



Council on Undergraduate Research

*Learning Through Research*

**To Scale-Up and Scaffold Undergraduate Research:  
Developing Pathways for Student, Faculty, and  
Institutional Change**

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**SERP Institute  
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# Council on Undergraduate Research

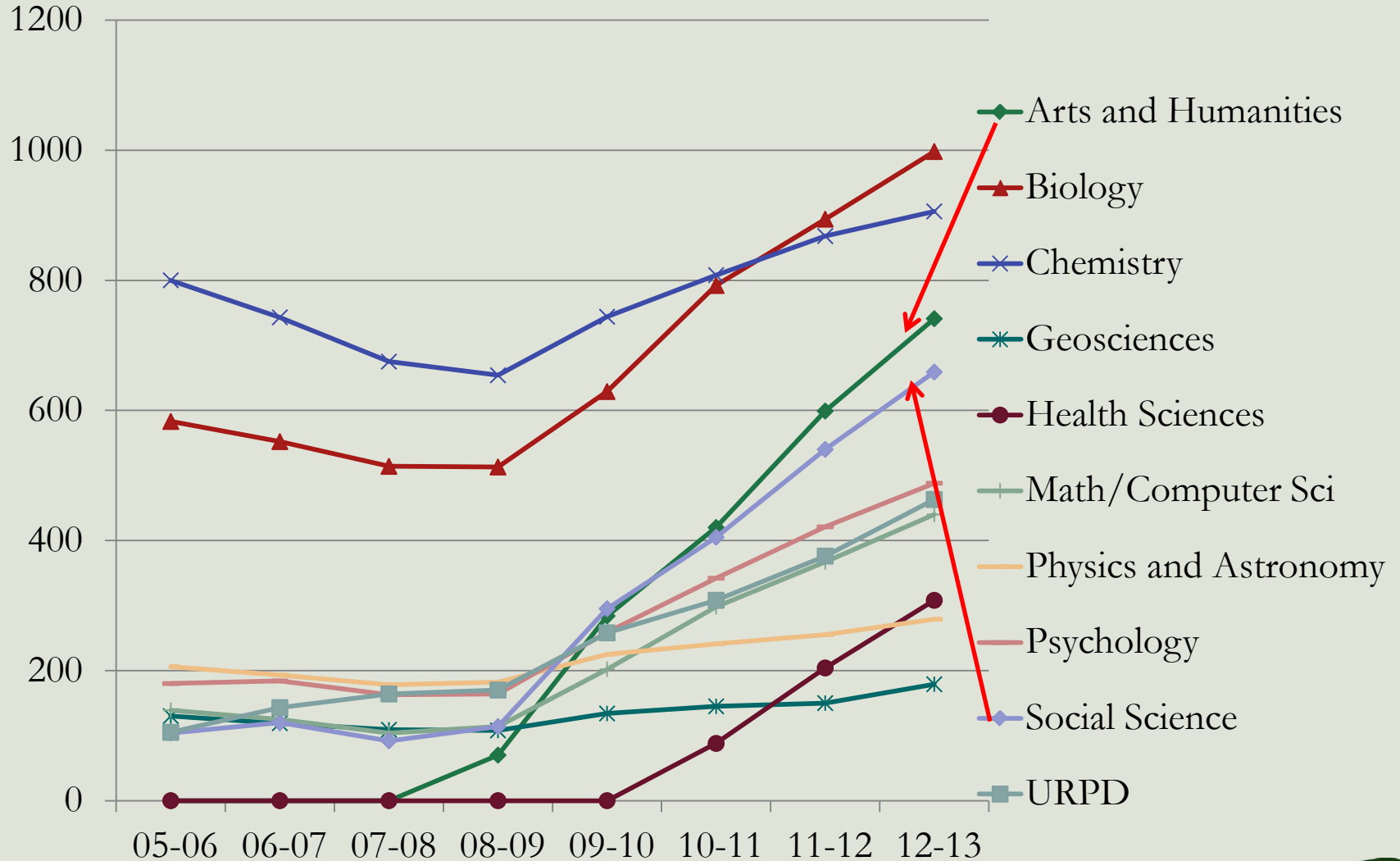
- **A national organization** of individual (>10,400) and institutional (>690) members representing all disciplines and over 900 institutions of all types.
- Ten **discipline-based divisions**: Arts & Humanities, Biology, Chemistry, Geosciences, Health Sciences, Mathematics & Computer Science, Physics & Astronomy, Psychology, Social Sciences, [Engineering](#).
- Two **multidisciplinary, administrative-based divisions**: At-Large and Undergraduate Research Program Directors.

