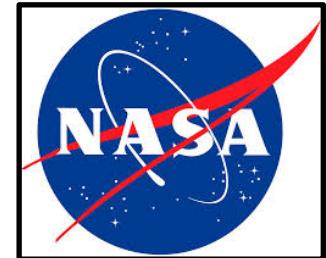




Summer Research Internships

What to know, how to apply

11/14/2014 – Eddie Schwieterman



What is an REU?

- ↗ Research Experience for Undergraduates
- ↗ Funded by the NSF (National Science Foundation)
- ↗ Encompasses many fields: Astronomy, Physics, Earth Science, Biology, Defense, Oceanography, Math, etc.

What is an REU?

- ↗ A summer (8-10 weeks) of guided research
- ↗ Stipends of ~\$4,000-\$5,000
- ↗ Travel & Housing Expenses
- ↗ Usually cohorts of 5-10 students
- ↗ Runs from ~June to ~August
- ↗ Opportunities to present research at national conferences
- ↗ Potential to be author or co-author on submission to peer-reviewed journal

www.nsf.gov/crssprgm/reu/reu_search.jsp g astronomy nsf reu

Most Visited University of Washi... Google Calendar Teaching social media and... Inbox (3) - skepted... Import to Mendeley science fiction terragen

National Science Foundation
WHERE DISCOVERIES BEGIN

HOME FUNDING AWARDS DISCOVERIES NEWS PUBLICATIONS STATISTICS ABOUT NSF FASTLANE

Research Experiences for Undergraduates (REU)

REU Program Overview

Program Solicitation

For Students

- [Search for an REU Site](#)

For Faculty

SEARCH FOR AN REU SITE

Email Print Share

Astronomical Sciences

Atmospheric and Geospace Sciences

Biological Sciences

Chemistry

Computer and Information Science and Engineering

Cyberinfrastructure

Department of Defense (DoD)

Earth Sciences

Education and Human Resources

Engineering

Ethics and Values Studies

International Science and Engineering

Materials Research

Mathematical Sciences

Ocean Sciences

Physics

Polar Programs

Small Business Innovation Research (SBIR)

Social, Behavioral, and Economic Sciences

SEARCH BY RESEARCH AREAS/KEYWORDS:

Enter full or partial research areas/keywords separated by commas:
(e.g. geophysics, ecology, nano, robot, ethics)

http://www.nsf.gov/crssprgm/reu/reu_search.jsp

Where are REUs?



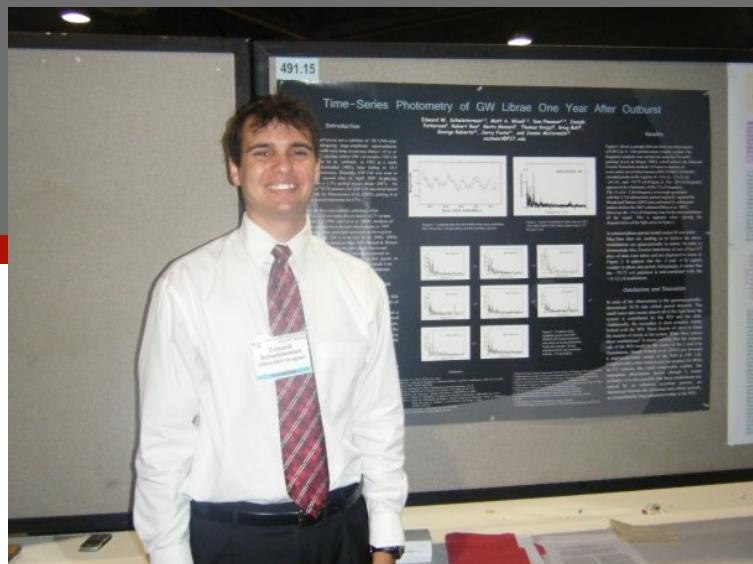
Everywhere!

Why do an REU?

