

# Designing Undergraduate Research for Rutgers-New Brunswick

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Distinguished Professor-Biomedical Engineering



# Rutgers is Poised For Success



Rutgers, The State University of New Jersey, is an internationally recognized comprehensive public research university with renowned faculty and award-winning students.

**Large Student Body**  
A diverse population of more than 69,000 students across 150 majors

**Over \$600 million in annual sponsored research grants**

**Land-grant institution providing a diverse range of research programs that serve the community**

**Culture and History of Innovation- both at Rutgers and in the State of NJ**



# Project Overview

## Hypothesis:



A well-designed **undergraduate research program** can be a **major driver for research and innovation** for the university as a whole.

# What is Undergraduate Research?

*An inquiry or investigation conducted by an undergraduate student that makes an original intellectual or creative contribution to the discipline*



# What are the Benefits of Undergraduate Research?



- **Enhances** student learning through faculty mentoring
- **Develops** critical thinking, creativity, problem solving, and self confidence
- **Increases** enrollment in graduate education
- **Provides** effective career preparation



- **Increases** retention and graduation rates, as well as research productivity
- **Encourages** an innovation-oriented culture
- **Promotes** visibility through publications and presentations
- **Establishes** long term relationships and a pipeline for alumni giving



# Undergraduate Research Can Take Many Forms

Projects can be student or faculty initiated

Students can work individually or part of a team

Class based or laboratory/field based

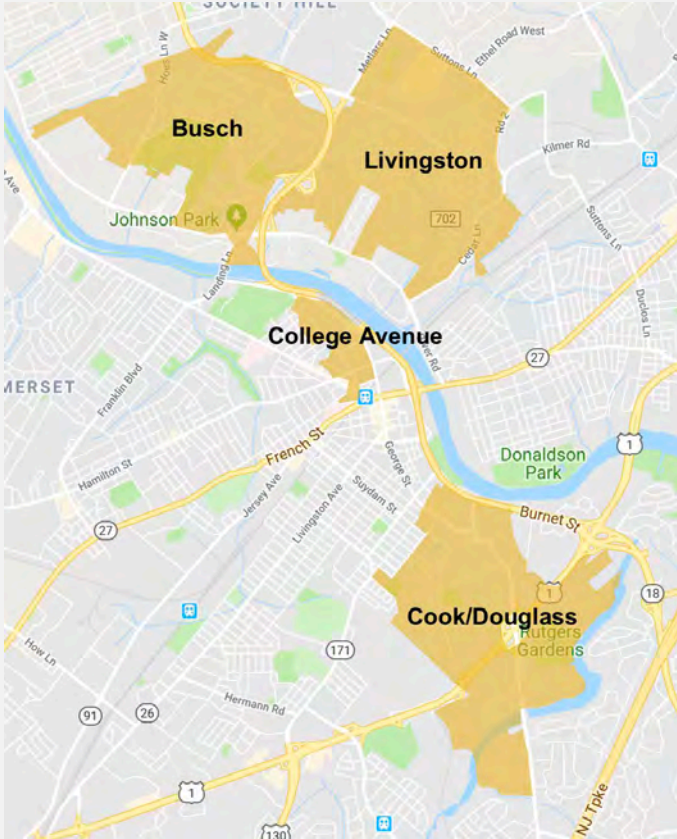
Academic year or summer

Credit bearing, paid, or volunteer



# Undergraduate Research At Rutgers-NB

## An Administrative View

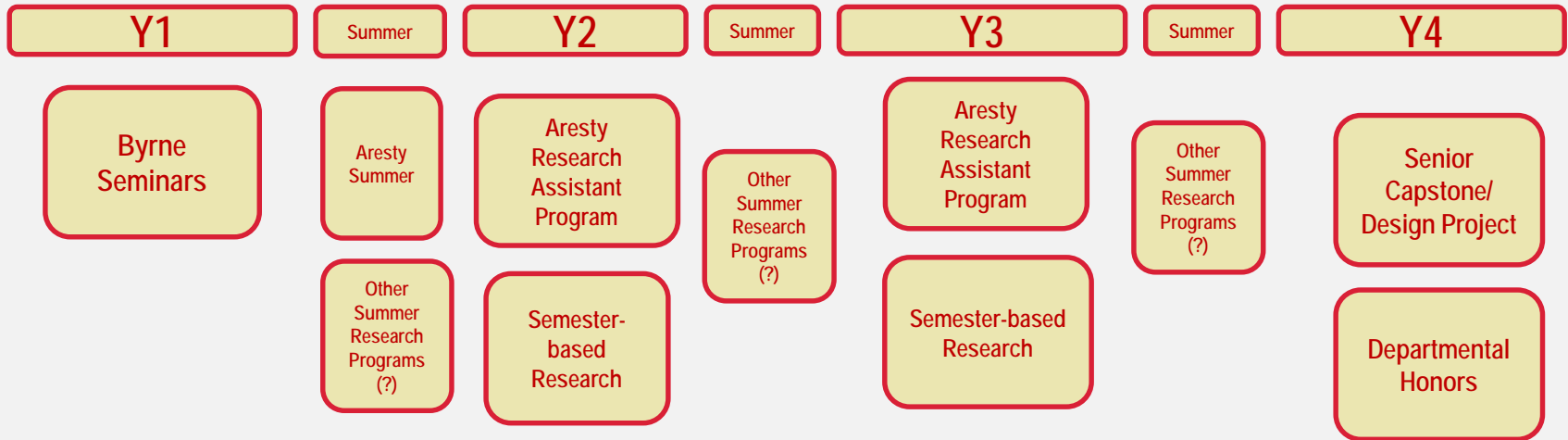


- **Aresty Research Center**
- **NSF REUs** (6) (Physics & Astronomy, Cellular Bioengineering, DIMACS, Ocean Sciences, Green Energy, Advanced Materials)
- Rutgers RiSE Summer Program
- IMSD (RWJMS)
- Division of Life Sciences-Summer Research
- NEURO-SURP
- SURF (Pharmacy)
- Douglas Project & Project SUPER
- Departmental Honors
  
- Research for Credit, Grant-funded, Volunteer Positions
- Summer Research at other Institutions

**Tracking? Outcomes?**



# Research Experiences at Rutgers-NB



- Students don't always know how to get involved
- Experiences are intermittent with a lack of continuity
- Not enough opportunities to meet demand
- Lack of connections with industry and career networks





# What do Students See?



## Research

Office of the Vice Chancellor for Research and Innovation

Centers & Institutes

Graduate Research

**Undergraduate Research**

### RELATED LINKS

- Undergraduate Academic Affairs
- Undergraduate Admissions
- Aresty Research Center
- Academic Departments & Programs
- Degree Navigator
- Catalogs
- Academic Calendar
- Undergraduate Research Opportunities (Video)

## Undergraduate Research

Undergraduates who want to conduct research will find plenty of opportunities at Rutgers. It's what happens at a research university. You don't just learn about theory in the classroom. You can work shoulder-to-shoulder with top faculty as they postulate and make discoveries—and you can put your own original ideas to the test.

Research gives you deep knowledge of a particular subject matter, and it gives you so much more. It requires you to analyze, think critically, write coherently, problem solve, and manage and interpret data—skills that are useful no matter what profession may be in your future. Research also sharpens life skills—patience, organization, teamwork, and persistence—that will serve you well in almost any situation.

