

# Beyond Boulder

Career Mentoring for PHYS & ASTR Majors

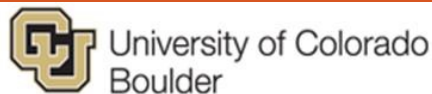


Join Prof. Chuck Rogers (PHYS),  
Dr. Marty Snow (LASP/REU), and  
Nick Schneider (APS) to discuss:

- How can I get research experience at CU?
- Should I get an REU? UROP? What are they?
- Can I get an internship in industry?
- What about teaching, outreach, informal ed?
- Am I better off just focusing on my grades?

**November 6, 5:15-6:15 pm**  
**Duane G125**

**Free Pizza!**



Questions? Contact: [Nick.Schneider@lasp.colorado.edu](mailto:Nick.Schneider@lasp.colorado.edu)

# Beyond Boulder, Nov 6<sup>th</sup> 2017: Please sign in

Name	Dept.	Current/Past Experience	Desired Experience
1			
2			
3			
4			
5			
6			
7			
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9			
10			
11			
12			
13			
14			
15			

“Experience” examples: Research w/ faculty, REU, LA, Fiske volunteer

# Your Panel: Undergraduate Research Experiences

- Nick Schneider, APS Faculty
  - [nick.schneider@lasp.colorado.edu](mailto:nick.schneider@lasp.colorado.edu)
- Chuck Rogers, PHYS Faculty
  - [charles.rogers@colorado.edu](mailto:charles.rogers@colorado.edu)
- Marty Snow, LASP (REU's)
  - [marty.snow@lasp.colorado.edu](mailto:marty.snow@lasp.colorado.edu)
- Parker Hinton, APS Undergrad
  - [parker.hinton@colorado.edu](mailto:parker.hinton@colorado.edu)
- Anya Portyankina (Coordinator for Undergraduate Research at LASP)
  - [anya.portyankina@lasp.colorado.edu](mailto:anya.portyankina@lasp.colorado.edu)
- Catherine Weldon, ASTR/PHYS Advisor
  - [cathrine.weldon@colorado.edu](mailto:cathrine.weldon@colorado.edu)

Today's slides posted here: <http://beyondboulder.pbworks.com>

# Pre-professional Experiences

## Research

- Local researchers
  - PHYS (attend PROS)
  - ASTR (attend FRT's and URP)
  - UROP's
  - Independent Study
  - Honors Thesis
  - NIST, SwRI, NCAR, NOAA
- REU's

## Common Themes

- Qualifications, GPA, time
- Resume/CV
- Initiative, "Just Showing Up"

## Teaching

- Learning Assistants
- CU Teach

## Informal Education

- Fiske Planetarium
- Sommers Bausch Obs.
- Denver Museum Nat&Sci
- CU-STARs

## Industry

- Aerospace Ventures Day
- Ball, LM
  
- BB will cover these next semester

# Preparation for Research

<https://www.colorado.edu/aps/undergraduate-students/ready-research>

## ASTR

- “Skills” coursework
  - 2600 Scientific Computing
  - 3800 Data Analysis
  - 3510/20/60 Observing & Instrumentation
- Content coursework
- Make/buff your CV
- Attend Faculty Research Talks
- Scout web pages

## PHYS

- “Skills” coursework
- Shop class
- Content coursework

# Undergrad Research: Important Links

- <https://www.colorado.edu/aps/undergraduate-students/ready-research>
- <https://www.colorado.edu/aps/undergraduate-studies/research-opportunities/research-internship-scholarship-opportunities>
- [https://www.nsf.gov/crssprgm/reu/reu\\_search.jsp](https://www.nsf.gov/crssprgm/reu/reu_search.jsp)
- <http://www.astrobetter.com/wiki/Summer+Internships>
- <https://www.colorado.edu/aps/faculty-research-talks>

### **Ball Aerospace 2018 Summer Intern Program:**

The Ball Aerospace Internship Program is a ten-week summer program that provides interns with practical experience working on relevant projects while working with designated mentors; access to state-of-the-art equipment; a competitive wage; relocation reimbursement; in-house training; group activities; possible future employment and the ability to participate in a rocket launch (BIRST) program. At the conclusion of your internship, you will be required to prepare and deliver a formal presentation of your project work to your respective department.