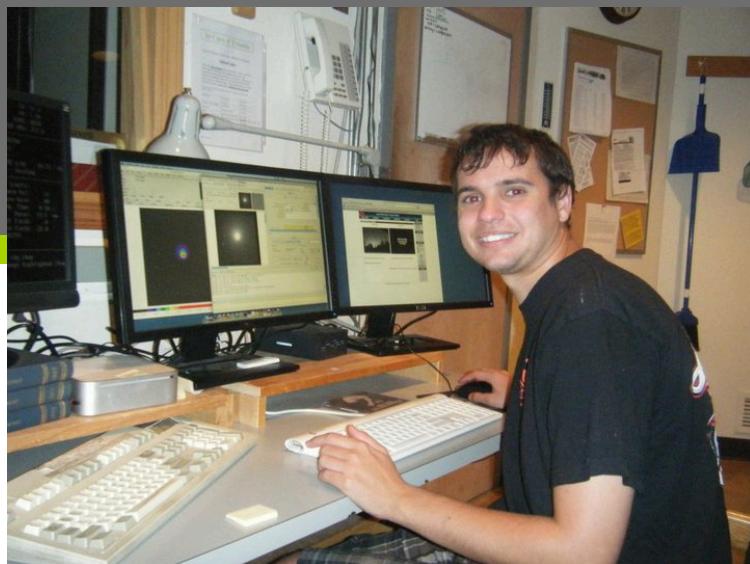
- ↗ Research Experience
- ↗ CV/Resume Building
- ↗ Summer Job (\$\$\$)
- ↗ Chance to meet new people (networking!)
- ↗ Opportunity to travel
- ↗ Letter writers and references outside your institution

Glamorous Life of an REU student

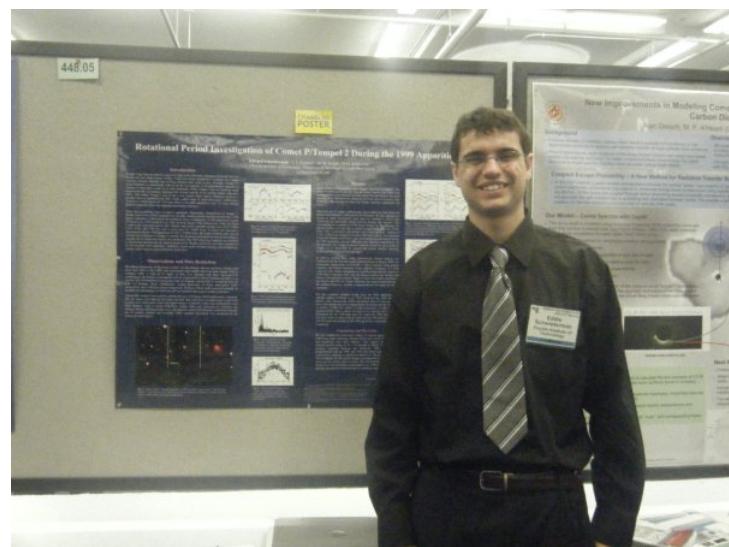
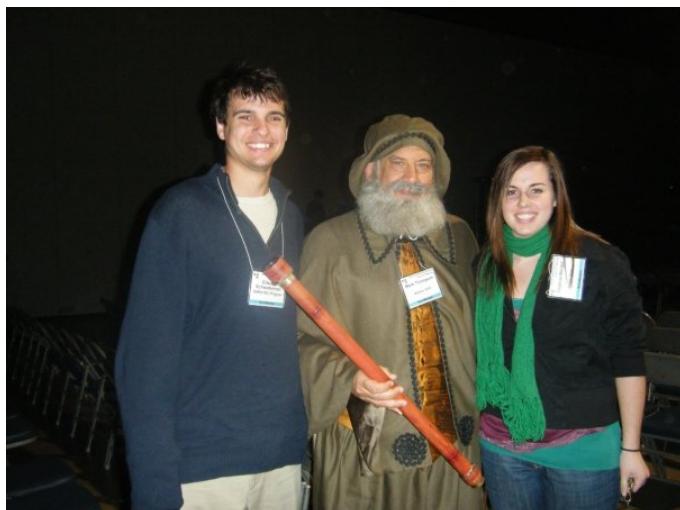