**The mission of CUR is to support and promote high-quality undergraduate student-faculty collaborative research and scholarship.**



# CUR Disciplinary Membership Patterns

## Exhibit Broadening of Undergraduate Research's Appeal



# CUR Resources

That promote and support undergraduate student-faculty research and scholarship

## MEETINGS

National Faculty Conferences

National Conference on  
Undergraduate Research

CUR Dialogues

Institutes & Workshops

Posters on the Hill

## SERVICES

Consulting Service

Mentor Network

Grant Preview Service

CUR Fellows/Goldwater Scholars

Awards

Listservs

Advocacy

## PUBLICATIONS

*CUR Quarterly*

“How To” Series

Specialized Volumes



# National Conference on Undergraduate Research 2014



# SERP Attendees and CUR

- More than 70% of institutions attending this conference have been engaged with CUR within the past five years
  - Publications in CUR Quarterly
  - Attending CUR meetings
  - CUR members




# SACS QEP's – Role of Undergraduate Research


- Some examples: Valdosta State University, University of Houston; Georgia Southern University, Louisiana State University, University of North Alabama, Trevecca Nazarene University, University of North Carolina Chapel Hill, Florida Atlantic University, College of William and Mary, Georgia Tech, George Mason, Florida Gulf Coast University, etc.
- Inaugurated at various times over the last decade
- Many now coming to end of implementation phase – into assessment

# Key Question Cycle

WHY?



How can we  
scale up and  
scaffold  
undergraduate  
research?



But  
first.....

