



BOULDER SOLAR ALLIANCE REU BOOT CAMP

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OUTLINE

- Program Goals and Context
- Lectures
- Group Project
- Final Exam
- Networking
- Summary



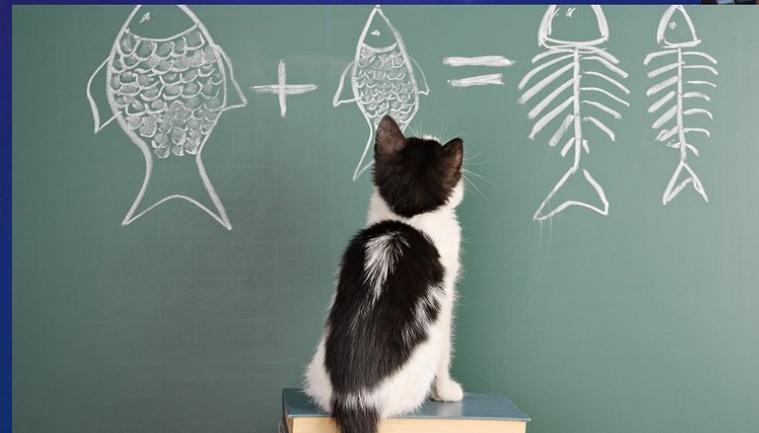
PROGRAM GOALS

- Research Experience for Undergraduates program funded by the NSF
 - 10 Week summer program for undergrads from around the country
 - Recruitment emphasizes non-R1 schools without easy access to research mentors
 - Authentic research experience before making a decision about graduate school
- Collaboration between many institutions in Boulder, Colorado
- Boot camp goals:
 - Give students big picture view of Solar and Space Physics
 - Context for their individual research project
 - Cohort building



SCIENCE LECTURES

- Overview of Sun-Earth System
- The Sun
 - Interior, atmosphere, solar cycle
- Solar Wind
- Space Weather (at Earth and at Mars)
- Magnetosphere (of Earth and other Planets)
- Earth atmosphere
 - Upper atmosphere, climate



SOME LECTURES ARE MORE INTERACTIVE THAN OTHERS





ADDITIONAL TOPICS/LECTURES (1)

- Anti-discrimination and Harassment training
 - ED33F-1041 poster on full curriculum

Survey Sample	Experienced Comments	Experienced Physical Contact	Aware of Mechanism to Report Contact	Reported Physical Contact	Satisfied by Outcome of Reporting
● Men N=142 ● Women N=516	● Men N=56 ● Women N=361	● Men N=8 ● Women N=131	● Men N=0 ● Women N=25	● Men N=1 ● Women N=36	● Men N=0 ● Women N=7

Full Curriculum



Scan Me

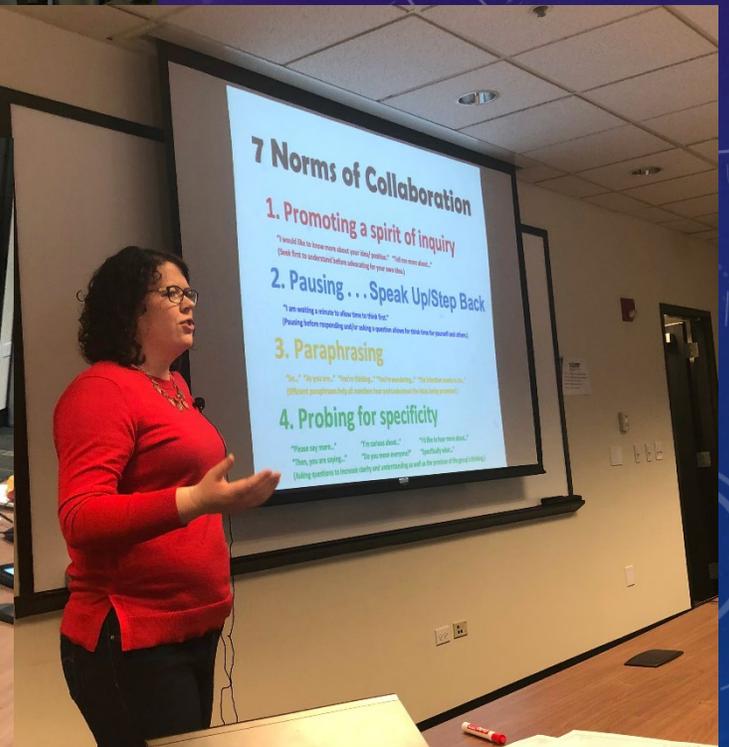
1. Discrimination in work or school situations

n = 18



ADDITIONAL TOPICS (2)