AAS – Long Beach (2009)



Lowell Observatory Anderson Mesa Telescope



AAS – DC (2010)

TIME-SERIES PHOTOMETRY OF GW LIBRAE ONE YEAR AFTER OUTBURST

EDWARD W. SCHWIETERMAN^{1,2}, MATT A. WOOD¹, DAN PIOWOWAR^{2,3}, JOSEPH PATTERSON⁴, ROBERT REA⁵, BERTO MONARD⁶, THOMAS KRAJCI⁷, GREG BOLT⁸, GEORGE ROBERTS⁹, JERRY FOOTE¹⁰ AND JENNIE MCCORMICK¹¹

THE ASTRONOMICAL JOURNAL, 141:2 (14pp), 2011 January
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doi:[10.1088/0004-6256/141/1/2](https://doi.org/10.1088/0004-6256/141/1/2)

THE INCREASING ROTATION PERIOD OF COMET 10P/TEMPEL 2

MATTHEW M. KNIGHT¹, TONY L. FARNHAM², DAVID G. SCHLEICHER¹, AND EDWARD W. SCHWIETERMAN³

THE ASTRONOMICAL JOURNAL, 144:153 (25pp), 2012 November
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doi:[10.1088/0004-6256/144/5/153](https://doi.org/10.1088/0004-6256/144/5/153)

A QUARTER-CENTURY OF OBSERVATIONS OF COMET 10P/TEMPEL 2 AT LOWELL OBSERVATORY: CONTINUED SPIN-DOWN, COMA MORPHOLOGY, PRODUCTION RATES, AND NUMERICAL MODELING

MATTHEW M. KNIGHT^{1,2}, DAVID G. SCHLEICHER¹, TONY L. FARNHAM³,
EDWARD W. SCHWIETERMAN^{1,4}, AND SAMANTHA R. CHRISTENSEN¹

¹ Lowell Observatory, 1401 North Cedros Avenue, Flagstaff, AZ 86001, USA

JOURNAL OF THE SOUTHEASTERN ASSOCIATION FOR RESEARCH IN ASTRONOMY, **3**, 45-51, 2010 FEBRUARY 1
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MODELING AND OBSERVING EXTRASOLAR PLANETARY TRANSITS

BRETT C. ADDISON¹, SAMUEL T. DURRANCE¹, AND EDWARD W. SCHWIETERMAN¹

Usual Application Requirements

- Transcripts
- CV/Resume (or application questionnaire)
- Letters of Recommendation (2-3)
- **Personal Statement**
 - Main essay
 - Programming competencies

Minimum Qualifications

- ↗ Vary somewhat
- ↗ Research experience: depends on the program – most like some, many do not like too much
- ↗ GPA ≥ 3.0
- ↗ Math: algebra, geometry, trig, calculus knowledge often assumed
- ↗ Freshman/sophomore physics
- ↗ Some *programming*

Application Deadlines & Info

- Applications open in December
- Usually due by **February 1**
- Highly competitive
- Apply to at least 3-5 programs (w/ a range of competitiveness)
- Don't be afraid to email your questions to the program coordinator!

