



# UC STEM Faculty Learning Community Webinar

## A Role for STEM Centers for Teaching and Learning in Changing the Teaching Culture

Presented by: Dr. Erin Sanders, Director  
UCLA's Center for Education Innovation and Learning  
in the Sciences (CEILS)

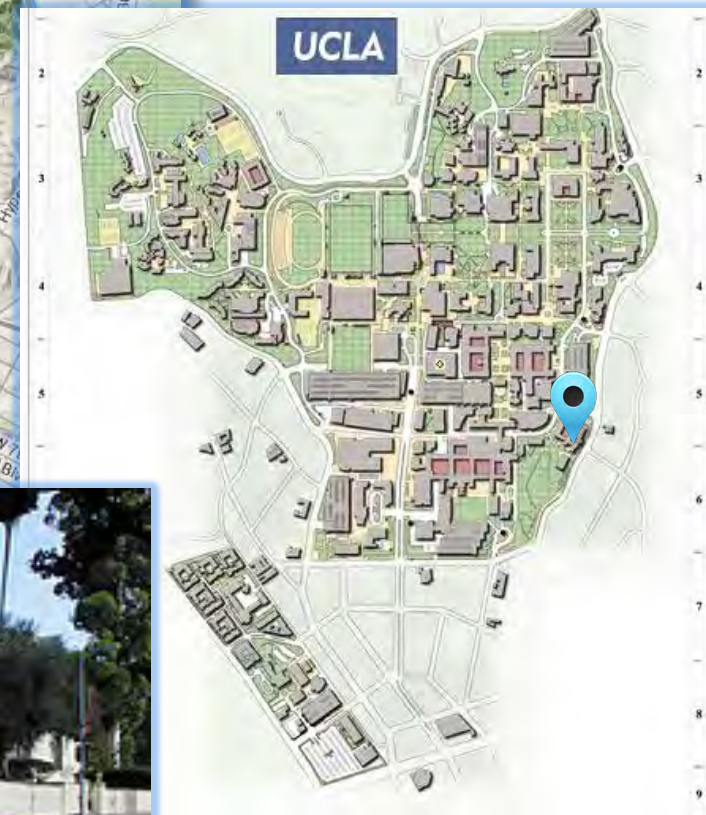
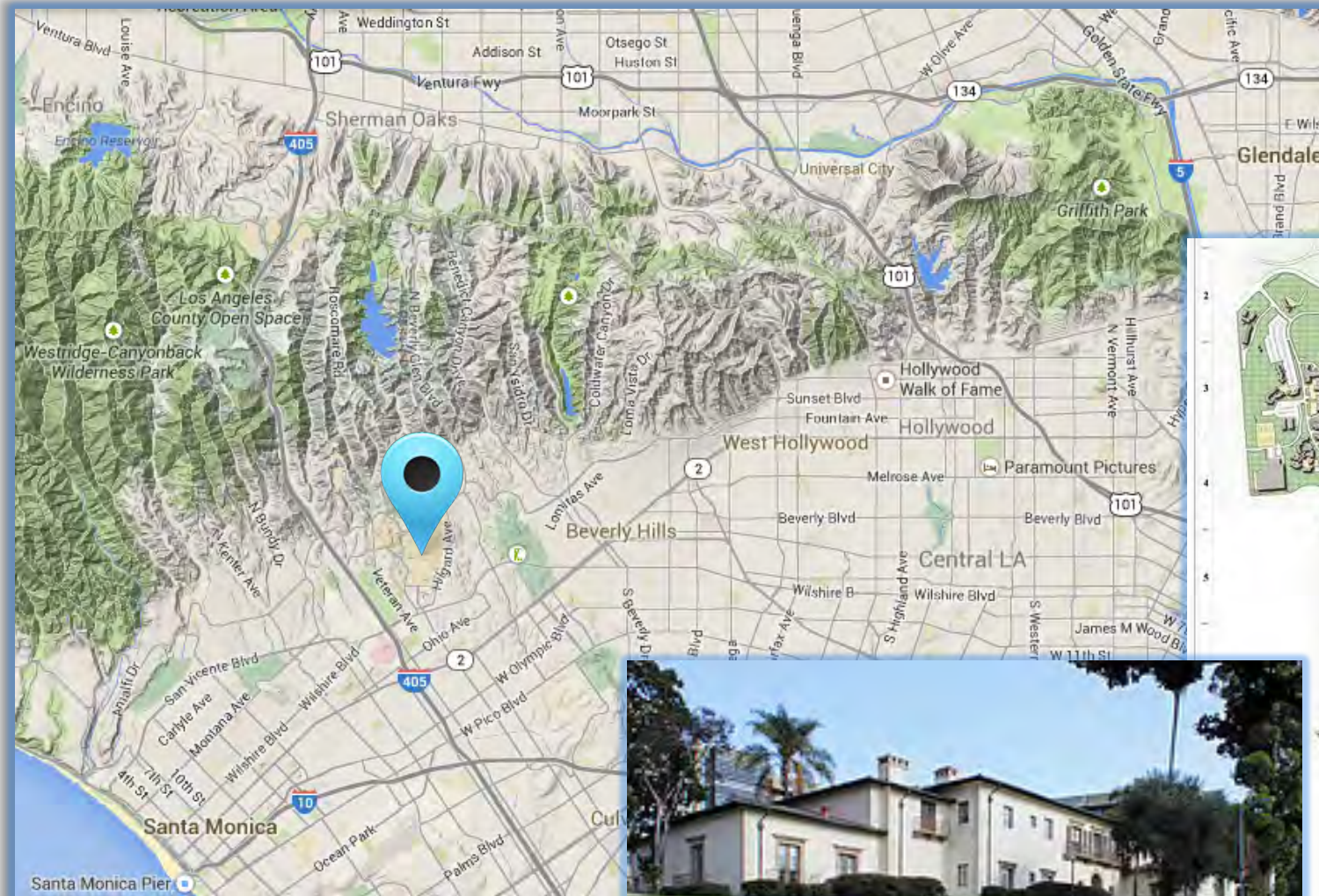
Sponsors



