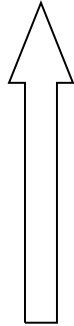
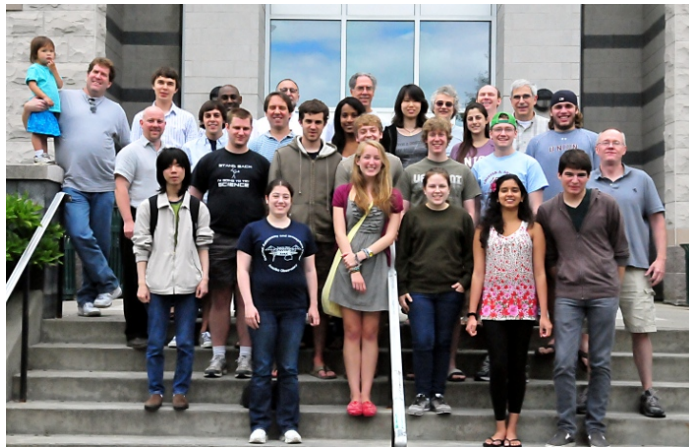


Physics & Astronomy

Summer Research Experience Opportunities



Benefits of Participation in Summer Research

- Experience what being a physicist is *really* like
- Hone practical skills (trouble shooting equipment, coding, etc.)
- Bolster your resume with real work experience, conference presentations, publications
- Travel (either for an off-site REU or to a conference)
- Get started on a senior thesis
- FUN!!!

Opportunities

- Off campus summer internships: Research Experience for Undergraduate (REU) sites & others
 - Especially for sophomores/juniors considering graduate school
- On-campus research with faculty in the Department of Physics and Astronomy
 - Many students do this after their freshman year!

Applying for an External REU

- Look through programs, and make a list of what you want to apply for, what's involved in the applications, and when the deadlines are. (Some may be over winter break!)
- Discuss your plans with your professors/former research advisors who might write you a letter of recommendation. **(Do this early!!)**
- Write a draft of a personal statement (refer to specific program requirements), and share it with your letter writer(s).
- Create a resume/CV for yourself. (If you need help, go to the Becker Career Center).

REU Sites

- NSF REU sites are listed at
 - https://new.nsf.gov/funding/initiatives/reu/search?f%5B0%5D=reu_research_area%3A25734&f%5B1%5D=reu_research_area%3A25744
- Also consider national labs (NIST, Los Alamos, etc), NASA Space Grant Program, SPS internships, etc.
- Programs are competitive...but there are lots of them!
- Compensation
 - *Amount varies from site to site*
 - *Stipend + housing (may be combined or split)*
 - *Travel expense (usually compensated)*

Research with Union Faculty

- Approach faculty whose projects are interesting to you, and discuss these projects in more depth.
- Make a (mutual) decision about who you want to work with, and what you want to work on.
- That faculty member will help you write a research proposal (2-3 pages) for the project.
- Create a resume/CV for yourself. (If you need help, go to the Becker Career Center).

Research with Union Faculty

- Apply for a Union College Summer Research Fellowship
 - Apply online at : <https://muse.union.edu/undergraduate-research/summer-research-applications/>
 - Application deadline mid-Winter term

- Compensation (based on last year's numbers: estimates)
 - Paid at a rate of \$475/week
 - Housing available for \$75/week (assuming we are in-person)



Prof. Colin Gleason

Experimental Nuclear Physics

- 0-2 students, depending on openings in group
- 4 or 6 week project related to analyzing data from particle physics experiments
- Learn basic particle physics and apply that knowledge to observables of interest
- Computational work in python or C++ (no prior experience required)



Prof. Nelia Mann

Theoretical and Computational Physics

- 1 student, for 4 or 6 weeks, preferably who has taken physics 122 before the project begins
- Projects exploring connections between quantum and classical mechanics
- Combine pen & paper calculations with computational tools (using Mathematica or Python)



Prof. James McKee

Gravitational Waves and Radio Astronomy (NANOGrav)

- 1-2 students, for 4 weeks
- Use Radio Astronomy observations of pulsars to contribute to the NANOGrav collaboration
- Search for new pulsars, process NANOGrav data, model variations in pulse shapes
- Using Linux environment and Python programming. Some experience preferred — a lot of experience to be gained!



Prof. Chad Orzel

Optics

- 1-2 Students, 6 weeks preferred, could do 4 weeks
- correlated photon/quantum optics experiment
- scanning confocal laser microscope project



Prof. Heather Watson

Geophysics

- 1-2 students for 4 weeks each (depending on funding)
- Investigate the structure of Europa's icy crust and ocean, and other outer Solar System moons
- Possible other projects involving the accelerator (crystal growth and RBS)



Prof. Francis Wilkin

Observational Astronomy and Theoretical Astrophysics

- 1-2 students
- Observational Astronomy (Union Observatory and/or remote use of El Sauce Observatory in Chile):
 - Exoplanet Transits (4 weeks)
 - Koronis asteroid family spin characterization (4 weeks)