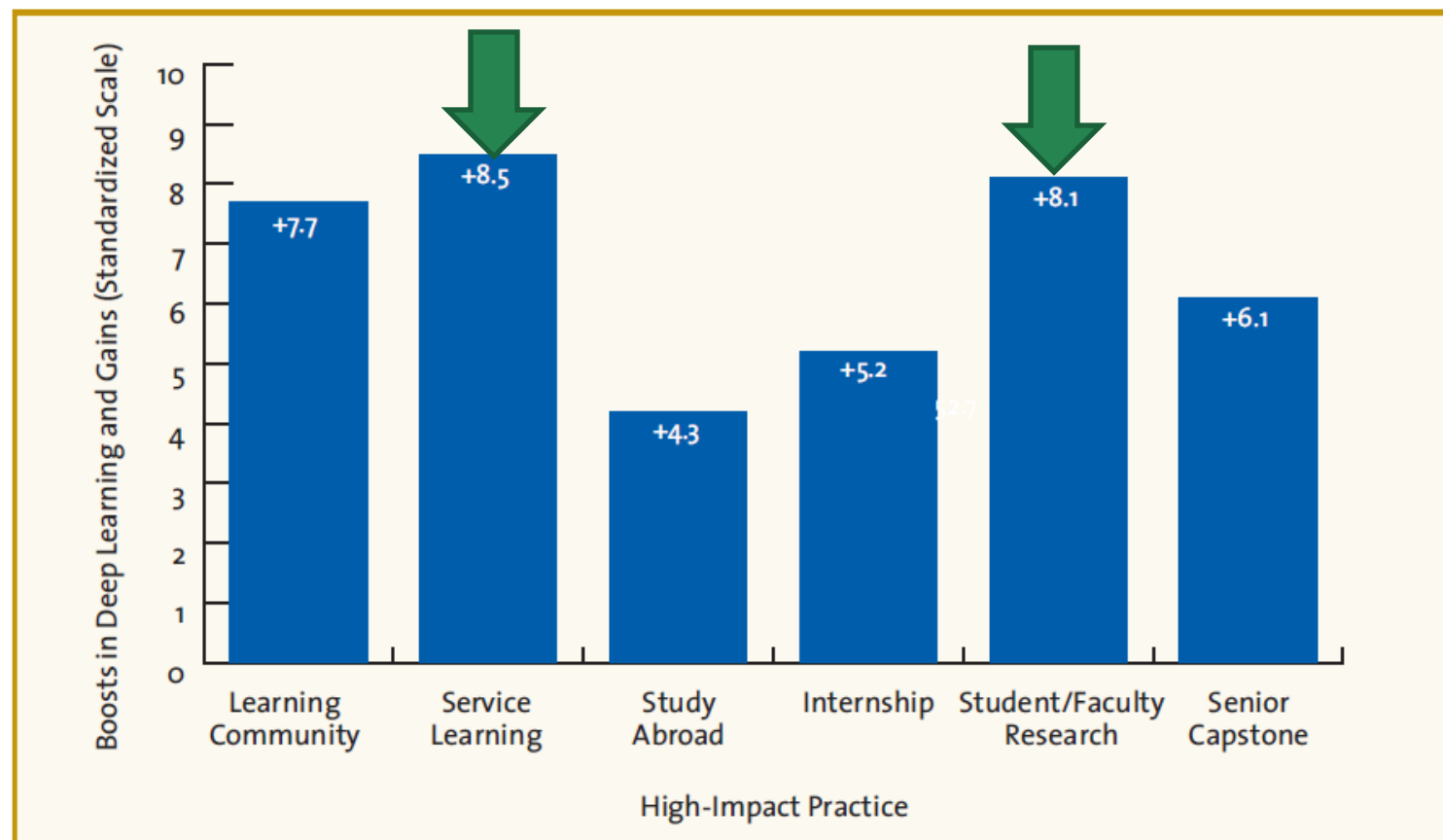


# UGR: Success Domains

- Increased aspirations and persistence
- Core STEM professional competencies
- Mentorship and learning communities

