



Summit Promotes Research Experiences at Community Colleges

The American Association of Community Colleges (AACC) convened the Community College Undergraduate Research Experience Summit on November 20 to 22, 2019, in Washington, D.C., with support from the National Science Foundation's Advanced Technological Education (ATE) program.

In collaboration with the Community College Undergraduate Research Initiative (CCURI) and the Council on Undergraduate Research (CUR), AACC invited 120 thought leaders from community colleges, four-year colleges, business and industry, nonprofit organizations, and government agencies to the summit. Their discussions during facilitated working groups led to recommendations for building, implementing, and sustaining undergraduate research experiences (UREs) at community colleges.

Recommendations for community college faculty are highlighted here. For the full report, executive summary, and specific recommendations for community college administrators, students, and partners, see www.aacc.nche.edu/URESummit.

“To me, if you are doing collaborative learning, if you are doing inquiry-based stuff, project-based learning, these are all tools in your toolkit that we know are high-impact practices ... Undergraduate research is just one of those tools. I just happen to think it is one of the best, if not the best. So, to me undergraduate research is teaching.”

*James Hewlett, Finger Lakes Community College Biology Instructor
Executive Director of the Community College Undergraduate Research Initiative*

UREs Cultivate Academic & Career Skills

Summit participants describe research experiences as powerful pedagogical tools for cultivating the academic and career skills that help students succeed in college and life. Data from summit participants support this claim.

Community college students who participated in the City University of New York (CUNY) Research Scholars Program (CRSP)—a yearlong undergraduate science, technology, engineering and math (STEM) research experience—completed associate degrees at a significantly higher rate (59% vs. 50.2%) than their counterparts in the comparison group. CRSP students were more likely to earn associate degrees in STEM disciplines and persist in STEM bachelor's degree programs. (Nerio et. al., 2019).

Pasadena City College's inquiry-based approach to active learning resulted in Hispanic students passing an introductory chemistry course and General Chemistry I and II at significantly higher rates than traditional lecture versions of the course sequence. For example, the overall success rate was 89.2% for the project-based learning classroom for General Chemistry II. (Burke et. al., 2020).

Definition of UREs

Undergraduate Research Experiences are activities that use the scientific method and/or the engineering design process to promote student learning by investigating a problem where the solution is unknown to students or faculty.

Examples of UREs currently offered by two-year colleges include:

- Course-based research
- Internships
- Independent studies
- Honors projects
- STEM design challenges from real-world scenarios
- Competitions that blend academic and technical skills
- Mentored research that is part of a larger project

Teachers See Improvements in Student Learning

98%

observed improvement in their students' STEM knowledge and skills.

(n=357)

97%

saw improvements in team building, critical thinking, and problem solving.

(n=361)

Almost all of the teachers whose students participated in the 2019 Remotely Operated Vehicle (ROV) Competition observed positive outcomes. Regional and international team ROV competitions are UREs organized by the Marine Advanced Technology Education (MATE) Center at Monterey Peninsula College and MATE Inspiration for Innovation, a nonprofit inspired and created by the principals of the MATE Center.

(MATE Inspiration for Innovation, 2019)

UREs Boost Faculty, Too

CUNY faculty who mentored the CSRP students reported the experience helped them professionally. In addition to increasing the satisfaction of seeing students succeed, the experience contributed to their efforts to obtain other funding.

(Nerio et al., 2019)



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Faculty Leadership Shapes UREs

Faculty creativity, ingenuity, and energy drive UREs. For this reason the 120 thought leaders who attended the Community College Undergraduate Research Experience Summit directed the following recommendations to faculty whom they encourage to add research experiences to their curricula.

To scale and sustain UREs

DEMONSTRATE the benefits of UREs by sharing quantitative data from program assessments and student outcomes, as well as qualitative data from student success stories and alumni testimonials;

DEVELOP collaborations with student organizations, with faculty in and across departments and disciplines, among vocational and academic programs, between institutions, with stakeholder businesses, at research institutions, with government agencies, and with non-governmental organizations such as professional societies; and

TAILOR UREs to the job market, local employers' needs and capacity to offer internships and apprenticeships, and partners' participation in competitions.

Researchers at the University of Texas Austin report that participating in early course-based research experiences "significantly increases students' likelihood of graduating with a STEM degree . . . regardless of students' gender, race/ethnicity, and first-generation in college status."

(Rodenbusch, 2015)

See www.aacc.nche.edu/URESummit for other recommendations to scale UREs, sustain partnerships for UREs, ensure equitable access to UREs in STEM, and to measure the impact of UREs.

Burke, C., Luu, R., Hsiao, V., Lai, A., Cheung, E., Tamashiro, D., Ashcroft, J. (2020). *Making STEM Equitable: An Active Learning Approach to Closing the Achievement Gap*. [Manuscript submitted for publication.] Pasadena City College, CA.

MATE Inspiration for Innovation (MATE II). (2019) *MATE ROV Competition: The 2019 Magnitude*. [Infographic.] Monterey, CA. https://materovcompetition.org/sites/default/files/2019_MATE_Infographic.pdf.

Nerio, R., Webber, A., MacLachlan, E., Lopatto, D., & Caplan, A. J. (2019). One-Year Research Experience for Associate's Degree Students Impacts Graduation, STEM Retention, and Transfer Patterns. *CBE-Life Sciences Education*, 18(2), ar25. <https://doi.org/10.1187/cbe.19-02-0042>.

Rodenbusch, S. E., Hernandez, P. R., Simmons, S. L., & Dolan, E. L. (2016). Early Engagement in Course-Based Research Increases Graduation Rates and Completion of Science, Engineering, and Mathematics Degrees, *CBE-Life Sciences Education*, 15(2). <https://www.lifescied.org/doi/full/10.1187/cbe.16-03-0117>.