! Show the committee that you know what you’re doing and how you’ll do it.
impact of research

what benefits to society would result from the successful competition of this project

Describe your expected outcomes

Who does this impact?

Does it affect a particular industry? Group of people?

i.e. who cares?

Tip! Not sure why this research matters? Talk with your faculty mentor. Ask questions.
get organized!

Example 1:
- Statement of Problem
- Objectives
- Plan of Action
- Expected Outcomes
- References

Example 2:
- Research Question
- Background
- Methodology
- Practical Applications
- Expected Results

Outline your proposal into key chunks of information: make it easy on yourself (and the committee)
A+ research timeline

overview of your research steps

shows the committee that your project is do-able

your timeline realistically fits the semester(s) requested and details are provided

FURI deadlines aren’t included (we know them)

Tip! Your first step should not be “conducting a literature review.” didn’t you do that while preparing your proposal?

Tip! Work backward from your final steps to initial steps. Planning is much easier!
Your timeline can be super-detailed or a bit more broad.
A+ research budgets

talk with your faculty mentor about supplies needed (if at all)

use the budget worksheet:
  item
  estimated cost
  reason you need it

funds cannot be spread out over several semesters

item is faculty’s property after end of research term

Tip! Search for estimates for proposed supplies. Have a good idea of how much supplies actually cost.
**Spring 2013**

<table>
<thead>
<tr>
<th>Budget Request</th>
<th>Cost</th>
<th>Budget Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-slip Lining Foam</td>
<td>$200</td>
<td>Padding needed for inside of metal coupling and braces for</td>
</tr>
<tr>
<td></td>
<td></td>
<td>comfort and to resist torque-slip</td>
</tr>
<tr>
<td>ICP-MA Measurements</td>
<td>$200</td>
<td>Analysis of neutron exposed batteries.</td>
</tr>
<tr>
<td>Total</td>
<td>$400</td>
<td></td>
</tr>
</tbody>
</table>

Fill in the boxes and you’re set. Don’t need anything? Include a blank budget in your application.
your academic transcript

The committee members ask:

are you on academic probation?

have you withdrawn from a core class?

do you have a pattern of withdrawing?

Tip! Address any transcript problems in your personal statement. Don’t leave the committee confused!
personal statement:
what drives you? why do you want to do research?

Tip! This is your opportunity to get personal. Tell your story. It’s a lot like the cover letter to a job. Tell them why this experience is one you want.
A+ personal statements

describe your personal goals
→ and how the research relates to those goals
→ why this research is important to you
→ have a personal connection to it? tell that story!

explain what skills you have to do the research
→ technical skills (ex: lab skills, programming, etc.)
→ leadership skills (ex: team work, etc.)

address anything odd/confusing about your application
→ low grades due to freshman year choices? Talk about it here.

Tip! The FURI committee uses the personal statement to get to know your goals, aspirations and why this research is important to you.
your faculty mentor submits a support letter with this info:

→ their perception of your ability and preparation to work on the project

→ your potential interest for graduate school

→ any add’tl info they find relevant
good proposals are not written... they are rewritten

Review your proposal package with your faculty mentor frequently to make sure you’re submitting the best representation of your research plans and goals.
merging documents? try pdfmerge.com. it can merge PDFs!

This can make applying for programs that require multiple documents much easier for you to do what you need to do.
Each application is assigned to 2 FURI faculty committee members. They review their applications, then the whole committee reviews the applications.
proposals approved depend on:

# proposals received
quality of proposals
amount of available funding

The application process is competitive and our funding levels vary per semester.
the research question or hypothesis to be investigated is well-thought and described
a clearly defined research plan describes the tasks that will be conducted in order to answer the research question.

Evaluation criteria: the proposal itself
the **timetable** is descriptive and correlates to the research plan defined in the proposal.
the proposal provides a concise review of research previously published relevant to the proposed work with appropriate citations

Evaluation criteria: the proposal itself
the **Fulton research theme** that is relevant to the research is explicitly stated

Evaluation criteria: the proposal itself
the **resume** demonstrates an ability to achieve goals and participate in the research.
The overall transcript illustrates good academic standing and the student’s ability to manage the course load and research.
The personal statement demonstrates that the student is motivated and aligns with the proposed research activities.
the **proposal support letter** strongly endorses the student’s abilities and preparation for the project and demonstrates a clear commitment toward the student’s project as a mentor.
Applications for Summer 2016, Fall 2016 and Spring 2017 are due by 12 p.m. (noon) on Tuesday, March 1, 2015.

Find the application [here](#)!
You’re Invited!

Friday, April 22
1-3 p.m.
Tempe-Engineering G-wing patio (ECG)

See last semester’s photos:
Fall 2015 FURI Luncheon
Fall 2015 FURI Symposium
other opportunities

**Fulton Undergraduate Research Initiative (FURI)** conduct research with a Fulton faculty mentor.

**Grand Challenge Scholars Program** endorsed by ASU and the National Academy of Engineering. Includes:

- Research - Service learning
- Interdisciplinary coursework - Entrepreneurship
- Global experience/courses

**Engineering Projects in Community Service (EPICS)** social entrepreneurship program where teams design, build, and deploy ideas to solve engineering-based problems for charities, schools and other not-for-profits

**Study Abroad** connect with various study abroad opportunities

**Startup Center** get connected with signature entrepreneurship and innovation courses, workshops, expert mentoring, new venture competitions, and other curricular and extra-curricular events.

Get connected. Make a difference. Talk with us to learn more!
Meet our Staff, Tempe-ECF 130

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Undergraduate Student Engagement