# High Impact Practices: Effect on Underserved Undergraduates (Finley & McNair, 2013)

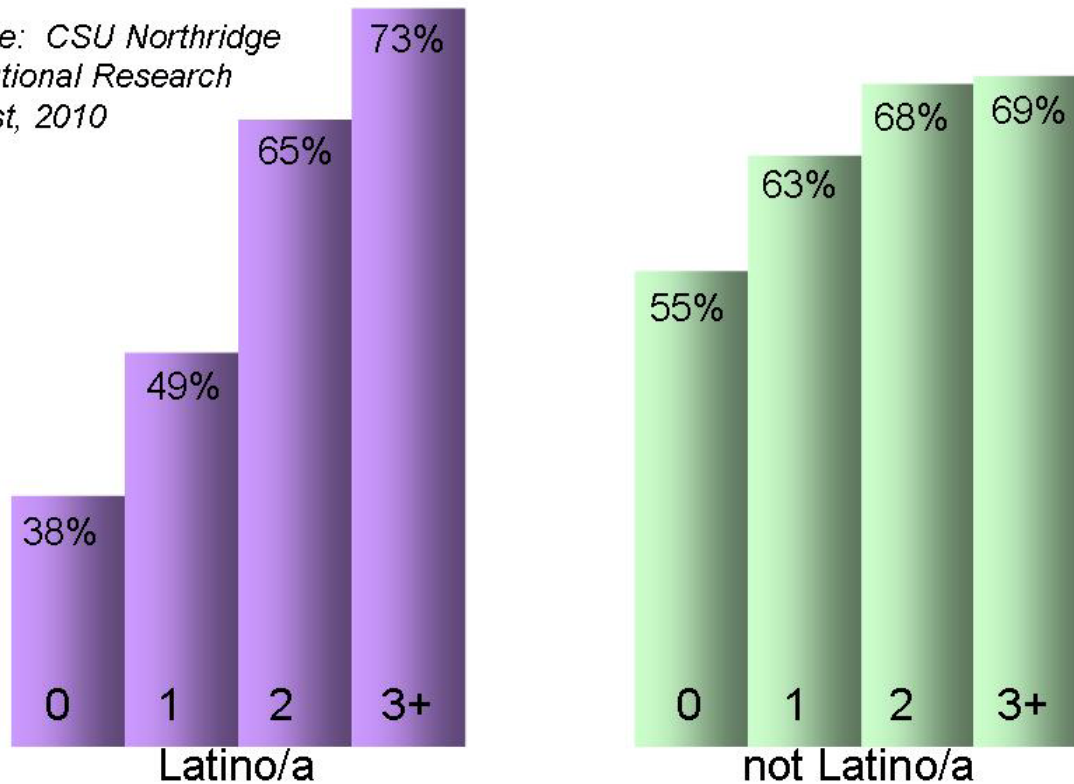
Average Boost to Students' Perceptions of Their Deep Learning and Gains  
by Participation in Specific High-Impact Practices



# California State University Data Demonstrate HIP Effectiveness

## CSU Graduation Rates by Ethnicity and participation in High-Impact Practices

Source: CSU Northridge  
Institutional Research  
August, 2010



Source: B. Huber, CSU Northridge Institutional Research



# UGR: “First Among Equals”

- Federal funding of research provides significant support for UGR, allowing institutions to leverage other resources
- Faculty advancement tied to research, teaching, and service: UGR can support all three
- Other high-impact practices and student success initiatives can be included in UGR programming, particularly with centralized UGR office



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## President's Council of Advisors on Science and Technology

