Summer Research Internships

What to know, how to apply *11/14/2014 – Eddie Schwieterman*

REU
Research Experiences for Undergraduates

NSF

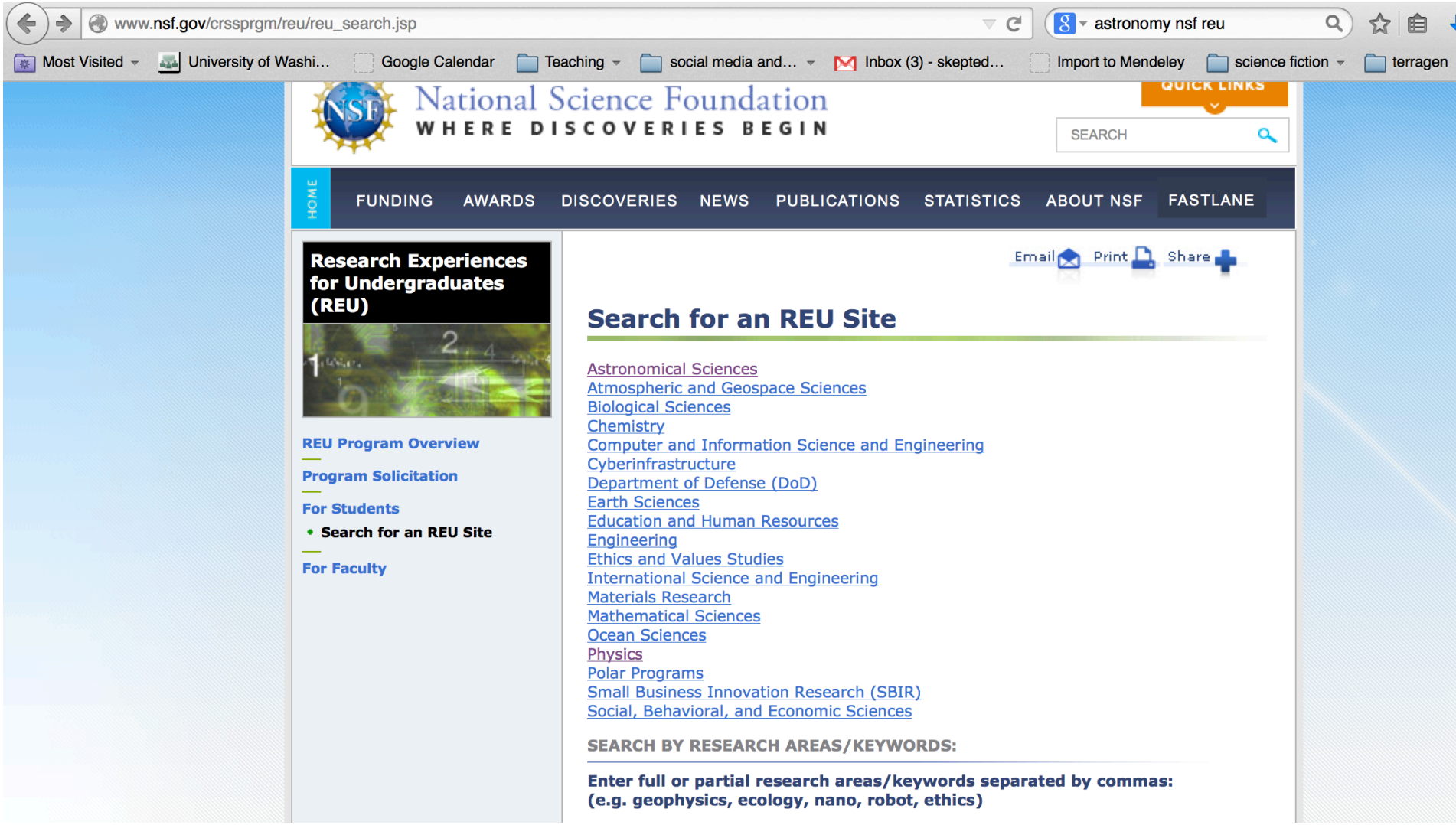
NASA

What is an REU?