Please visit the webpage below for more information:

<http://www.ball.com/aerospace/about-ball-aerospace/careers/college-internships>

*ASTR majors:  
you should  
have  
received this  
already*

### **NASA 2018 Intern Program:**

NASA Internships are educational hands-on opportunities that provide unique NASA-related research and operational experiences for high school, undergraduate, and graduate students as well as educators.

These internships integrate participants with career professionals emphasizing mentor-directed, degree-related, real-time world task completion. During the internship participants engage in scientific or engineering research, development, and operations activities. In addition, there are non-technical internship opportunities to engage in professional activities which support NASA business and administrative processes. Through these internships, participants leverage NASA's unique mission activities and mentorship to enhance and increase their professional capabilities and clarify their long-term career goals.

NASA Internships can be full or part-time, conducted at a NASA facility, contractor facility, or anywhere activities are ongoing to advance NASA's missions. Mentors can be civil servants, contractors, or faculty conducting activities directly related to NASA's unique assets and ongoing mission activities.

NASA internships occur within the following 4 sessions per year generally corresponding to the academic calendar: spring, summer, fall, and year-long (often following the academic year Aug.-May)

<https://intern.nasa.gov/>

**Galileo Galilei**  
123 Copernicus Lane  
Boulder CO 80302  
Cell: 303-555-1212  
Email: [Galileo.Galilei@colorado.edu](mailto:Galileo.Galilei@colorado.edu)

**Objective:** I am seeking a part-time research assistant position to obtain research skills and experience in any field of astrophysics, planetary science or space physics. Gaining experience especially important for evaluating my potential career paths, possibly including graduate school. A paid position is preferred, but I would consider volunteering until funding is available, applying for a UROP grant, or working for Independent Study credit.

**Education:**

Major: ASTR major at CU Boulder, Fall '15-present, Astrophysics Track

Expected Graduation: Spring 2019

GPA: 3.72 in the ASTR, PHYS and APPM, 3.65 overall

Relevant Upper Division Coursework:

- ASTR2600 "Computational Techniques".
- ASTR3510 "Observations & Instrumentation I". Final project on photometry of open clusters
- ASTR3750 "Planets, Moons and Rings"

**Computer Skills:**

- Fluent in IDL programming from ASTR2600 and course projects
- Extensive experience in IRAF from ASTR3510
- Some experience in Python
- Familiar with Microsoft Word, Powerpoint, Excel
- Extensive experience in Dreamweaver and iWeb webpage development

**Other Astronomy-related employment and experience**

- Grader for ASTR1020 in Fall 16 with Prof. Glenn
- Volunteer Observer at SBO Open Houses
- Docent at Fiske Planetarium
- Learning Assistant in ASTR1020
- Long-time amateur astronomer; built my own telescope
- Summer REU at U. Illinois in Summer '15 on crater statistics on Mars. Mentored by Eugene Shoemaker

**References**

- Prof. Jason Glenn, instructor for whom I graded in Fall '16.
- Alan Sandage, CASA postdoc who mentored my project in ASTR3510.
- Prof. Nick Schneider, instructor for ASTR3710 in which I received an A.

**Availability:** Ready to work 10 hrs per week effective immediately, and full-time over the summer.

**Scientific Interests:** Cosmology, Telescopes & Instrumentation, Extrasolar planets, Space Weather

Nick Schneider [L..., 4/20/2013 11:40 AM]

**Comment [1]:** For most students, everything essential will fit on one page. Don't pad with non-science items if it pushes you onto a second page. There is no fixed format for a CV, so you can arrange sections below as you wish. Make sure it's easy to skim for key items.

Nick Schneider [L..., 4/20/2013 11:28 AM]

**Comment [2]:** Your wording should express your own motivation

Nick Schneider [L..., 4/20/2013 11:25 AM]

**Comment [3]:** Just an option, but might increase your odds

Nick Schneider [L..., 4/20/2013 11:41 AM]

**Comment [4]:** Emphasize grades in majors courses (if they deserve it). Only include High School if you don't have enough under your belt in college. Almost all ASTR majors were top performers in high school

Nick Schneider [L..., 4/20/2013 12:04 PM]

**Comment [5]:** If you can't quote high overall GPA, list high grades by courses in the section below

Nick Schneider [L..., 4/20/2013 11:34 AM]

**Comment [6]:** This section may matter most. Put your best skills forward. Consider describing a challenging project

Nick Schneider [L..., 4/20/2013 11:27 AM]

**Comment [7]:** It's OK to put on non-astronomy items, but they won't count as much.

Nick Schneider [L..., 4/20/2013 11:55 AM]

**Comment [8]:** This list is longer than any student could possibly achieve, but in making it so I indicate the kinds of items to be included.

