

**THE COMPASS PROJECT**  
[www.berkeleycompassproject.org](http://www.berkeleycompassproject.org)



**Berkeley**  
UNIVERSITY OF CALIFORNIA

# **PROGRESS** through **PREDICAMENT**

How collaborating on tough problems  
cultivates a successful, supportive community

Ana Aceves    Badr Albanna    Joel Corbo    Gina Quan

# What is Compass?

The Compass Project is a **student-founded** and **student-run** organization in the physical sciences at UC Berkeley.

Its goal is to **support students** (especially those traditionally **underrepresented**) through the challenges of their academic careers by creating a **unique environment** that blends teaching, learning, mentoring, leading, and community building.





# Core Values

Compass's success lies in the shared vision and values of its membership.



**Strong  
Community**



**Challenging  
Problems**



**Student  
Ownership**



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# Two Goals for This Talk

**Inform** you about some of the programmatic and organizational aspects of Compass.

Discuss how well we are **meeting our program goals** in the context of our values.





# Today

Community  
(Summer Program)

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Ana Aceves

Overview of Compass

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Joel Corbo

Challenging Problems  
(Semester Courses)

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Badr Albanna

Student Ownership  
(Leadership)

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Gina Quan

Questions (for us and you)

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# **Community (Summer Program)**



# Summer Program

- 16-20 incoming freshmen
- 2 weeks preceding fall semester
- All expenses paid
- Residential, on Berkeley's campus



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# In the Classroom

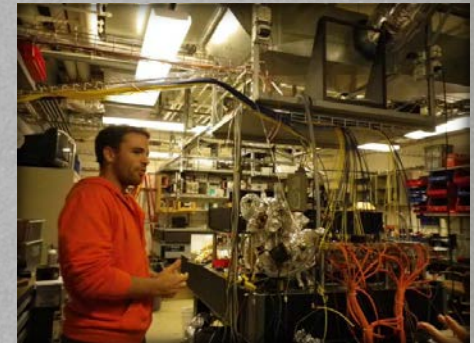
- Overarching question (“How do wind turbines work?”)
- 3 classes (theoretical, experimental, reflective)
- Minimal lecturing
- Co-teaching, by grad students
- Curriculum updated daily to track student learning





# Outside of the Classroom

- Homework
- Lab tours
- Weekend field trips
- Social events



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# Quotes on Community

“Having Compass and its community as a first year student at a large university helped me find my way and transition to Cal.”

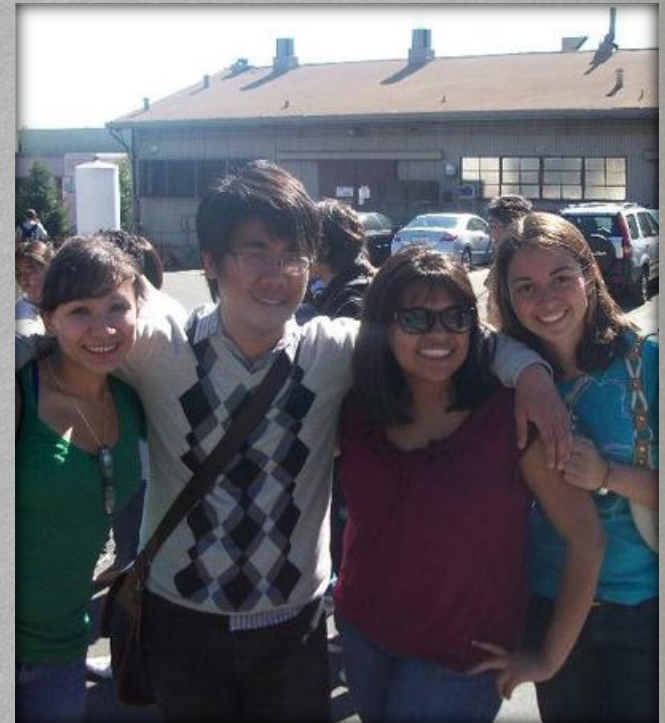
“Compass has become a family for me and a support system I can count on for guidance and help.”