- **R**esearch **E**xperience for **U**ndergraduates
- 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



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

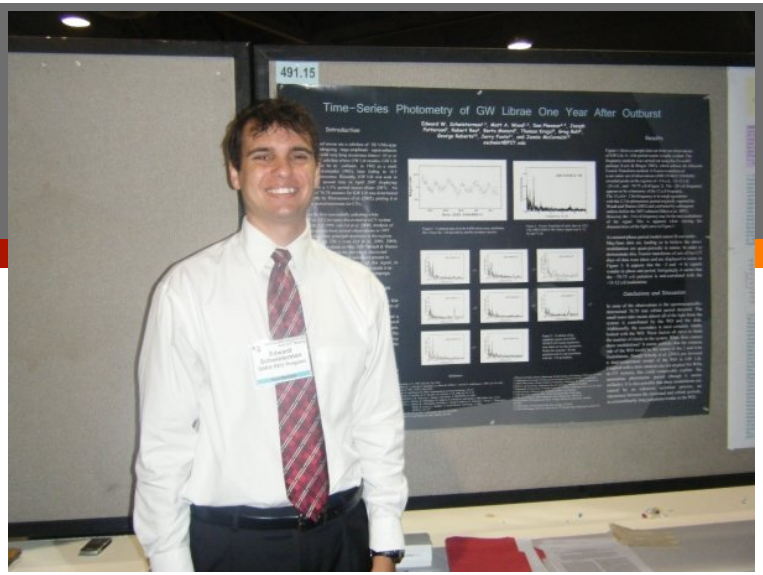
Where are REUs?

Everywhere!

Why do an REU?

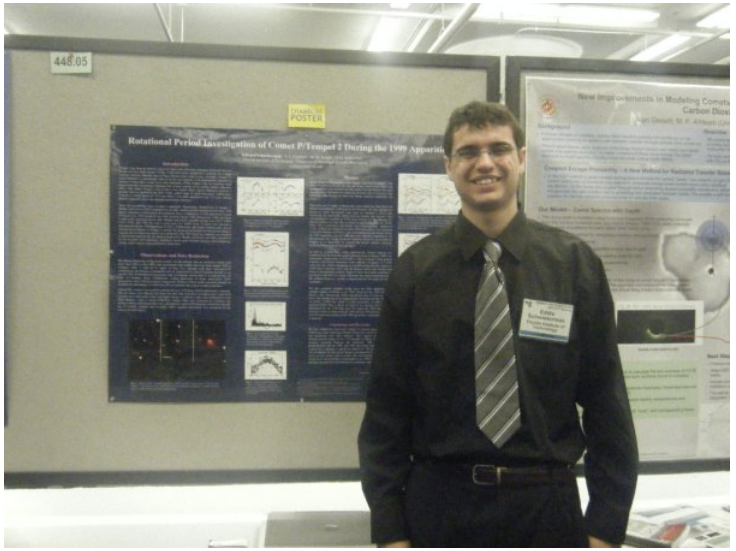
- Research Experience
- CV/Resume Building
- Summer Job ($$$)
- Chance to meet new people (networking!)
- Opportunity to travel
- Letter writers and references outside your institution

Glamorous Life of an REU student



AAS – Long Beach (2009)

Lowell Observatory Anderson Mesa Telescope



AAS – DC (2010)

Journal of the Southeastern Association for Research in Astronomy, **3**, 6-10, 2010 March 1

TIME-SERIES PHOTOMETRY OF GW LIBRAE ONE YEAR AFTER OUTBURST

Edward W. Schwieterman[1,2], Matt A. Wood[1], Dan Piwowar[2,3], Joseph Patterson[4], Robert Rea[5], Berto Monard[6], Thomas Krajci[7], Greg Bolt[8], George Roberts[9], Jerry Foote[10] and Jennie McCormick[11]

The Astronomical Journal, 141:2 (14pp), 2011 January doi:10.1088/0004-6256/141/1/2

THE INCREASING ROTATION PERIOD OF COMET 10P/TEMPEL 2

Matthew M. Knight[1], Tony L. Farnham[2], David G. Schleicher[1], and Edward W. Schwieterman[3]

The Astronomical Journal, 144:153 (25pp), 2012 November doi: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. Schleicher[1], Tony L. Farnham[3], Edward W. Schwieterman[1,4], and Samantha R. Christensen[1]
[1] Lowell Observatory, 14

Journal of the Southeastern Association for Research in Astronomy, **3**, 45-51, 2010 February 1

MODELING AND OBSERVING EXTRASOLAR PLANETARY TRANSITS

Brett C. Addison[1], Samuel T. Durrance[1], and Edward W. Schwieterman[1]

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!

