



Council on Undergraduate Research

Learning Through Research

Connecting Diverse Stakeholders to Scale-Up and Scaffold Undergraduate Research: Developing Blueprints for Student, Faculty, and Institutional Change

**Elizabeth Ambos
Executive Officer
Council on Undergraduate Research**

**Project Kaleidoscope – Southern California Annual Meeting
February 1, 2014**



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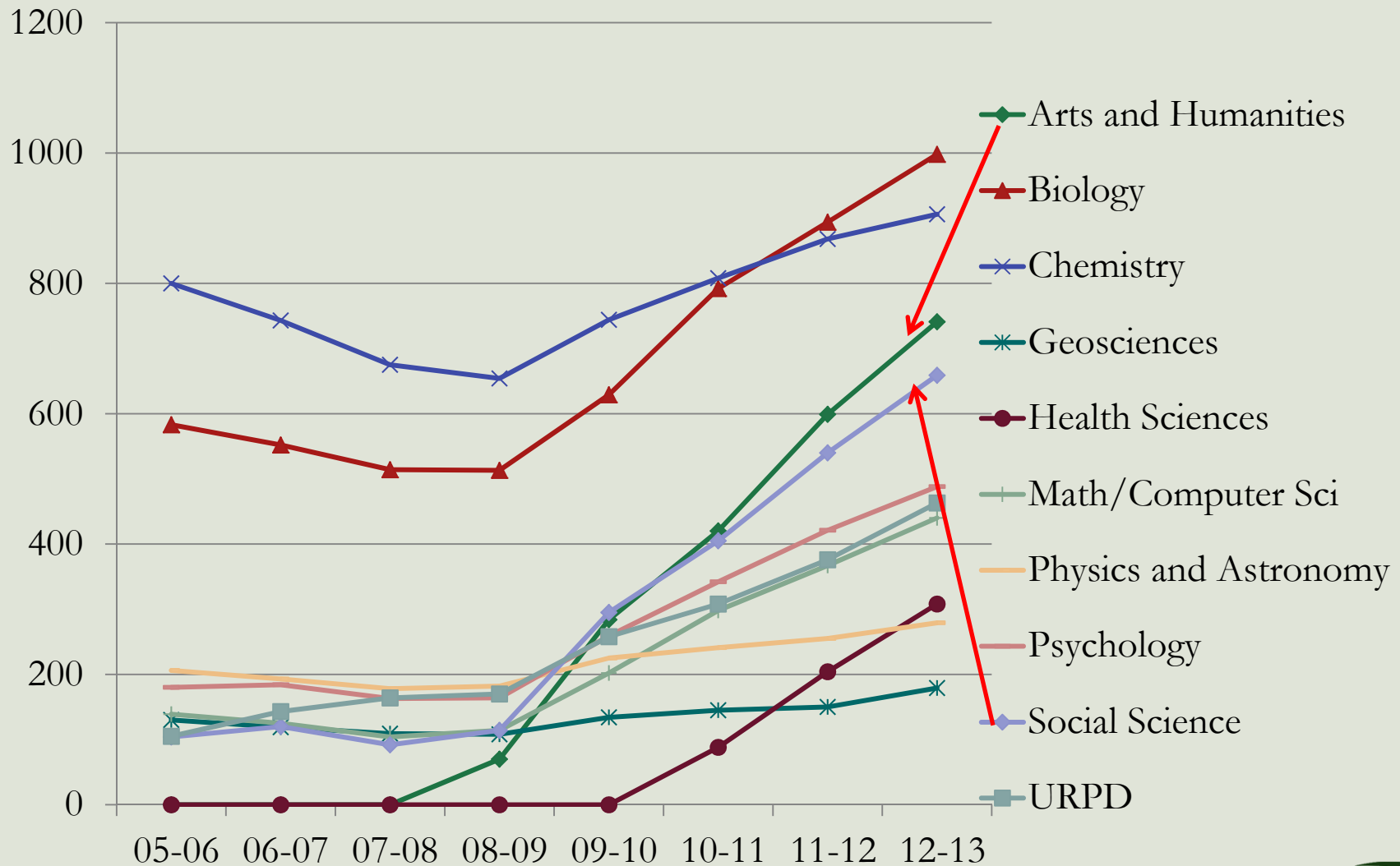
- **A national organization** of individual (>9,400) and institutional (>670) members representing all disciplines and over 900 institutions of all types.
- Ten **discipline-based divisions**: Arts & Humanities, Biology, Chemistry, Geosciences, Health Sciences, Mathematics & Computer Science, Physics & 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

Listsers

Advocacy

PUBLICATIONS

CUR Quarterly

“How To” Series

Specialized Volumes



Key Question Cycle

WHY?

How can we
scale up and
scaffold
undergraduate
research?