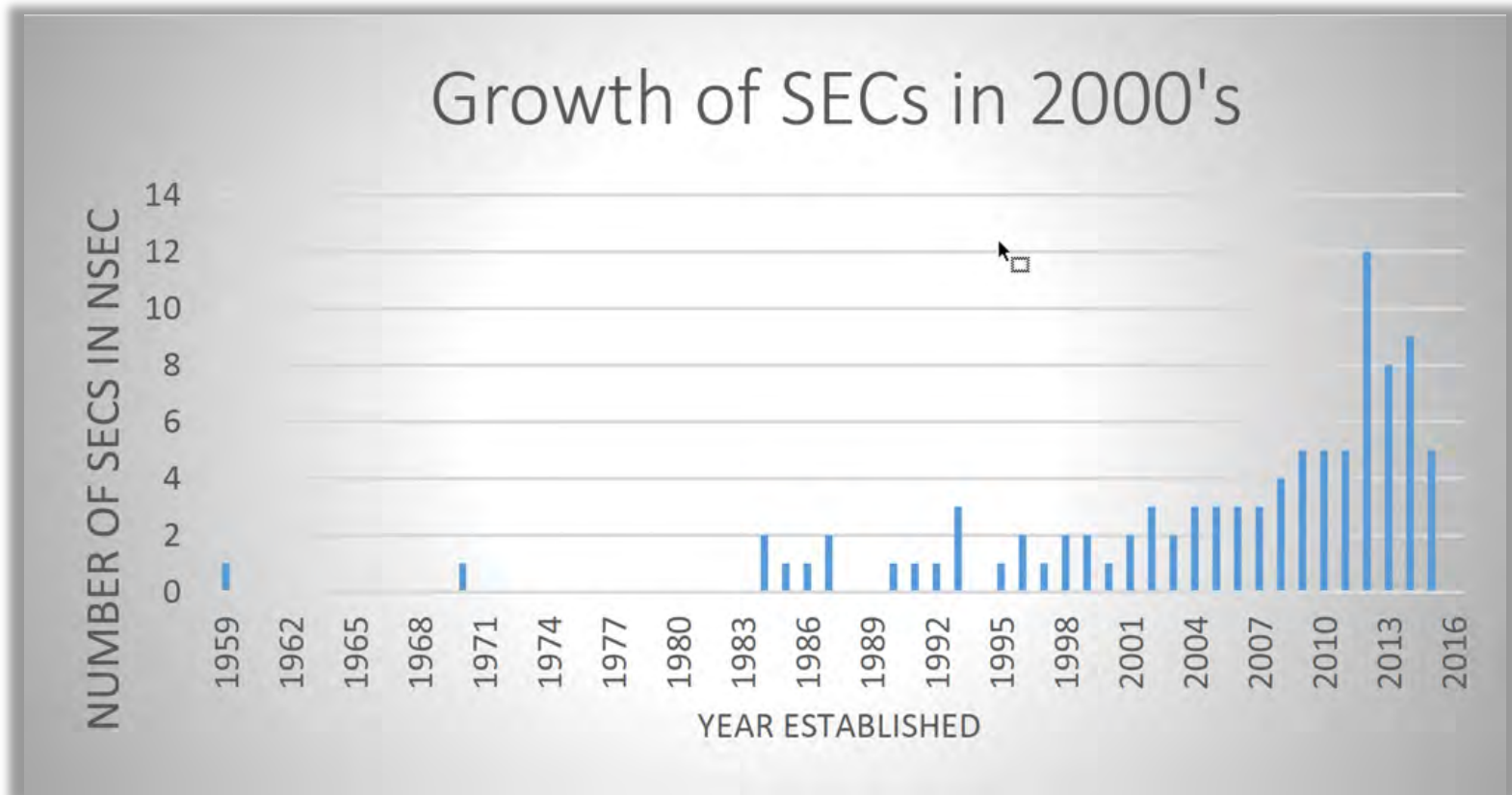
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# UCLA CELLS

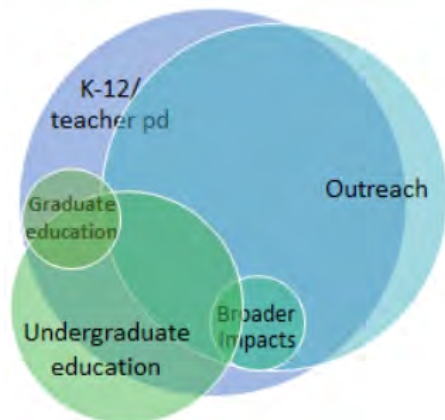
Center for Education Innovation & Learning in the Sciences



# CEILS Established in 2013



Source: Data is from 93 Centers with NSEC profiles.



**NSEC**

Network of STEM Education Centers



# NSEC

Network of STEM Education Centers

## STEM Education Center Toolkit

There are as many ways of organizing the activities and people of a center as there are centers. But that doesn't mean that there aren't some common lessons to be learned. Each section of the Toolkit draws on the real experiences of centers to illuminate guidance and best practices in a particular area of activity.

### About the Toolkit



#### Communicating Vision and Mission

Time spent developing vision and mission statements is an investment in success, but being able to communicate that vision and mission is just as important.

[read more »](#)



#### Organizational Structures

There are as many ways of organizing the activities and people of a center as there are centers. But that doesn't mean that there aren't lessons to be learned.

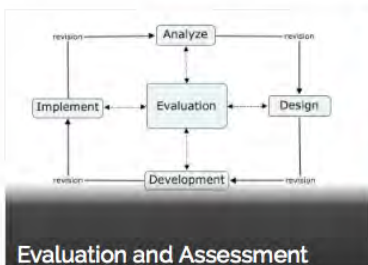
[read more »](#)



#### Funding and Resources

There are multiple, interconnected parts to funding and supporting center activities. Each is important and needs to be understood in terms of how all of them play together as a system.