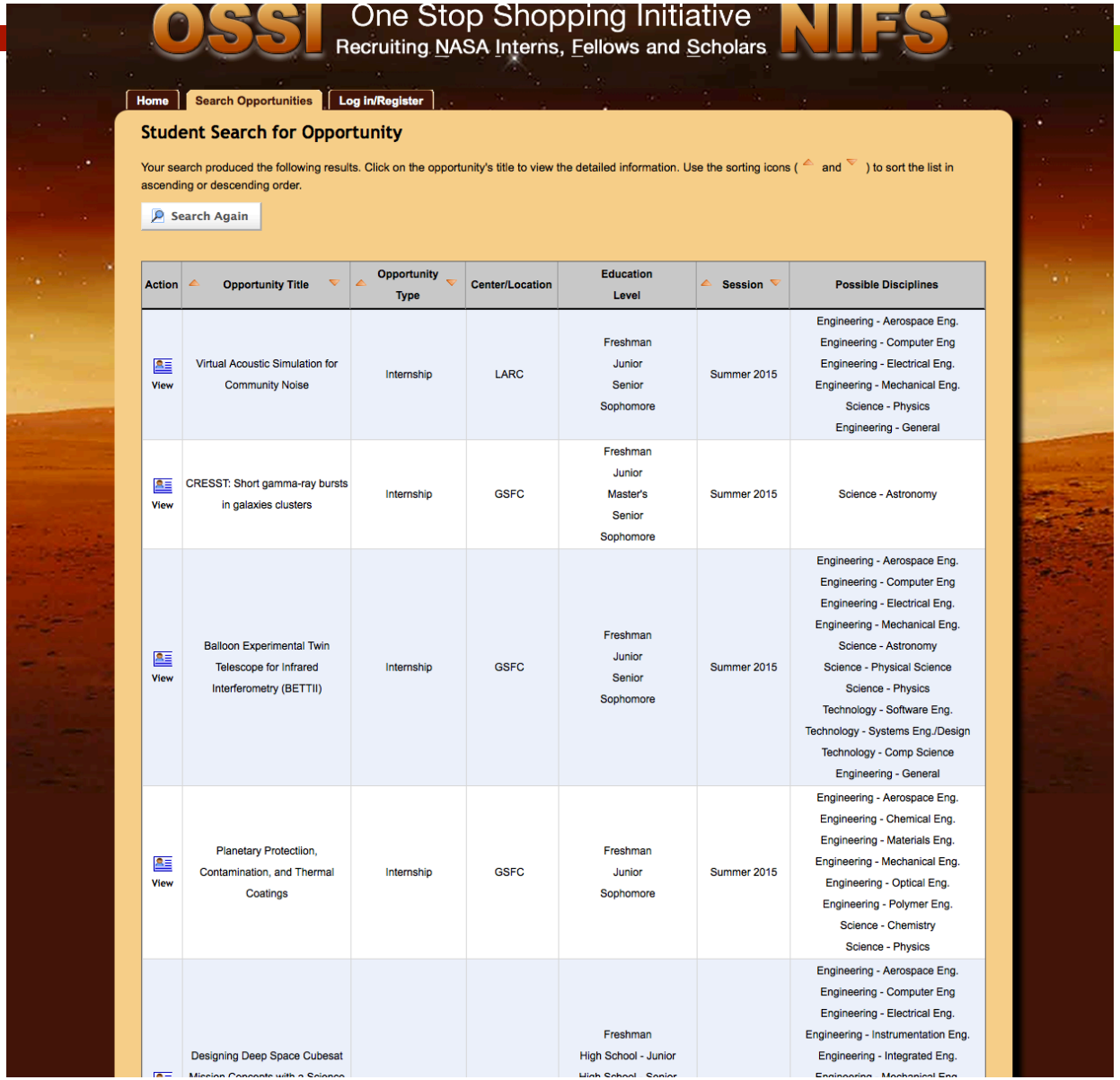
Gotcha for UW Students

- 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



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

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 - 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
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 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 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
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
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 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 Technology - Comp Science Science - General
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 Doctoral Senior Sophomore	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

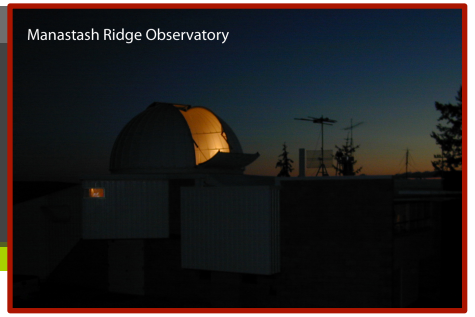
Reference Etiquette

- ***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



- *"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

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/