# Undergrad to Undergrad

- Lasting relationships beyond the summer program
- “Compass apartments”
- Makes transitioning into college life easier
- Peer-to-peer counseling between different years





# Grad to Grad

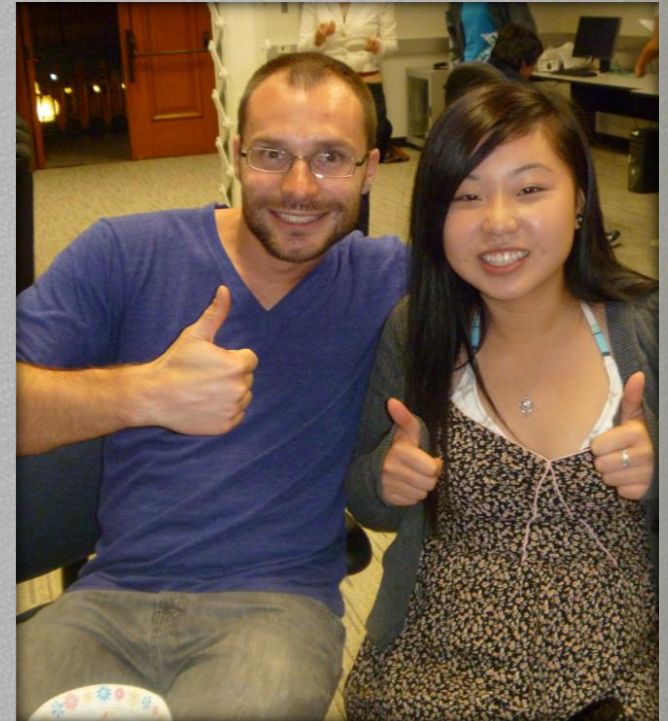
- “Making friends in grad school is really hard, but Compass makes it really easy.”
- Bonding through working together on summer program
- Develop relationships outside of Compass





# Undergrad to Grad

- Undergrads treated as peers
- Grads mentor undergrads
- These relationships are otherwise rare on campus



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# **Overview of The Compass Project**



# Why Compass?

## For undergrads:

- Retention  
(for the right reasons)
- Develop problem solving skills
- Self-advocacy

## For grad students:

- Improved pedagogy
- Professional development
- Mutual support





# Basic Facts about Compass

- Who?** ~65 undergrads, ~35 grad students, 2 postdocs, ~10 alums
- When?** Founded in 2006, first summer program in August 2007
- What?** Originally, the summer program. Rapid growth since (“Project”)