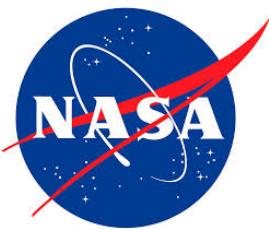
Gotcha for UW Students

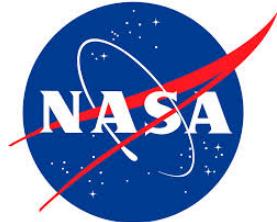
- Most program start in early June
- Some have later start times
- Many will accommodate students on quarter system, but some do not

Alternatives to REUs

- ↗ NASA Internships (see next slides)
- ↗ UWSURP (full & part time options)
- ↗ Continue with Pre-MAP mentors or other UW astronomy folks
- ↗ ASTR 481 Observing (prerequisite: ASTR 480)
- ↗ Other UW Internships

NASA Centers





OSSI One Stop Shopping Initiative

Recruiting NASA Interns, Fellows and Scholars

NIFS

[Home](#) [Search Opportunities](#) [Log In/Register](#)

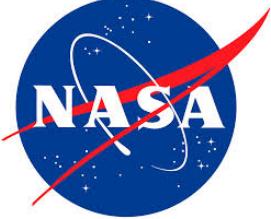
Student Search for Opportunity

Your search produced the following results. Click on the opportunity's title to view the detailed information. Use the sorting icons ( and ) to sort the list in ascending or descending order.

[Search Again](#)

| Action | Opportunity Title | Opportunity Type | Center/Location | Education Level | Session | Possible Disciplines |
|--|--|------------------|-----------------|--|-------------|---|
|  View | Virtual Acoustic Simulation for Community Noise | Internship | LARC | Freshman Junior Senior Sophomore | Summer 2015 | Engineering - Aerospace Eng. Engineering - Computer Eng. Engineering - Electrical Eng. Engineering - Mechanical Eng. Science - Physics Engineering - General |
|  View | CRESST: Short gamma-ray bursts in galaxies clusters | Internship | GSFC | Freshman Junior Master's Senior Sophomore | Summer 2015 | Science - Astronomy |
|  View | Balloon Experimental Twin Telescope for Infrared Interferometry (BETTII) | Internship | GSFC | Freshman Junior Senior Sophomore | Summer 2015 | Engineering - Aerospace Eng. Engineering - Computer Eng. Engineering - Electrical Eng. Engineering - Mechanical Eng. Science - Astronomy Science - Physical Science Science - Physics Technology - Software Eng. Technology - Systems Eng./Design Technology - Comp Science Engineering - General |
|  View | Planetary Protection, Contamination, and Thermal Coatings | Internship | GSFC | Freshman Junior Sophomore | Summer 2015 | Engineering - Aerospace Eng. Engineering - Chemical Eng. Engineering - Materials Eng. Engineering - Mechanical Eng. Engineering - Optical Eng. Engineering - Polymer Eng. Science - Chemistry Science - Physics |
|  View | Designing Deep Space Cubesat Mission Concepts with a Scientist | | | Freshman High School - Junior High School - Senior | | Engineering - Aerospace Eng. Engineering - Computer Eng. Engineering - Electrical Eng. Engineering - Instrumentation Eng. Engineering - Integrated Eng. Engineering - Mechanical Eng. |