- Science Policy
- Collaborative Science
- Near Peers



GROUP PROJECT

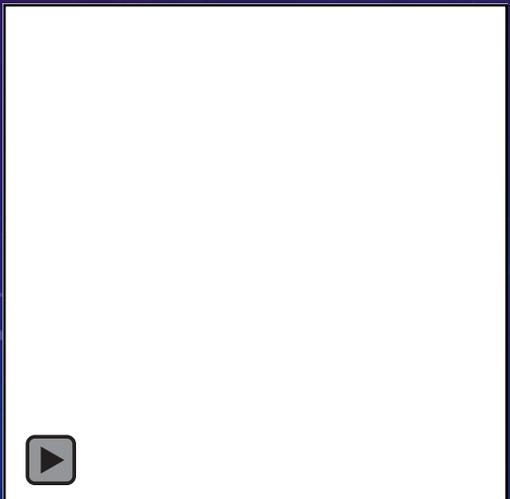


- Open ended task with no recipe for how to accomplish it
- Hardware project outside the scope of most undergrad physics labs
- Collaboration
- Cohort building – learn the strengths and weaknesses of fellow students
- Produce a dataset to use in scientific programming tutorial
- Two half-day working sessions plus a summary presentation





2019 PROJECT: HELIOSTAT AND PINHOLE CAMERA



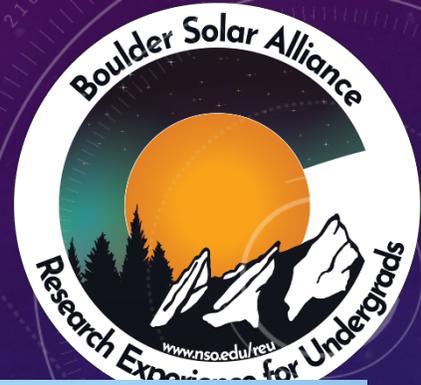


2018 PROJECT: HIGH ALTITUDE BALLOON



2017 PROJECT: IONOSPHERIC MONITOR





2016 PROJECT: RADIOSONDE BALLOON



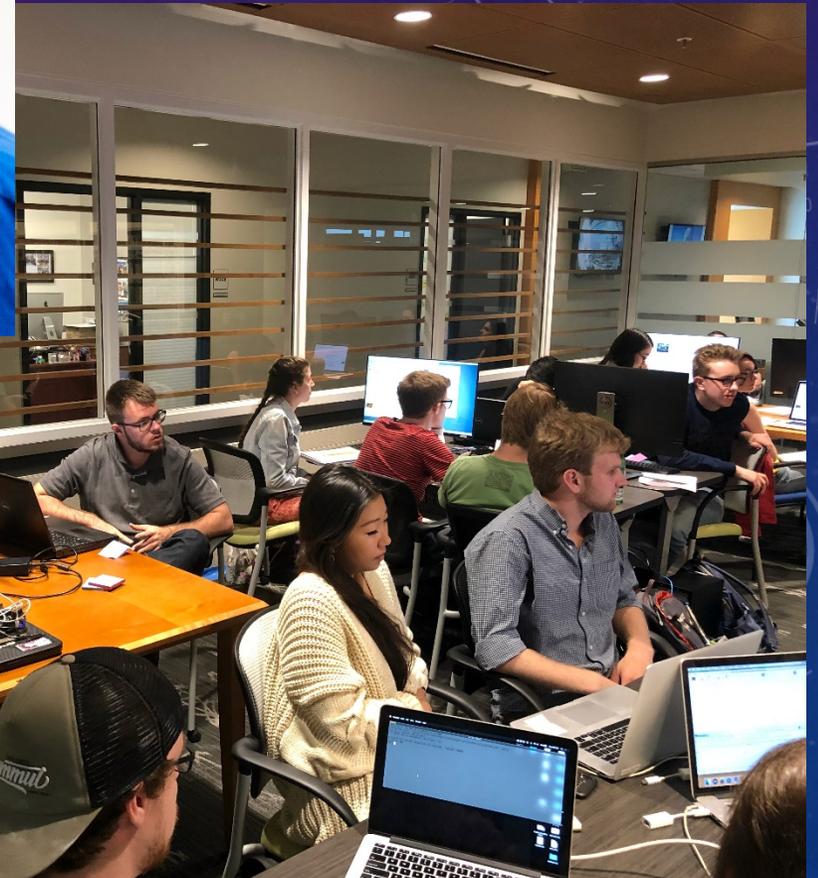
AGU Fall Meeting 2019 LD41A-07





INTRODUCTION TO SCIENTIFIC PROGRAMMING

- Old mentors want IDL
- Modern mentors want Python
- So we have parallel sessions now....
- Use data collected in group project