# Demographics

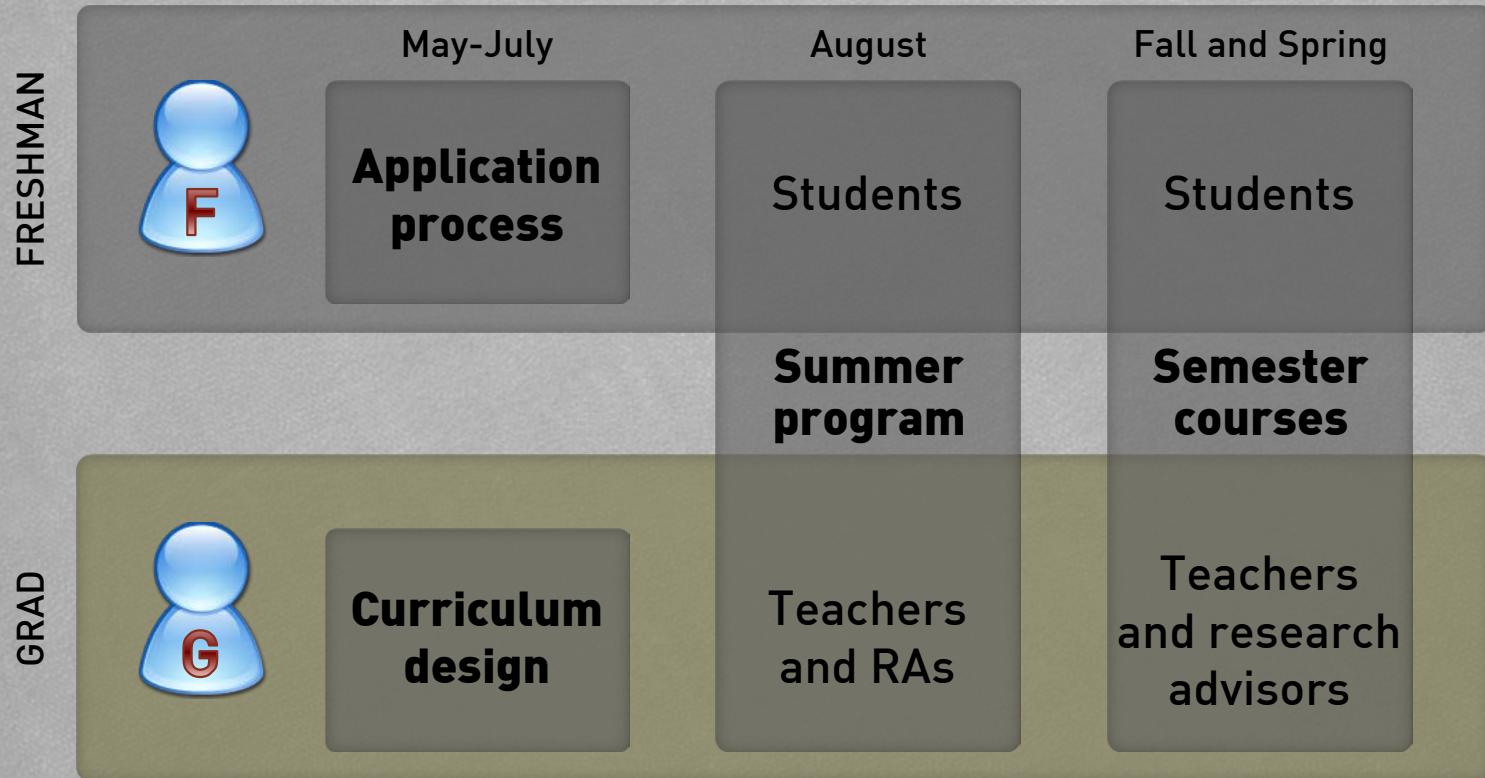
2008-2011 Compass Summer Program students  
(N=62)(vs. Berkeley physics department average):

- **47%** are female (vs. 16%)
- **21%** are Chicano/Latino (vs. 6.9%)
- **5%** are African American (vs. 0.5%)
- **3%** are Native American (vs. 0.5%)
- **26%** are first-generation college students