<http://goo.gl/VJIJpB> → NASA Internship Home Page



| Designing Deep Space Outpost | | | | | | | |
|------------------------------|---|------------|------|--|-------------|--|--|
| View | Mission Concepts with a Science Payloads and Advanced Concepts for Exploration Interactive Tool | Internship | GSFC | High School - Senior Junior Senior Sophomore | Summer 2015 | Engineering - Integrated Eng. Engineering - Mechanical Eng. Engineering - Structural Eng. Science - Astronomy Science - Physics Technology - Information Technology Technology - Software Eng. Technology - Systems Eng./Design | Engineering - Integrated Eng. Engineering - Mechanical Eng. Engineering - Structural Eng. Science - Astronomy Science - Physics Technology - Information Technology Technology - Software Eng. Technology - Systems Eng./Design |
| View | TEMPO Student Collaboration | Internship | LARC | Freshman Junior Master's Senior Sophomore | Summer 2015 | Engineering - Environ Eng. Science - Chemistry Science - Earth Sciences Science - Environ Sciences Science - Physical Science Science - Physics | Engineering - Environ Eng. Science - Chemistry Science - Earth Sciences Science - Environ Sciences Science - Physical Science Science - Physics |
| View | Advanced Spacecraft Dynamics Simulation | Internship | GSFC | Freshman Junior Master's Doctoral Senior Sophomore | Summer 2015 | Engineering - Aerospace Eng. Engineering - Computer Eng Engineering - Electrical Eng. Engineering - Mechanical Eng. Mathematics - Applied Mathematics | Engineering - Aerospace Eng. Engineering - Computer Eng Engineering - Electrical Eng. Engineering - Mechanical Eng. Mathematics - Applied Mathematics Mathematics - General Science - Astronomy Science - Earth Sciences Science - Physical Science Science - Physics Engineering - General Science - General |
| View | WFIRST AFTA Project Engineer | Internship | GSFC | Freshman Junior Senior Sophomore | Summer 2015 | Engineering - Aerospace Eng. Engineering - Electrical Eng. Engineering - Mechanical Eng. Engineering - Structural Eng. Science - Astronomy | Engineering - Aerospace Eng. Engineering - Electrical Eng. Engineering - Mechanical Eng. Engineering - Structural Eng. Science - Astronomy Science - Physics Engineering - General |
| View | CRESST: Studying the magnetic field of accreting pulsars in X-ray binaries with Suzaku | Internship | GSFC | Freshman Junior Senior Sophomore | Summer 2015 | Science - Astronomy Science - Physical Science Science - Physics Science - General | Science - Astronomy Science - Physical Science Science - Physics Science - General |
| View | Data Analysis and Modeling for LISA Pathfinder | Internship | GSFC | Freshman Junior Master's Doctoral Senior Sophomore | Summer 2015 | Engineering - Mechanical Eng. Science - Physical Science Science - Physics Technology - Systems Eng./Design | Engineering - Mechanical Eng. Science - Physical Science Science - Physics Technology - Systems Eng./Design |
| View | Hidden Impact Basins and the Early Bombardment History of the Moon, Mars and Earth 2 | Internship | GSFC | Freshman High School - Junior High School - Senior High School - Sophomore Junior Master's Doctoral Senior Sophomore | Summer 2015 | Science - Astronomy Science - Earth Sciences Science - Environ Sciences Science - Physical Science Science - Physics | Science - Astronomy Science - Earth Sciences Science - Environ Sciences Science - Physical Science Science - Physics Technology - Comp Science Science - General |

| | | | | | | |
|---|---|------------|------|--|-------------|--|
|  View | Hidden Impact Basins and the Early Bombardment History of the Moon, Mars and Earth 2 | Internship | GSFC | Freshman High School - Junior High School - Senior High School - Sophomore Junior Master's Doctoral Senior Sophomore | Summer 2015 | Science - Astronomy Science - Earth Sciences Science - Environ Sciences Science - Physical Science Science - Physics |
|  View | Energetic Particles in the Heliosphere | Internship | GSFC | Freshman Junior Senior Sophomore | Summer 2015 | Science - Physical Science Science - Physics |
|  View | Pale Rainbow Dots - Characterizing Worlds Around Other Stars | Internship | GSFC | Freshman High School - Junior High School - Senior Junior Master's | Summer 2015 | Science - Astronomy Science - Earth Sciences Technology - Comp Science |
|  View | Magnetic Environments Throughout the Solar System: Cores, Oceans, Aquifers, Atmospheres, and the Solar Wind | Internship | GSFC | Freshman Junior Master's Senior Sophomore | Summer 2015 | Mathematics - General Science - Astronomy Science - Earth Sciences Science - Physics |
|  View | NASA Journalism and Multimedia Internship | Internship | GSFC | Freshman Junior Master's Doctoral Senior Sophomore | Summer 2015 | Science - Earth Sciences Business - Public Affairs Technology - Comp Science Other - Education Science - General |

Showing Records 1 to 15 out of 15.