[read more »](#)



#### Evaluation and Assessment



#### Building Partnerships

<http://serc.carleton.edu/StemEdCenters/toolkit/index.html>

2016

## Collaborating at the Centers

REPORT FROM A STEM EDUCATION TRANSFORMATION WORKSHOP INVOLVING LEADERS OF CENTERS FOR TEACHING AND LEARNING AND STEM EDUCATION CENTERS

CASSANDRA HORII, KACY REDD, MATHEW OUELLETT, NOAH FINKELSTEIN, ANDREA BEACH, DEBORAH CARLISLE, SUSAN SHADLE, AND GABRIELA WEAVER



JOINT REPORT FROM THE POD NETWORK IN HIGHER EDUCATION, <http://podnetwork.org/>, AND THE NETWORK OF STEM EDUCATION CENTERS, <http://serc.carleton.edu/StemEdCenters/index.html>

# Key Insights from NSEC Report

## Campuswide Centers for Teaching and Learning (CTLs) vs. Discipline-based CTLs such as STEM Centers for Teaching and Learning (SECs)

- Complementary strengths
- Differentiated areas of expertise

### SECs and CTL Shared Expertise

- **Pedagogical expertise.** CTLs' expertise is more general and can span across disciplines, though is often well informed about STEM-specific evidence-based practices. SECs tend to have deep knowledge of STEM pedagogy informed by DBER (Discipline Based Educational Research).
- **A connection to student success efforts on campus.** Generally, SECs are connected more directly to students than CTLs. Both CTLs and SECs have experience working with identified groups of STEM faculty on issues of student learning and persistence in STEM.
- **Involvement in institutional culture change.** Both CTLs and SECs have experience working across departments/units of an institution to impact organizational change (catalyzing important discussions); building interdisciplinary networks by bringing individuals and units together for different purposes. For SECs, institutional change efforts are focused on STEM education reform. For CTLs, such efforts may be STEM-specific or may be more general across disciplines.
- **Shared commitment to scholarly approaches.** CTLs and SECs are informed by literature, and centers work collaboratively across unit boundaries to address teaching and learning challenges/institutional needs.

\*CEILS is a discipline-based CTL in STEM, or SEC



Erin Sanders  
*Director*



Shanna Shaked  
*Senior Associate Director  
Physical Sciences  
Initiatives & LA Program*



Rachel Kennison  
*Associate Director  
Professional Development  
& Student Engagement*



Jess Gregg  
*Associate Director  
Educational  
Development*



Ann Mao  
*Administrative  
Assistant*

## Combined, we have...

- **3 PhDs (in Life and Physical Sciences)**
- **3 Master's Degrees (in Teaching, Social Work, & Psychology)**
- **Decades of experience in pedagogy, instructional design, and fostering student success**

# CEILS Instructional Consultants



Jordan Moberg Parker  
*Life Sciences*



Debra Pires  
*Life Sciences*



Gaston Pfluegl  
*Life Sciences*



Heather Tienon  
*Physical Sciences*



Joshua Samani  
*Physical Sciences*



Beth Goodhue  
*UCLA Center for  
Community Learning*

# Faculty Advisory Committee

## Life Sciences

Blaire Van Valkenburgh, Assoc. Dean (ex officio)

Stephanie White, Neuroscience

Jeff Long, MCDB

Lawren Sack, EEB

Barbara Knowlton, Psychology

Frank Laski, LS Core

Beth Lazazzera, MIMG

Aaron Panofsky, ISG

Patricia Phelps, IPB (Chair)

Van Savage, Biomathematics

## Physical Sciences

Albert Courey, Assoc. Dean (ex officio)

Miguel Garcia-Garibay, Dean (ex officio)

Robert Gould, Statistics

Don Blasius, Math

Yung-Ya Lin, Chemistry & Biochemistry

Ian McLean, P&A (Chair-Designate)

Cully Nordby, IoES

Giles Peltzer, EPSS

Jochen Stutz, AOS

Sylvia Hurtado, School of Education

# CEILS Mission

CEILS creates a collaborative community of instructors committed to advancing teaching excellence, assessment, diversity, and scholarship, resulting in the enhancement of student learning experiences in the Life and Physical Sciences at UCLA.



# CEILS Goals

1. Provide faculty a **language taxonomy** to discuss equity and inclusion

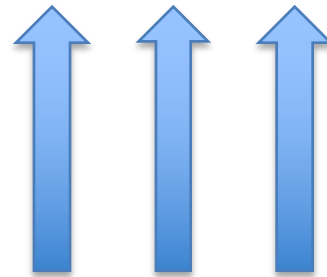
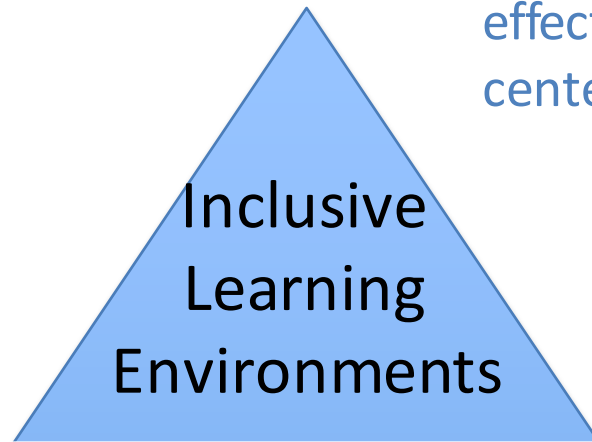
2. Offer faculty a **learning community** to share and discuss teaching practices