Nick Schneider [L..., 4/20/2013 11:38 AM]

**Comment [9]:** References outside the scientific or academic world are less likely to be useful



# Role-Playing

- **Eager Student**

- I'd like to...
- Is now a better time?
- Can I walk with you?
- I'm really eager to ...
- Here's my resume. I...
- OK, I took the courses
- Can I volunteer? Write UROP?
- Can I be supervised by your postdoc? By your grad student? May I attend your group meeting?

- **Busy Professor**

- Sorry, come back later
- No, meeting across campus
- Well OK
- What are your skills?
- You need some courses
- I don't have funding
- I don't have time
- OK OK OK

Semester-long  
research projects  
available!

## Undergraduate Research Symposium

- This is a mini-symposium for undergrads who are interested in doing a short-term research project within APS.
- Various speakers (faculty, postdocs, and research associates) will present ideas for a project.
- Undergrads can then apply via email (with a cv) for the positions they are most interested in.
- Coding skills encouraged!



Location: Duane Physics Room G130  
Date: Monday December 4  
from 6:15-8:00 pm

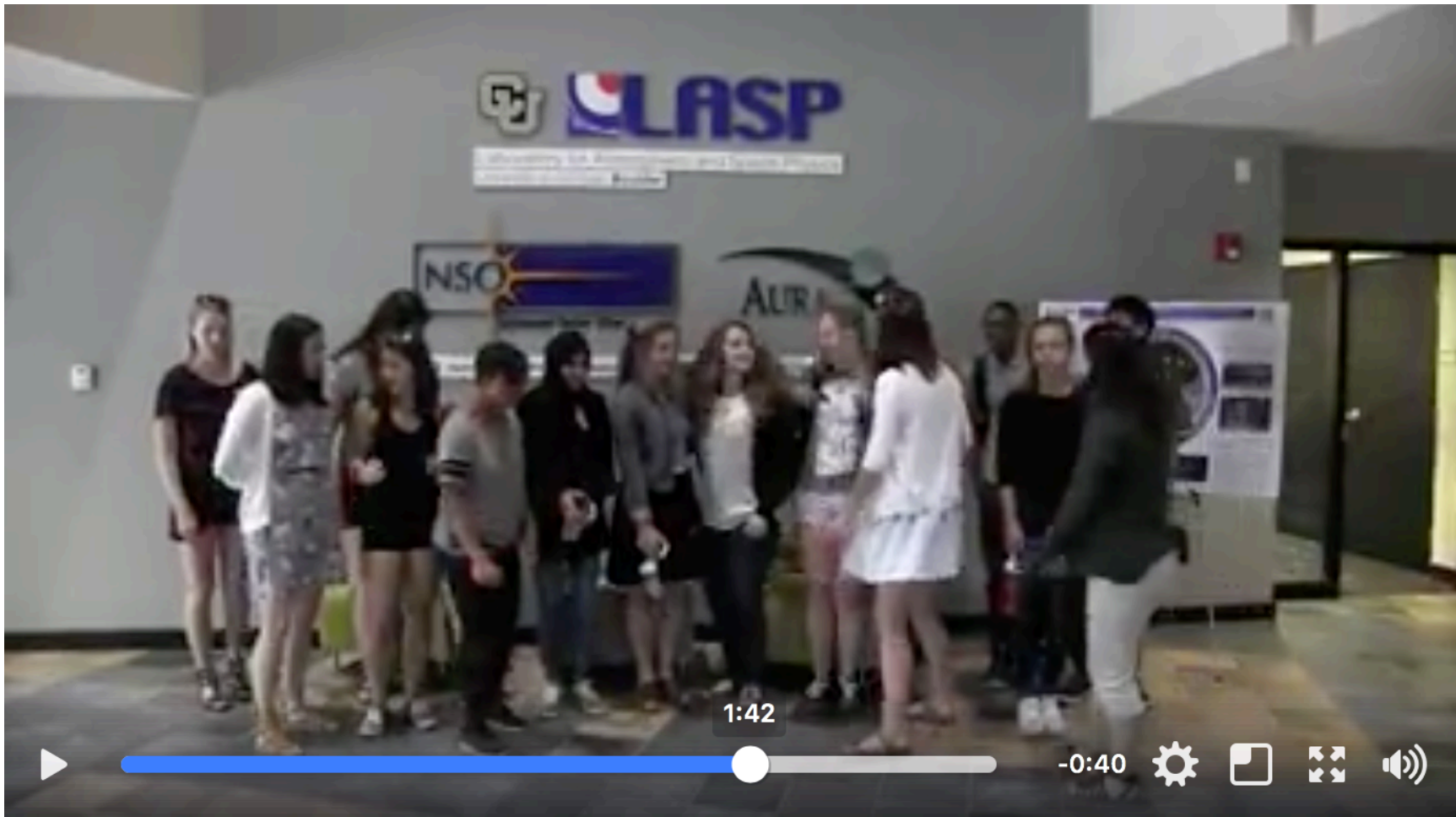
Refreshments will be provided!