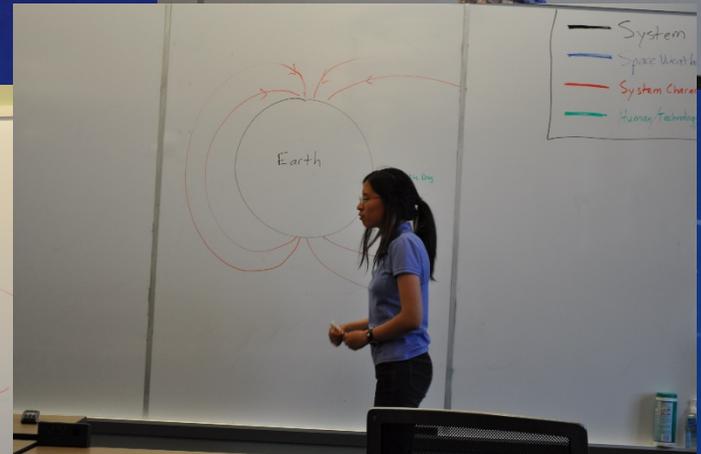
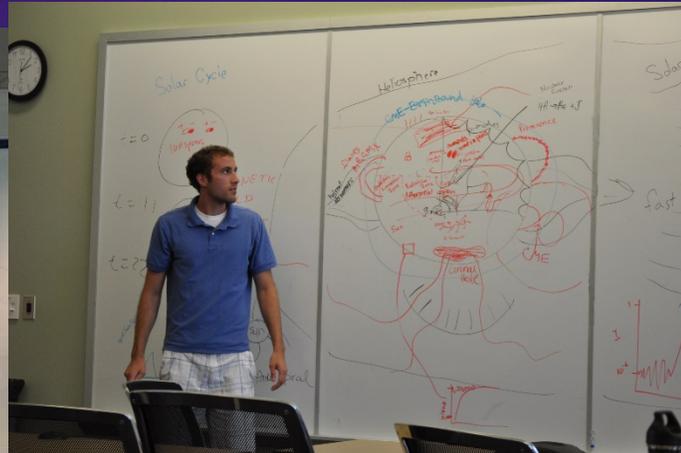


How much IDL can you teach in half a day?

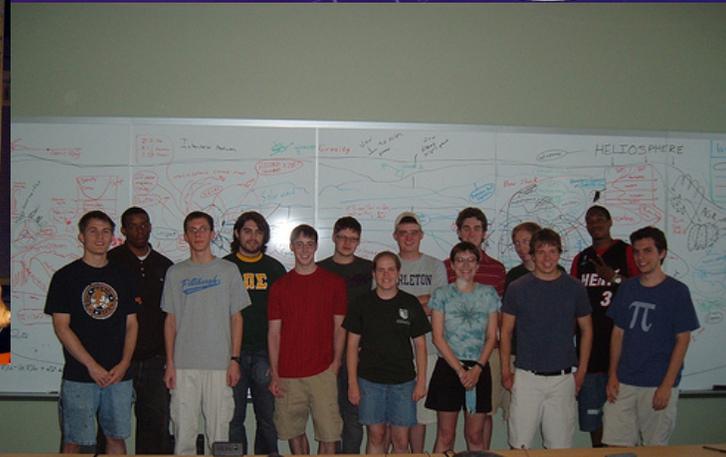
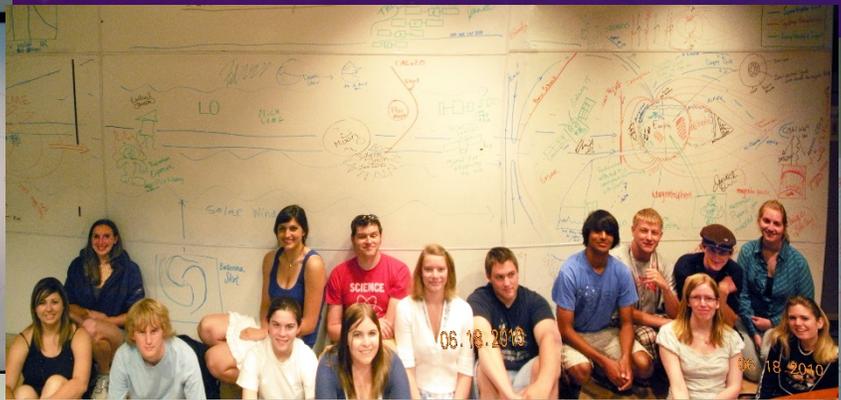
Just enough to get the students into trouble!

SYSTEM BLOCK DIAGRAM

- To summarize the long week, the students start with a white board showing only the Sun and the Earth.
- Each student in turn adds one thing that they learned during the boot camp week.



SYSTEM BLOCK DIAGRAM FINISHED!





NETWORKING WRAP UP BBQ WITH MENTORS



...ALL IN ONE (FOUR-DAY) WEEK!

- Two lectures a day provide scientific background
- Additional lectures provide professional development
- Group project takes students out of comfort zone and builds relationships
- Scientific programming workshop gives students a start on data analysis
- Block diagram summary activity reinforces the breadth of the week's content
- Evening BBQ allows students to socialize with mentors