3. Give faculty **access to data** that tracks the disparities but also documents the improvements

4. Engage faculty in **training** to effectively implement student-centered pedagogies & practices

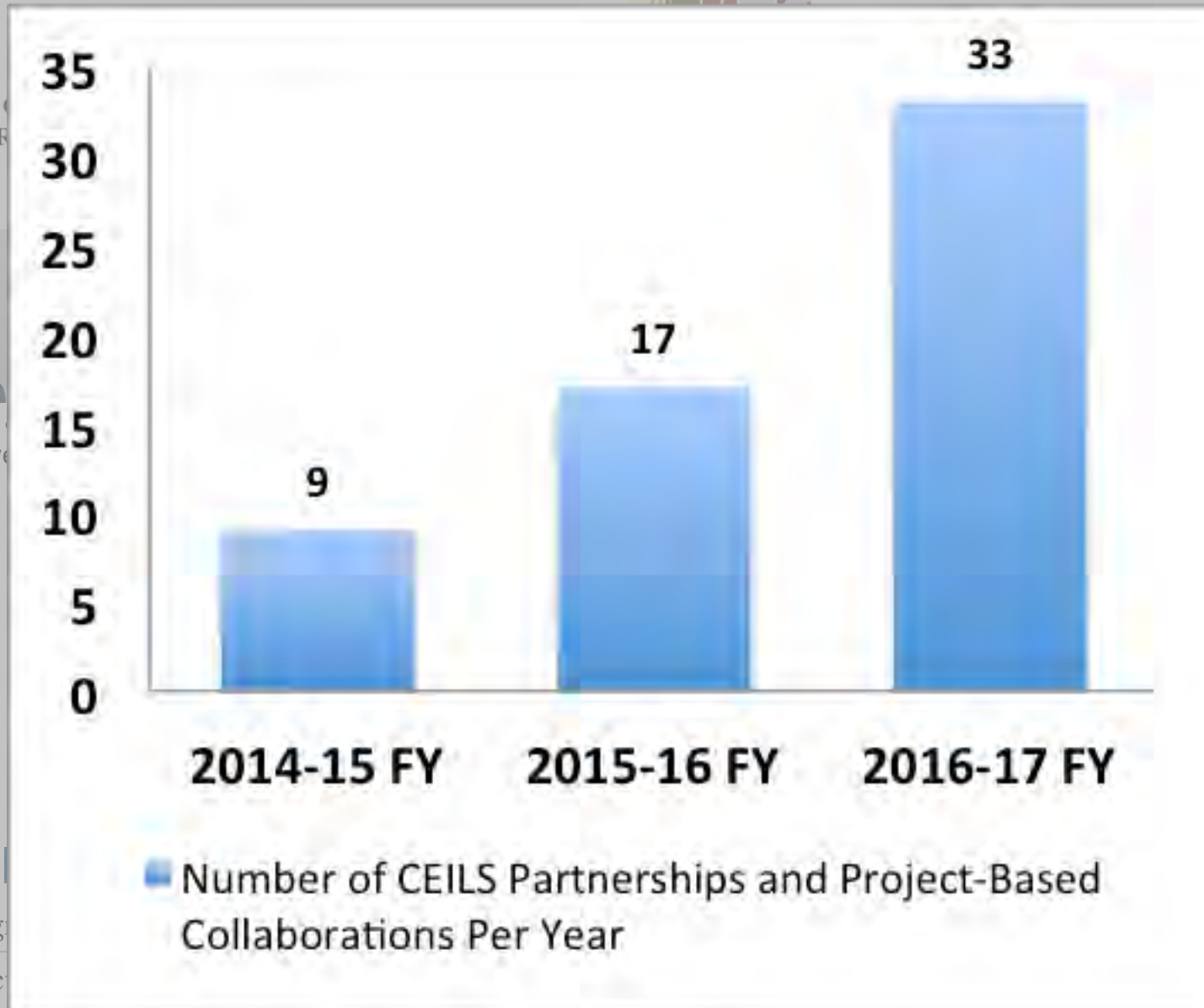
5. Provide faculty **resources** (e.g., grant development, Learning Assistants) to support efforts to improve their teaching

6. Help faculty earn **rewards** for their success

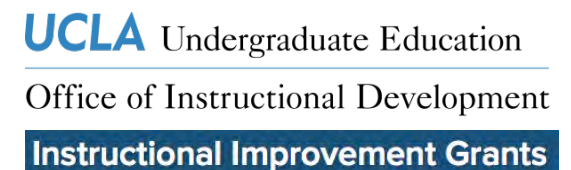
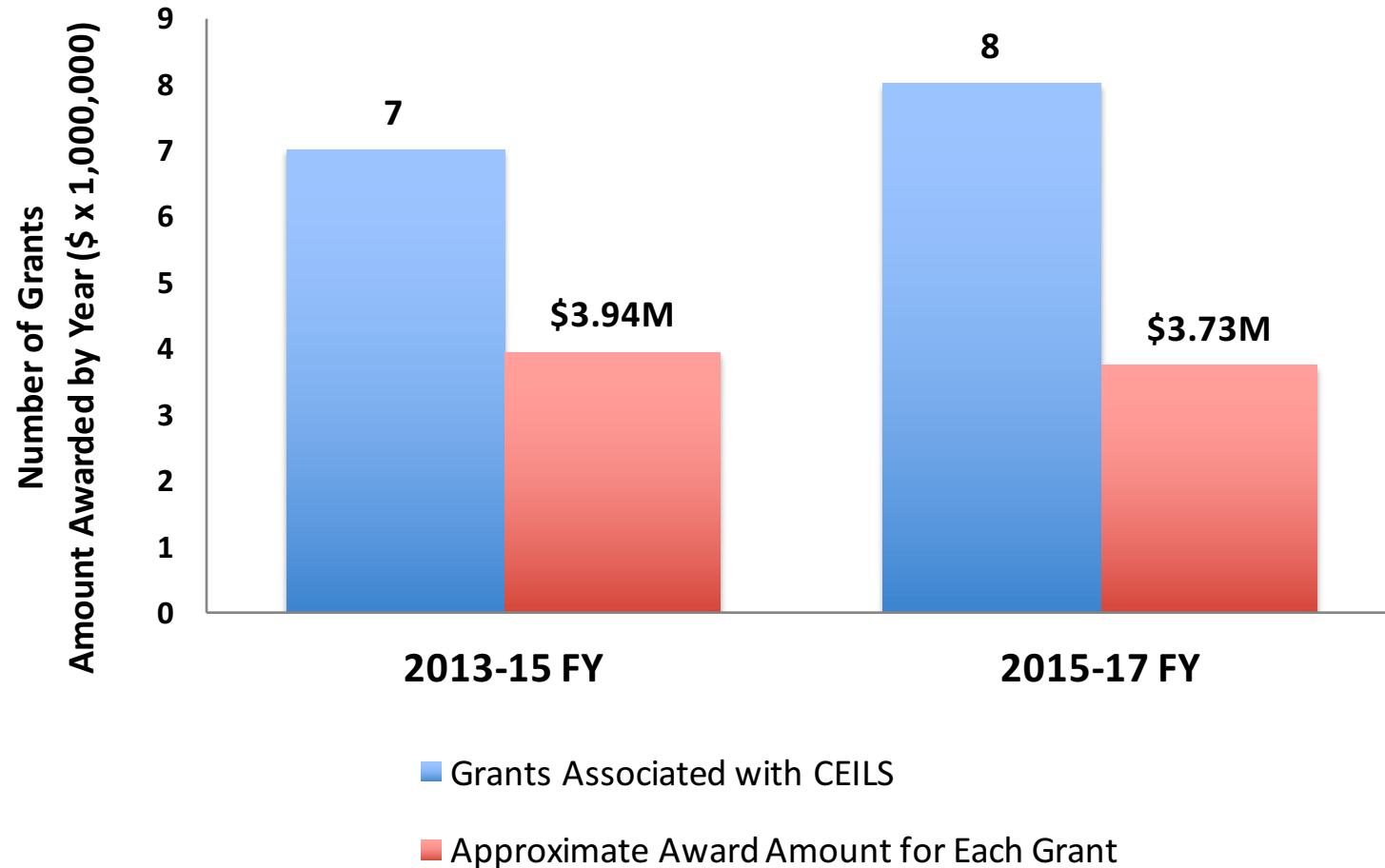