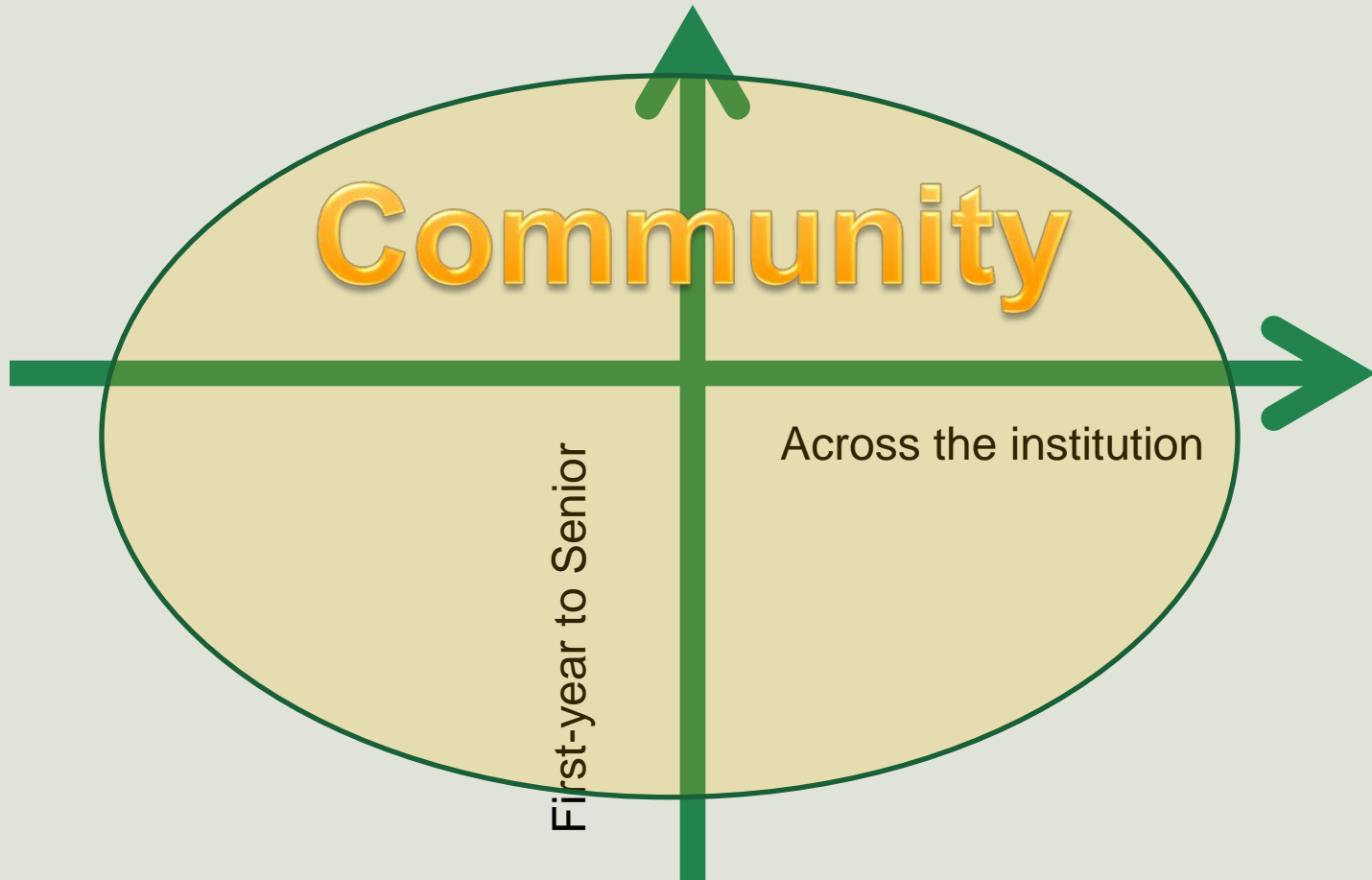
Undergraduate Research:  
A Right Not a Privilege

*PCAST Recommendation: Advocate  
and provide support for replacing  
standard laboratory courses with  
discovery-based research courses.\**

\*From: PCAST Report: "Engage to Excel", released February 27, 2012



# UGR Expansion: Horizontal and Vertical Integration



# *Undergraduate Research: A Variety of Modes*

- Summer immersion
- One-on-one mentoring for semester or year-long projects
- Research-based curriculum (primarily upper division)
- Research-infused curriculum (often lower division)