But
first.....

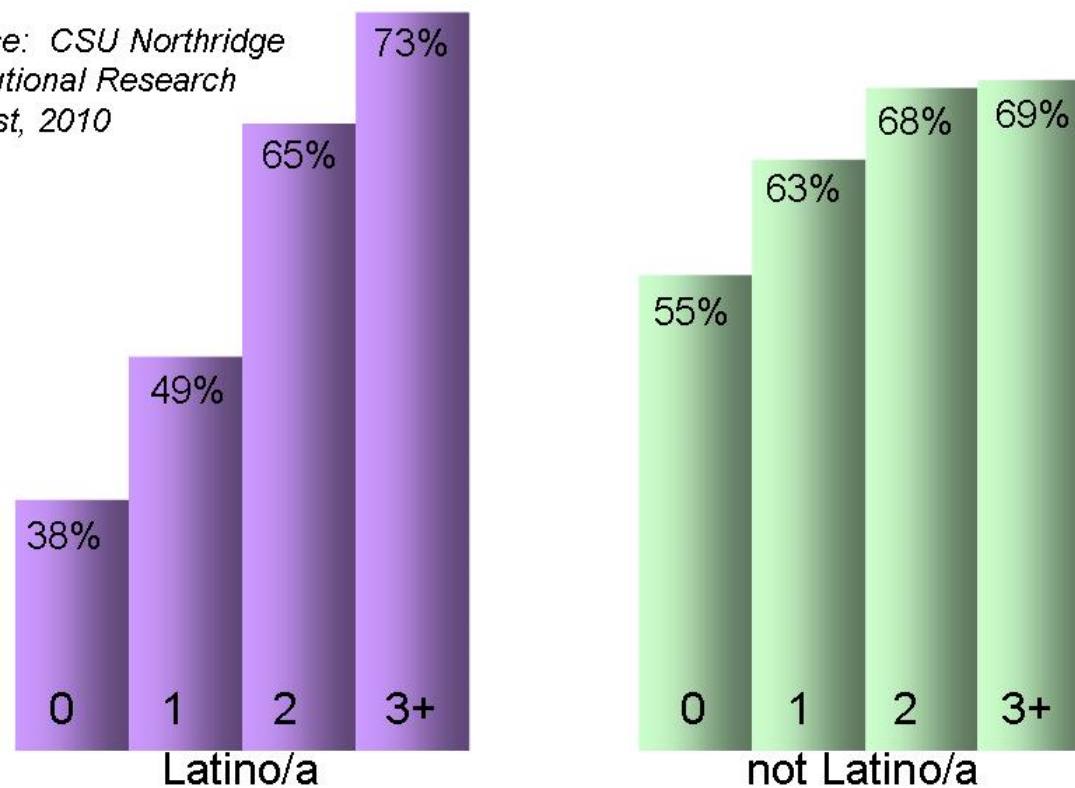
UGR: Success Domains

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

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

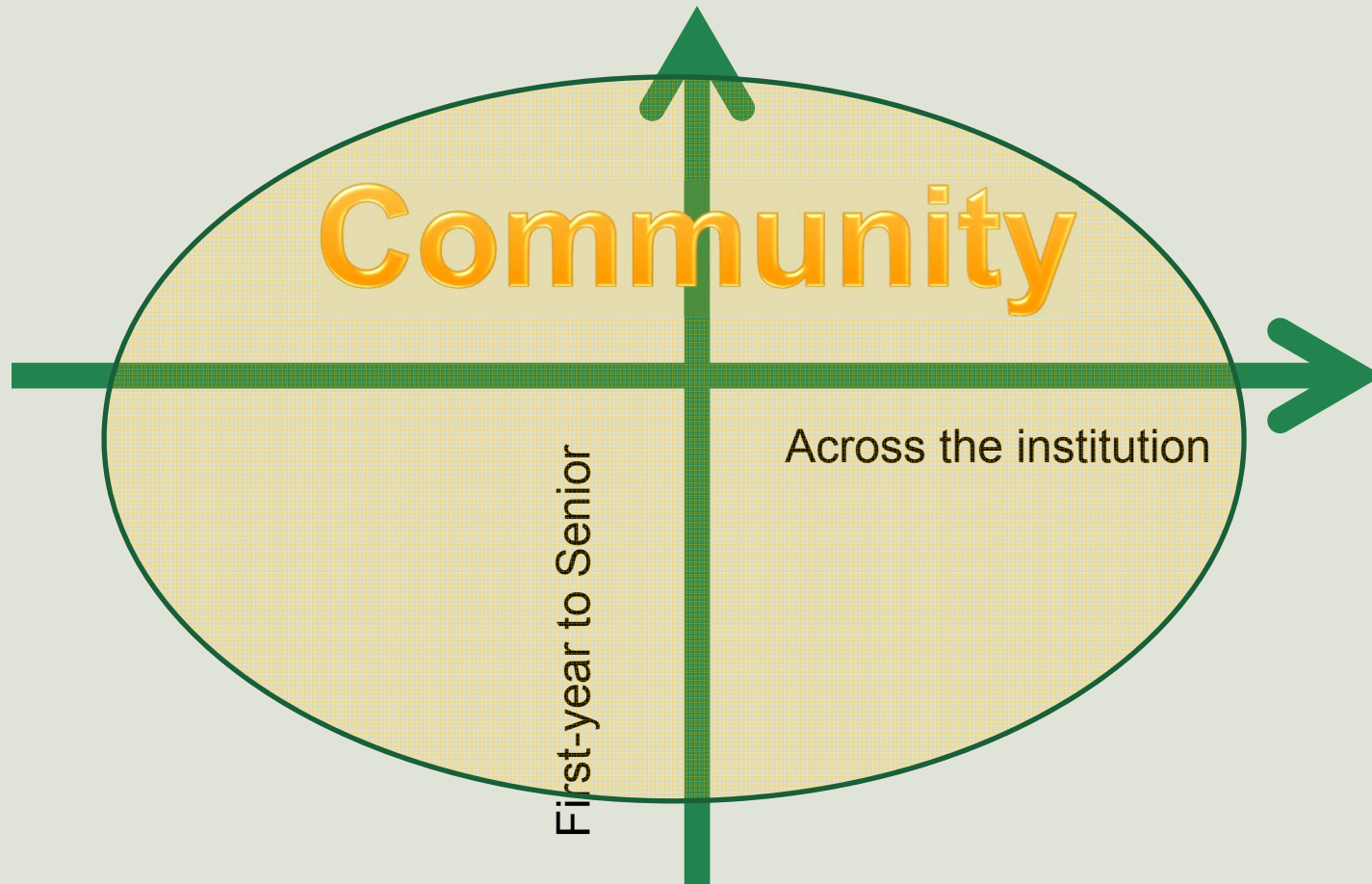
Undergraduate Research:
A Right Not a Privilege

*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)



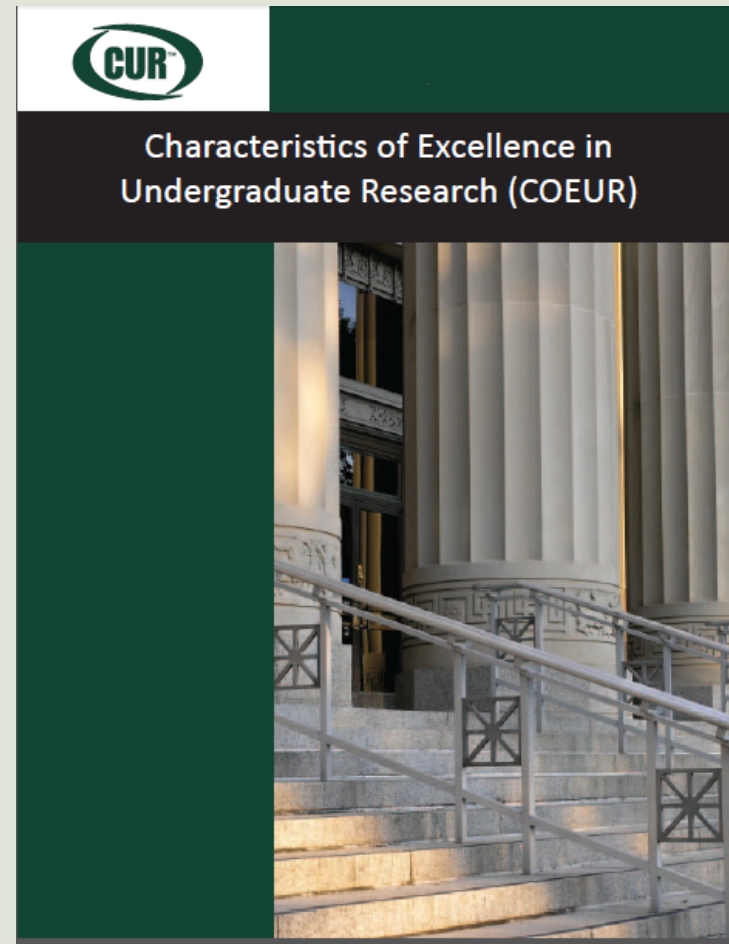
Decreasing
cost per
student

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



Four Main Topics for PKAL

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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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 RCOSA 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/>

Question

- Are departments held accountable for student success in the major, in the form of goals for reduction of D/F/W rates, increases in student retention and graduation?



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

Edited by:
NANCY H. HENSEL AND ELIZABETH L. PAUL

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