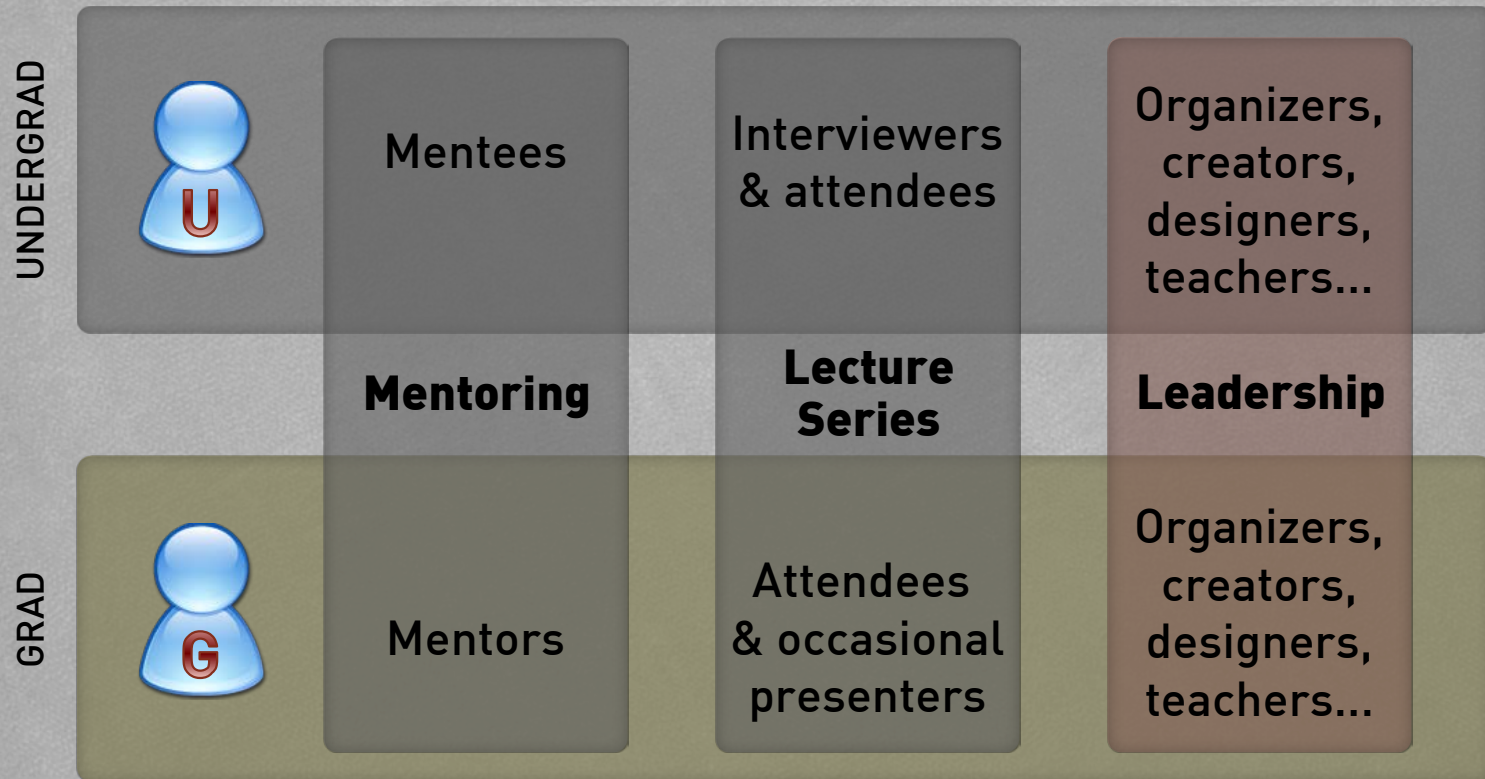


# Academic Courses





# Services & Leadership



+ office hours + high school outreach + social events + ...



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# Organizational Structure

## Courses

Summer program  
Semester courses  
Teacher training  
Pedagogy

## Academic Services

Mentoring  
Lecture series  
Office hours  
High school outreach

## Support

Technology &  
social media  
Publicity & design  
Social events

## External

Budgeting &  
fundraising  
Program evaluation  
Alumni association

Student-run, with  
departmental support  
(administrative,  
financial, office space,  
faculty advisor)

Consensus-based  
decision making

Continuous influx  
of new leadership

Still a challenge:  
**financial stability**





# **Challenging Problems (Semester Courses)**



# Semester courses

- 2 hours/week for credit
- Co-taught by grads and senior undergrads
- Concurrent with other math and science classes
- Fall: “Introduction to Modeling”  
Spring: “Introduction to Measurement”

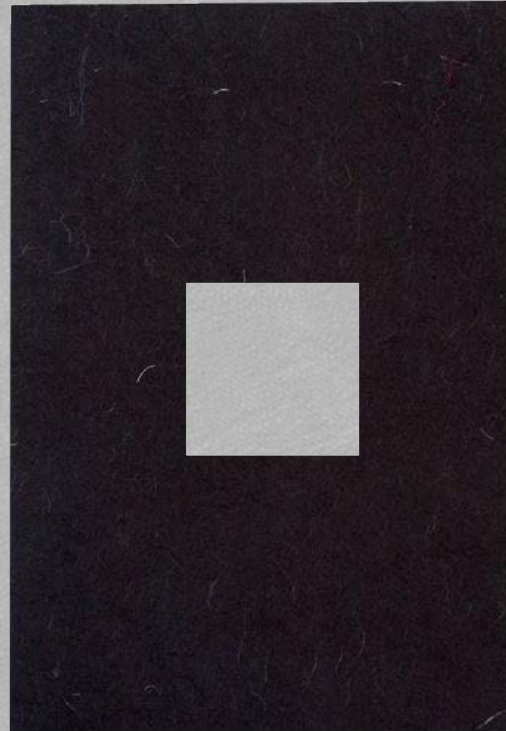




# What is a “challenging problem?”



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# What is a “challenging problem?”