Help Desk Contact Information
MSFC-DL-HelpdeskMSFC@mail.nasa.gov
 Phone: 1-866-419-6297
 Hours of Operations: 24/7

General Application Tips

- ↗ Have an application checklist
- ↗ Track everything in a spreadsheet
- ↗ Send transcripts early
- ↗ Ask your letter writers early
- ↗ Write general personal statement first and then tailor to individual program applications

Who do you ask for a letter?

- Research mentors are the best
- Professors for upper level classes
- Academic advisors
- No family or friends

Reference Etiquette

- ↗ Ask politely
- ↗ (but don't be afraid to ask)!
- ↗ If there is any uncertainty, ask if they will write you a *positive* letter
- ↗ Give them at least 2 weeks notice
- ↗ Try to balance between research & academic references

Personal Statement Writing

- Start with some good examples
- Write about what makes you qualified
- Do NOT write about “why I love astronomy”
- Include your personal motivation for applying to the internship
 - Specific details about the program and why it appeals to you

ASTR 581

Manastash Ridge Observatory



- “*Theory and practice of obtaining optical data at a telescope. Preparation, obtaining data with a CCD on a telescope, and subsequent data analysis for completion of a research project. Prerequisite: ASTR 480*”
- Real observing projects at MRO
- Astronomy undergraduate advisor recommends one summer REU/internship and one summer registered for ASTR 481

Summer Internship Q & A

- ↗ Peter Senchyna (senchp@uw.edu)
 - ↗ Smithsonian Astrophysics Observatory / Harvard- Center for Astrophysics REU
 - ↗ University of Washington Space Grant Summer Research Program
- ↗ Kristen Garofali (kgarofali@gmail.com)
 - ↗ University of Toledo REU & Summer Internship
 - ↗ Undergrad research at Michigan State University
- ↗ Tevin Doynes (tjdonyes@gmail.com)
 - ↗ Marketing internship for insurance company
 - ↗ Student research at Fred Hutchinson Cancer Research Center

List of REU/internship opportunities

To accompany the lecture I have compiled a (partial) list of resources for finding summer research opportunities. Note that REU applications usually open in **December** and are due by **February 1** (with notification by **April 15**). Other programs vary with deadlines. As always, you can email Michael or me or come to our office hours if you have any questions about the application process. Also, your mentors are a great resource for advice.

See following slides...

Nationwide REU/Summer Internships

NSF-REU opportunities in Astronomy:

http://www.nsf.gov/crssprgm/reu/list_result.jsp?unitid=5045

NSF-REU opportunities in Physics:

http://www.nsf.gov/crssprgm/reu/list_result.jsp?unitid=69

Other NSF-REU opportunities:

http://www.nsf.gov/crssprgm/reu/reu_search.jsp

NASA Internships (available all year, including the summer):

<http://goo.gl/VJIJpB>

American Astronomical Society (AAS) list of summer opportunities:

<http://aas.org/jobs/summer-opportunities>

Alternatives at UW

Continue working with your Pre-MAP mentors or another astronomy professor/post-doc/grad student. Find people here:

<http://www.astro.washington.edu/people.php>

University of Washington Space Grant Undergraduate Research Program:

[http://www.waspacegrant.org/for_students/student_internships/wsgc_internships/
SURP_for_students.html](http://www.waspacegrant.org/for_students/student_internships/wsgc_internships/SURP_for_students.html)

Complete listing of summer research programs at UW in all fields:

<http://www.washington.edu/research/urp/students/find/summeratUW.html>

Take the summer observing course ASTR 481 (prerequisite: ASTR 480)

<http://www.astro.washington.edu/users/laws/classpages/a481/>

Other Advice

Astro-bites article on applying for REUs:

<http://astrobites.org/2013/01/05/so-you-want-to-apply-for-an-reu-heres-how/>