## Research Intrigues You. Now What?

The [Aresty Research Center](#) is a great place to start your research journey. This research clearinghouse helps match undergraduates and faculty mentors with mutual interests. The center also nurtures students embarking on independent, original research and connects students to research opportunities beyond Rutgers. Each spring, the center hosts the [Undergraduate Research Symposium](#), giving students a taste of what it's like to present research in a professional academic forum.

## Research in the Sciences, Arts, and Humanities

Research happens in all disciplines, not just the hard sciences. Undergraduates in any major can pursue research.

Among those making presentations at the 2016 Aresty Undergraduate Research Symposium:

- A psychology major examines The Fundamental Attribution Error: A Replication of Jones and Harris (1967);
- An entomology student presents on The Effect of Antimicrobial Pesticides on the Brown Marmorated Stink Bug;
- An electrical engineering major shares findings about the Internet of Things: Cloud-KSVD, A Distributed Dictionary Learning Algorithm;
- A music major argues for Konpa-direk as the Sound of Haiti;
- A cell biology and neuroscience major looks at the Effects of Autism Associated Engrailed-2 Expression on Nucleus Accumbens of Reward Pathway in Mice.

## Out on the River

A new vessel takes students on the Raritan to conduct research. Hop on board for a look:



## Five Tips to Jumpstart Your Research at Rutgers

Sometimes, the quickest way to reach a goal is the direct approach. To that end, here are pointers for going directly after that research gig.

- 1. Volunteer.** It's always a terrific idea to ask. Even if you are a first-semester student, there are faculty out there who would be happy to have your assistance. So visit your professor or department adviser and ask about research possibilities.
- 2. Be a research subject.** Get a feel for the research environment by volunteering to be a subject. The [Department of Psychology](#) is a great resource; all students majoring in [psychology](#) must participate in research. Check the [Daily Targum](#), the student newspaper, for advertisements seeking subjects.
- 3. Take a research course.** Many departments offer courses specifically meant for research. You'll usually need a faculty member to approve your idea before registering. Check the [course catalogs](#) for courses with titles like "Research in Psychology," "Research in Mathematics," "Independent Study," and "Advanced Independent Study and Research."
- 4. Fulfill a research departmental requirement.** Some academic departments require research as part of a major. Majors in [molecular biology and biochemistry](#), [genetics](#), and [biotechnology](#) must complete a research project. Check [Degree Navigator](#) or meet with an adviser to learn about research requirements in departmental majors.
- 5. Pursue an honors track, honors thesis, or senior honors thesis.** Many departments' honors tracks call for original research. For instance, [earth and planetary sciences](#), [Spanish and Portuguese](#), and [political science](#) are programs whose honors tracks have a strong research component. Qualifying students also have the option of completing an honors thesis or [senior honors thesis](#), which are entirely research-focused. [Economics](#) and [English](#) are two examples. Consult with a departmental adviser to learn more and check out the School of Arts and Sciences' [general information on senior honors theses](#).