For any questions, please contact Dr. Ann-Marie Madigan at:  
[annmarie.madigan@jila.colorado.edu](mailto:annmarie.madigan@jila.colorado.edu)



Astrophysical & Planetary Sciences  
UNIVERSITY OF COLORADO **BOULDER**

# Research Experience for Undergraduates (REU's)



[What it's like to be an REU student in Solar and Space Physics](https://www.facebook.com/tipsyweasel/videos/10155855369816719/)

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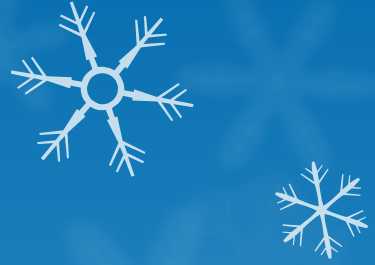
# Research Experience for Undergraduates

Solar and Space Physics at the University of Colorado

Martin Snow

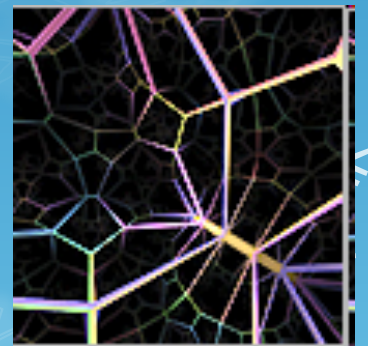
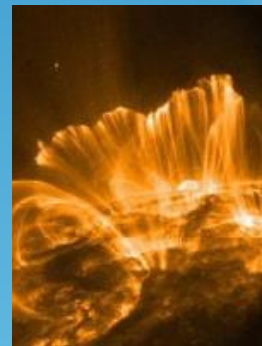
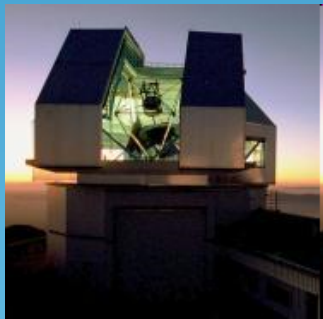
[snow@lasp.colorado.edu](mailto:snow@lasp.colorado.edu)

303-885-8689



# Research Experience for Undergraduates

- An NSF program to engage students in research.
- Students from around the nation apply to program, not just students from host institution.
- Programs collectively cover all science areas supported by NSF.
- Individual programs will have a single intellectual theme.