Faculty Teaching  
in Undergraduate Classrooms

# Expanding Partnerships

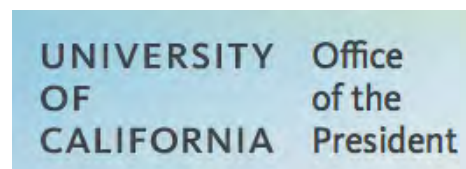


# Almost \$8M in Grants Supporting Transformations in Undergraduate Instruction



# CEILS: Current Grants & Awards

- Implementation of Student-Centered Pedagogy, Its Impact on Learning, Persistence, and the Teaching Culture  
**(NSF IUSE, \$1.8M; PI: Blaire Van Valkenburgh, 2014)**
- The BD2K Concept Network: Open Sharing of Active Learning and Tools Online  
**(NIH R25, \$600K; PI: Christopher Lee, 2014)**
- Collaborative Research: CIRTl INCLUDES – Toward an Alliance to Prepare a National Faculty for Broadening Success of Underrepresented 2-Year and 4-Year STEM Students **(NSF INCLUDES, \$10K - Collaborative Proposal with CIRTl; PI: Erin Sanders, 2016)**
- UPLIFT: UCLA Postdocs' Longitudinal Investment in Faculty Training  
**(NIH IRACDA, \$2.5M; PIs: Michael Carey & Tracy Johnson, 2016)**
- Building a Framework to Integrate STEM Curricular and Co-Curricular Innovations at UCLA **(AAU STEM, \$20K; PIs: Gina Poe & Megan McEvoy, 2017)**
- Committing to Inclusive Excellence: The UCLA Transfer Success Program **(HHMI, \$1M; PI: Tracy Johnson, 2017)**



# Teaching Development Opportunities for Science Faculty

Bringing Theory to Practice

CEILS BTtoP Workshops 

- Active Learning for Inclusive Classrooms
- Creating Equitable Classroom Discussions
- 10+ Strategies for Getting Feedback from Students
- Increasing Student Engagement Through Interactive Polling (clickers)
- Designing Your Course Syllabus
- Flipping your Class with *Camtasia*, a Tool for Interactive Screencasts
- Training Workshop for Using COPUS, the Classroom Observation Protocol for Undergraduate STEM Courses

# Other Teaching Development Opportunities for Science Faculty

- Annual UCLA Faculty Workshop on Best Practices in Teaching (**September 20, 2017**)
- Summer Institute for Transforming Undergraduate STEM Education (**July 24-28, 2017**)
- Faculty Learning Program to Improve STEM Undergraduate Teaching and Learning (**3 quarters**)
- Inclusive Excellence Faculty Retreat (March, 3 days)
- STEM Education Research Journal Club (weekly)
- Special Seminars by Visiting Scientific Teaching Scholars (1-2 per quarter)



Berkeley Center for Teaching & Learning

UCLA College  
Physical Sciences

UCLA College  
Life Sciences



hhmi  
Howard Hughes  
Medical Institute



How does CEILS specifically engage departments?

## **PROJECTS... with focused learning outcomes**

- Help faculty maximize their teaching potential
- Help faculty engage in current and innovative teaching practices
- Help faculty quantify their impact on students and improvements in their teaching

# Project: Consistent Syllabus Across Courses

How? Utilize resources on CEILS website

Teaching Guides

[Home](#) / [Teaching Guides](#)



DESIGNING YOUR COURSE AND  
SYLLABUS

ASSESSING STUDENT LEARNING

TEACHING TECHNIQUES FOR ACTIVE  
LEARNING

Designing Your Course and  
Syllabus

Assessing Student  
Learning

Teaching Techniques for  
Active Learning (Includes  
iClicker)

# Curriculum Transformation Projects

## *Life & Physical Sciences*

### Undergraduate Learning Assistants Program

- Trains undergraduate 'peer instructors' in collaborative learning techniques
- Implemented in science and math gateway courses
- Based on evidence-based, national model from CU Boulder