Decreasing  
cost per  
student

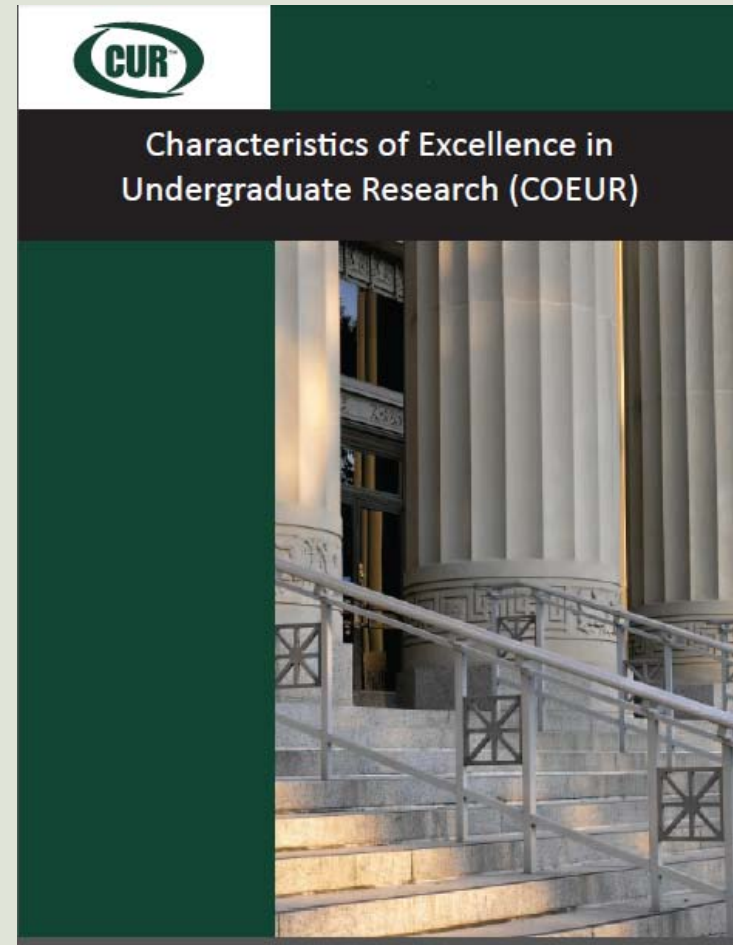


# UGR: Scaling up and Scaffolding – HOW?

- Institution-wide
  - *Characteristics of Excellence in Undergraduate Research* best practices
- Department or College-based
  - Curriculum redesign to emphasize research
  - Alignment of faculty recruitment, retention and advancement

# COEUR – Characteristics of Excellence in Undergraduate Research

- ❖ Key Success Factors:
- ❖ Establishment of central UGR campus office
- ❖ Extensive student/faculty participation in campus, regional, and/or national UGR celebratory events
- ❖ Development of consistent assessment of UGR's impact
- ❖ Establishment of policies for recognizing/rewarding faculty engagement in UGR



Available FREE on the CUR website



# Four Main Topics for SERP

EASY

- How do we incorporate more student research into upper division courses?
- How do we integrate research across the curriculum?
- How do we improve the effectiveness of faculty mentors?
- If we recognize that the department is the unit of change, how do we effect that change?

HARD

# How Do We Incorporate More Student Research Into Upper Division?

- Is research a significant part of your department's undergraduate major degree requirements at the upper division level?
- If *yes*, what form(s) does/do this requirement take?
- If *no*, what are some of the reasons why this has not occurred?

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HARD

# Promising Practice: HHMI SEA PHAGE

- Investment by Howard Hughes Medical Institute supported Science Education Alliance to insert phage discovery (associated with soil bacterium) into introductory biology  
(<http://www.hhmi.org/programs/science-education-alliance>)
- Based on program developed by Graham Hatfull at University of Pittsburgh

# Question:

- Is research scaffolded through your curriculum as a developmental process, with attention to research skill development?



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HARD

# Promising Practice: Elon University CEL

- Elon University has initiated a multi-year institute for faculty practitioner/researchers interested in investigating aspects of the faculty-mentored undergraduate research experience
- <http://www.elon.edu/e-web/academics/cel/mentoringur/>

# Question

- In there a feedback process in place whereby faculty mentors receive input from students they have mentored, other faculty and/or staff (particularly those with expertise in student development) on their performance as a mentor?

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HARD

# Promising Practice: University of San Diego Chemistry Department

- Curriculum designed with research focus
- Department of Chemistry and Biochemistry at USD develops shared goals for scholarship, including planned grants and publications
- Meet frequently as a department to revisit progress toward goals
- Received award from RCSA for department development
- <http://www.sandiego.edu/cas/chemistry/>

# Promising Practice: CSU Dominguez Hills Anthropology

- Entire curriculum is built around student research
- Faculty hired with expectation that they will work as a team and incorporate research into the curriculum
- Students have on-line research journal
- <http://www.csudh.edu/anthropology/>



# FACULTY SUPPORT AND UNDERGRADUATE RESEARCH: Innovations in Faculty Role Definition, Workload, and Reward



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Council on Undergraduate Research



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