- Presented in its own context
- No clear method for solution
- Open-ended
- An instigator for further inquiry
- A gift that keeps on giving



# Talking about models

1. Understanding and applying models (Using the ray model of light to understand images through apertures)
2. Extending models (Including lenses)
3. Creating our own models! (Students design and answer their own research question)





# The classroom

- Small group vs. large group
- Coming to consensus on results and future questions for study
- Graduates students act as advisors for research groups





# Talking about models

“[A model is] a useful representation of a physical phenomena in a particular context that aids in understanding.”

(Discussion included falsifiability, self-consistency, applicability, “accurate vs. inaccurate”)



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# Other Challenging Problems

## **For undergrads, adjusting to college:**

- Working in study groups
- Approaching TAs and professors
- Reflecting on grades

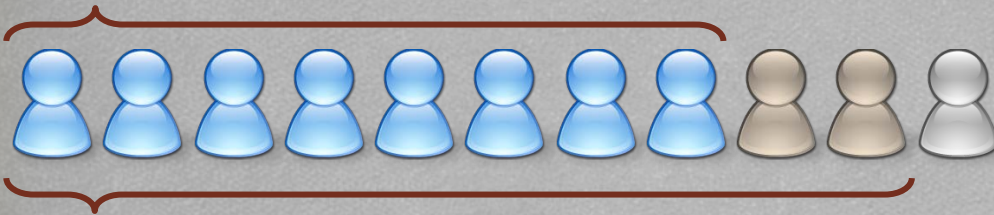
## **For grads, learning to teach:**

- Co-teaching
- Teacher training and guidance in curriculum development
- Education journal club



# Group work

**8/11** of **fall** compass students taking physics worked more than half the time in groups (mostly on homework).



**10/11** worked in groups at some point.

**8/8** of **spring** compass students taking physics worked more than half the time in groups (mostly on homework).





# Navigating the university

**13/13** met at least a few times with a math or physics professor or TA.



**9/13** met regularly (at least monthly).



# **Student Ownership (Leadership)**



# Undergrads in Leadership

Compass is not a program done **to** or **for** students, it is a program **of** and **by** students.

Undergraduates **shape** Compass by taking on leadership roles.

Leadership allows undergraduates to have a sense of **ownership**.



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# Undergrads in Leadership

In Compass, if you want to **see** something done, you can go out and **do it**.

When Compass needed someone to coordinate the Lecture Series, I did it!



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# Undergrads in Leadership

Undergraduates do more than fill leadership roles: they **advocate** for and create changes in the program.

Three undergraduates **created** a scavenger hunt day to help students learn how to work together and transition from the summer into the Summer Program.



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# Undergrads in Leadership

It worked because:

- Graduate students provided mentorship and support
- We were treated as peers in the organization

It helped us to:

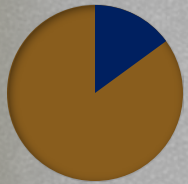
- Learn to coordinate and be organized
- Learn how to advocate for ourselves
- Dream big ideas!



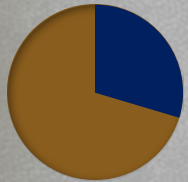
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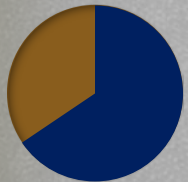
# Undergrads in Leadership



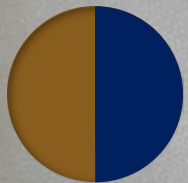
**15%** of Compass Undergraduates in leadership roles (event organizing, chairing a cluster, coordinating summer program).



**30%** of Compass Undergraduates have participated in structural decisions.



**65%** of Compass Undergraduates have volunteered time.



**50%** of people giving this talk are undergraduates.



# Recap: Core Values



**Strong  
Community**



**Challenging  
Problems**



**Student  
Ownership**





# Acknowledgments

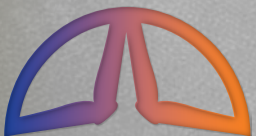
- UC Berkeley Physics, Astronomy, and Earth & Planetary Sciences departments
- Frances Hellman, Bernard Sadoulet, Colette Patt, Claudia Trujillo
- UC Berkeley Vice Chancellor for Equity and Inclusion, Dean of Letters and Sciences, NSF
- APS



# A question for you

(while we answer your questions)

**Consider the values (strong community, challenging problems, and student ownership) we have just presented. How do you or would you apply them at your home institutions?**



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