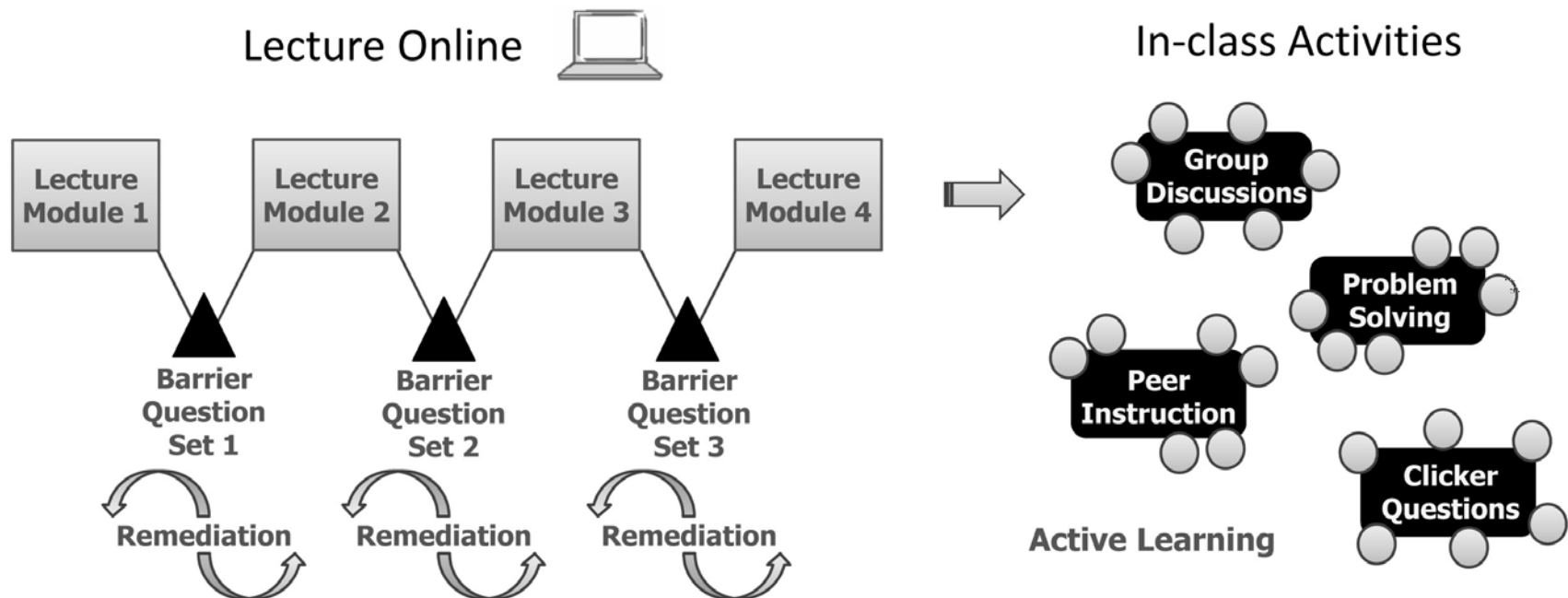


# Curriculum Transformation Projects

## *Life Sciences*

### Transforming Teaching in the Life Science Core

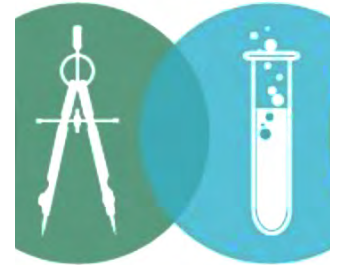
- Switch to highly structured, flipped (HSF) courses
- Impact: 8,000 undergraduates per year



# Curriculum Transformation Projects

## *Life Sciences*

### Transforming Mathematical Preparation of LS Majors



- LS30A, LS30B, LS20, Stats 13
- Goals
  - Improve student success and enhance quantitative preparation
  - Incorporate student-centered pedagogy, biological examples, and computational exercises into first-year math and statistics courses
  - Impact: Over 2,000 undergraduates per year
- Outcome
  - Improved academic performance of LS30 students in other science courses
    - LS30 completers earned A/A+ in Physics at twice the rate of students taking traditional Calculus courses
    - 60% of LS30 students earned a B+ or higher in Physics compared to only 40% of students completing traditional Calculus courses
    - Average GPA for LS30 students in Physics was a 3.3 whereas average GPA for Calculus students in same Physics course was only 2

# Curriculum Transformation Projects

## *Life Sciences*

### Career Exploration in the Life Sciences

- Credit-bearing opportunity to reflect on career matches and explore jobs outside of medicine and traditional academia
- Impact: Currently 100's of students
  - Goal is to reach 1000's per year