# REU in Solar & Space Physics with the Boulder Solar Alliance

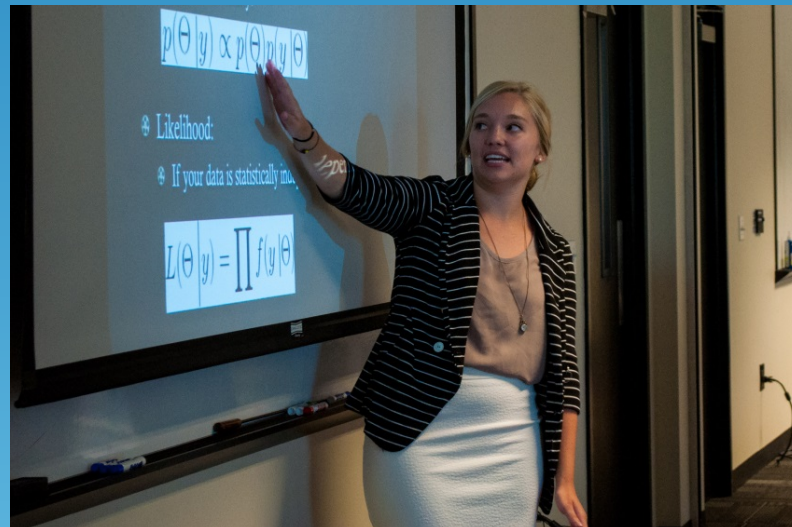
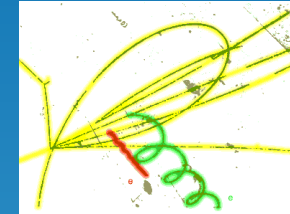
- Collaboration between seven institutes (LASP, HAO, SWPC, NSO, SwRI, NWRA, ASTRA)
- 10 week summer program
  - 1 week summer school
  - Weekly brown-bag lunches, including student mini-presentations
  - Student Symposium (30 min oral plus poster)
  - Informal social gatherings (BBQs, hikes, theater, tubing in creek, etc.)



<http://lasp.colorado.edu/reu>

# Student Skills

- Knowledge of Physics and Math
  - *Essential in every project!*
- Computational or Programming Skill
  - Varies with project, can be acquired as part of project



- Verbal and Written Communication Skills
  - Practice makes perfect

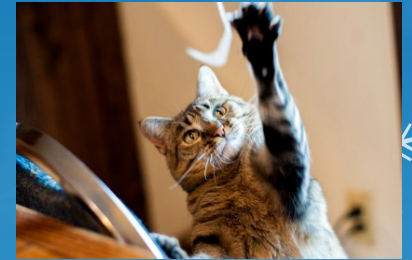
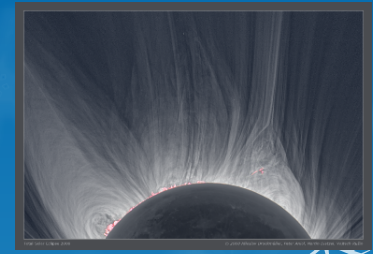
# What sort of research project can I do in a summer?





# A sampling of 2016 Projects:

- Solar Physics
  - Exploring sunspot cycles in observations and supercomputer models
  - The mysterious case of the missing filaments
  - 3D potential field modeling of coronal structures
- Space Weather & Space Physics
  - Correlating long duration Gamma-ray solar flares with high-energy SEP events
  - Current events: the formation, growth, and development of a current sheet in an eruptive solar flare
- Planetary Science
  - The response of high energy photoelectrons in the Martian atmosphere to variable solar input
  - Mars' atmospheric escape: variability in the upper atmosphere

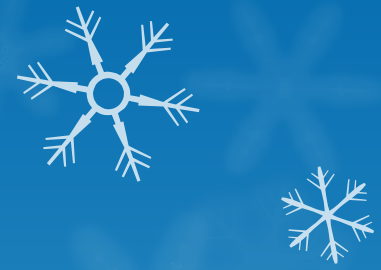


# 2016 Projects (continued)

- CubeSats
  - Maintaining a healthy cubesat: analysis of MinXSS FM-1 data and preparations for FM-2
  - Max power point tracking system



# Weekends and Social Gatherings



# Applying for a position

- Due date (1 February for solar REUs)
- Unofficial transcript
- Contact information for 3 academic/work references
- Description of any relevant experience or skills
- Personal statement about why you should get the job instead of someone else.

Martin Snow

[snow@lasp.colorado.edu](mailto:snow@lasp.colorado.edu)

303-885-8689

[Lasp.colorado.edu/reu](http://Lasp.colorado.edu/reu)

[www.nsf.gov/crssprgm/reu/reu\\_search.jsp](http://www.nsf.gov/crssprgm/reu/reu_search.jsp)