About 9,130,000 results (0.33 seconds)

**Undergraduate Research**<https://newbrunswick.rutgers.edu>

Undergraduates who want to see what happens at a research university. You've visited this page 3 times.

**Internships and Research**<https://ruccs.rutgers.edu/acad>

Undergraduate Research Fellowships intended to defray research costs.

**Undergraduate Research**<https://mbb.rutgers.edu/acad>

One of the main requirements for Biochemistry is to perform an internship carried out with any science faculty. You've visited this page 2 times.

**Undergraduate Research**<https://psych.rutgers.edu/.../un>Social and Organizational Psychology. <http://jraiiello.webnode.com/rese>**Undergraduate Research**<https://geography.rutgers.edu/>

Undergraduate Research. Preparing to Change Global Climate: Derek. You've visited this page 2 times.

**Research Opportunities**<https://psych.rutgers.edu/acad>

Other Undergraduate Research Opportunities provide various forms of support.

**Research at Rutgers | F**<https://newbrunswick.rutgers.edu>

It's different at a research university. You're in a classroom. Undergraduates will find pi

**Undergraduate Research Sy**<https://secure.rutgers.edu/urs/search>

This project will use a mixed methods approach to collaborative research in the humanities at two scales: within ...

# Page cannot be found

## Error: 404 - Article not found

You may not be able to visit this page because of:

1. an **out-of-date bookmark/favourite**
2. a search engine that has an **out-of-date listing for this site**
3. a **mistyped address**
4. The requested resource was not found.
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Please see the sitemap below or go back to our [Home Page](#)

- Office of Research Commercialization
- New Jersey Agricultural Experiment Station Research
- New Jersey Small Business Development Centers
- Rutgers University Foundation Office of Corporate and Foundation Relations

**RESEARCH  
CENTERS AND  
INSTITUTES  
STATEWIDE**

Learn how Rutgers Delivers innovation.



# Challenges (Opportunities) at Rutgers-New Brunswick

- **Barriers** to entry-underdeveloped website
- Experiences are **intermittent**
- **Few opportunities** to engage first year students
- Not enough **Capacity**
  
- Academic advising and University Career Services are **not formally engaged** with undergraduate research
- **Insufficient coordination** between existing programs
- **Underdeveloped global** research opportunities
- **Poor connections** between research experiences and industry



# Benchmarking

## Who Does it Well:

- University of Michigan
- University of Texas- Austin
- University of Maryland



## Key Features:

- **Coordination.** Office of Undergraduate Research
- **Clarity.** Easy to navigate websites with relevant information
- **Structure.** Sustained-team-based research experience with a common curriculum component, alumni mentorship, and faculty and industry partners



# First Steps- Leverage What We Have

## Communication



## Clarity

**Undergraduate Research**

Undergraduates who want to conduct research will find plenty of opportunities at Rutgers. It's about as easy as a research internship. You don't just learn about theory in the classroom. You can work shoulder-to-shoulder with top faculty as they teach and make discoveries—and you can put your own original ideas to the test.

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- An anthropology student presents on The Effect of Anticorruption Policy on the Brown Movement 1968-89
- An electrical engineering major shares findings about the Internet of Things: Cloud-KSU: A Distributed Dictionary Learning Algorithm
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## Structure

### Undergraduate Research Council



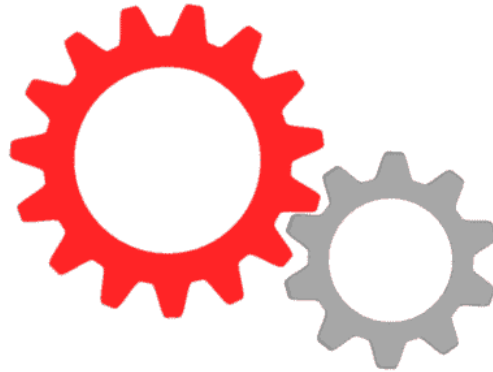
## Future Steps

- **Support Research Infrastructure:** Office of Undergraduate Research
  - News and Opportunities
  - Events
  - Awards
  - Data and Evaluation
- **Expand Undergraduate Research Capacity**
  - Industry Partnerships
  - Global Research Opportunities
  - Graduate Students and Research Faculty Mentorship
  - Big 10 Academic Alliance
- **Increased Grant funding:** Federal/State/Private
- **Develop Co-working Research Space:** Maker/Design



Undergraduate Research can serve as an Engine for Innovation at Rutgers and help to strengthen the University's position as a preeminent and inclusive student-focused research institution.

Research @  
Rutgers New  
Brunswick



Undergraduate  
Research



**Thank You**