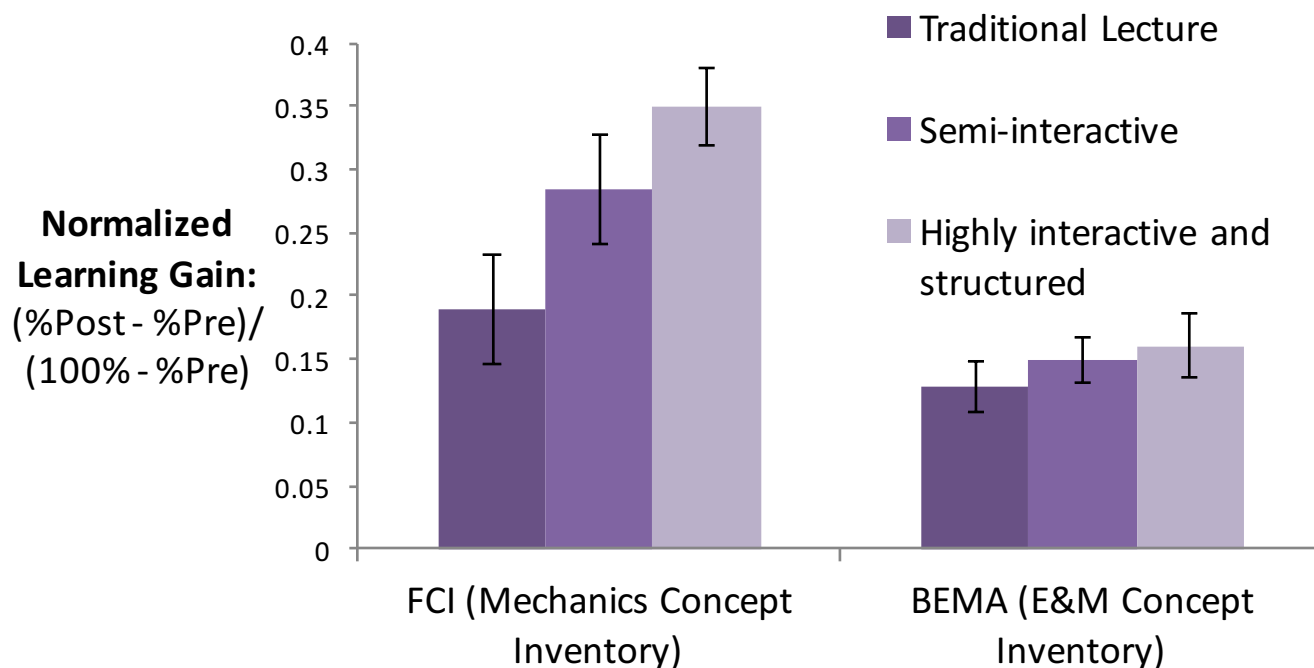
<https://ceils.ucla.edu/l110/>

# Curriculum Transformation Projects

## *Physical Sciences*

### Revision of Physics for Life Science majors

- Incorporate student-centered pedagogy and interdisciplinary instructional materials
- Impact: 800+ students per year



# Faculty Tools for Reflective Teaching:

## (1) Classroom Observations

Formative feedback facilitated by CEILS staff

- **Quantitative and “objective”**: Use COPUS app to record instructor and student behaviors; common for assessment of teaching practices (e.g., switch to flipped classroom)

OBSERVING AAS 010 SECTION 1 – ED SWITH

Student Actions				TIME		Instructor Actions			
L	Ind	AnQ	SQ	13:27:11		Lec	Rtw	D/V	PQ
Prd	CG	WG	OG	TIME REMAINING 0:49		CQ	AnQ	FUp	SUp
WC	SP	TQ	W	Engagement Level		MG	1o1	Adm	W
Other				L M H		Other			
+						+			
Comments									
SUBMIT									

# Faculty Tools for Reflective Teaching

## (2) Solicit Student Feedback

### Mid-quarter evaluations

- Get feedback from students about class activities, resources used for teaching, and classroom technology
- Easy to integrate into CCLE and customize questions

Tutorial available on YouTube (<https://youtu.be/1ZkU192EJa0>)

### Center for Education Innovation and Learning in the Sciences (CEILS) Mid-quarter Course Evaluation

*This survey represents a serious attempt to obtain feedback from students regarding the class activities, resources, and technology that the instructor is using to help students engage with material and learn in this course. Your honest and constructive opinion will be very useful in helping your instructor make changes in the course now to help you learn the material better while you are still enrolled in the course. So please answer each of the following questions truthfully.*

Why did you enroll in this course? (answer all that apply)

- ☐ Required course for my major
- ☐ Elective course for my major
- ☐ Interest in or curiosity about the topic
- ☐ No other course options available this term
- ☐ Other



# Faculty Tools for Reflective Teaching

## (3) Data Analytics Dashboards

### Course Performance Disparity Tool

- Provides visualizations that facilitate discussions promoting changes in the classroom that lessen the disparities between groups



 Tableau Dashboard

Developer: Kelly Wahl, UCLA

# Supporting Future STEM Faculty:

## *Training Opportunities for Graduate Students & Postdocs*



- National network of which UCLA is now a member
  - Supports professional development of STEM graduate students and postdocs in their preparation for a career in academia that involves teaching undergraduates
  - Provides training and resources to future faculty in inclusive teaching and active learning
- 
- Prestigious national program that provides funding for postdocs dedicated to academic careers that involve teaching and research
  - Offers research mentoring and teaching development as well as a teaching practicum at CSULA

# UPLIFT

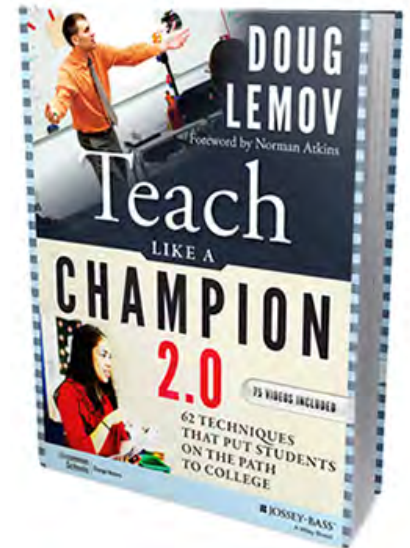
UCLA Postdocs Longitudinal Investment in Faculty Training

# Supporting Future STEM Faculty:

## *Training Opportunities for Graduate Students & Postdocs*

### **Educational Development Workshop** for Teaching Assistant Coordinators (TACs) and Faculty Advisors in the Sciences (**August 22-23, 2017**)

- Train-the-trainer workshop to help prepare instructors (TACs) of departmental TA Training courses
- Focuses on inclusive teaching practices that facilitate equitable class discussions and collaborative learning



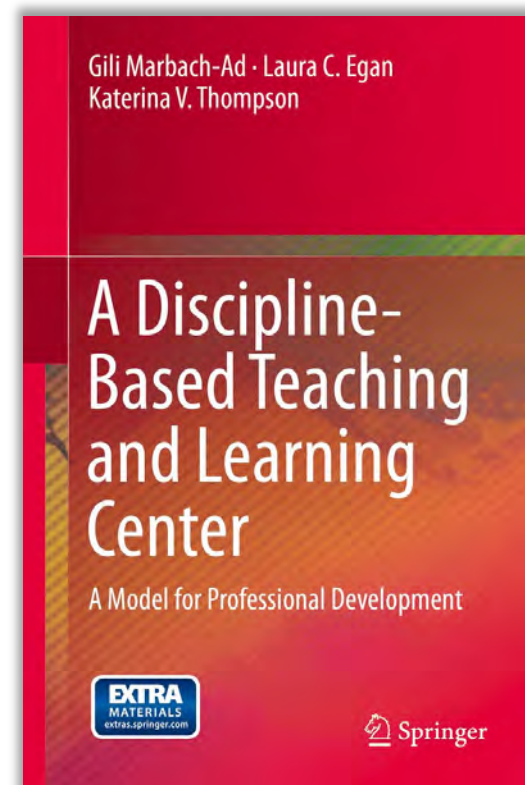
**On demand follow-up:** Upon request of TACs, CEILS staff offers supplemental support to TA Training classes and departmental bootcamps/workshops

# CEILS

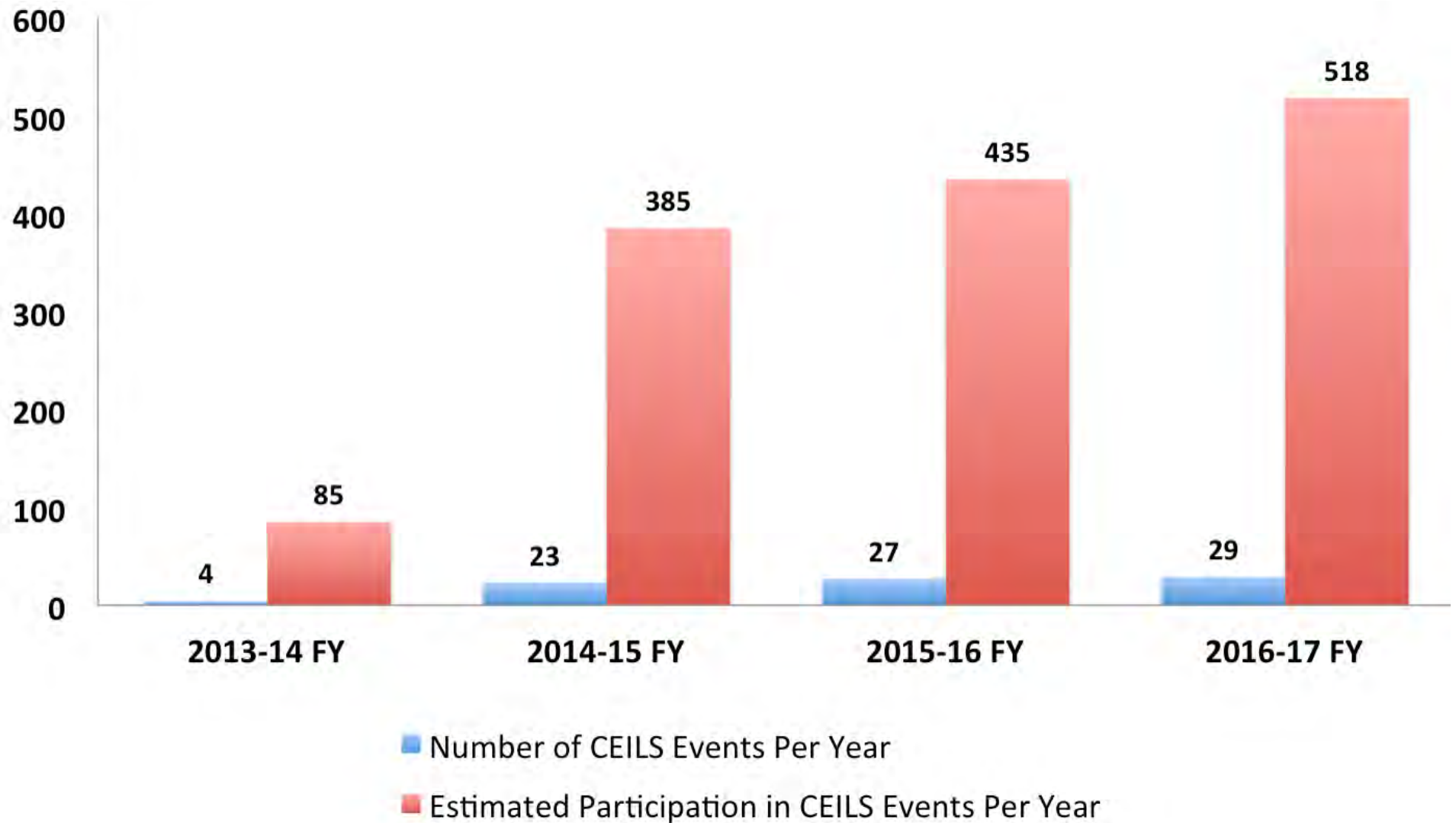
*How do we know it's working?*

## CEILS Engagement Tracker

- 5 levels of impact
  - **Participation** (number of attendees categorized by position, department)
  - **Satisfaction** (exit surveys)
  - **Learning** (exit surveys)
  - **Application** (follow-up through individual consultations, classroom observations, interviews, and self-report)
  - **Longitudinal Outcomes** (follow-up using institutional data tracking student learning gains, NP rates, persistence, course grades, etc.)



# CEILS Engagement: Participation



# CEILS Engagement: Application

**AOS:** Department has shifted to most faculty using clickers and/or some form of active learning.

**EPSS:** Chair has adjusted the grading scheme for his 400-student class, no longer grading on a curve.

**LS Core:** Chair is consulting with CEILS on grading strategies for new introductory life science series for first-year direct admits.

**IBP and MCDB:** Incorporating learning outcomes into syllabi.



# UCLA CEILS

Center for Education Innovation & Learning in the Sciences



Questions?

Thank you!

<https://ceils.ucla.edu>