

## Undergraduate Research at Community Colleges

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Community colleges serve close to half of all US undergraduates. Their role in this diverse higher education landscape may have evolved since their inception more than a century ago, but it is clear that any national educational reform effort must include these institutions so that the impact of reform can be maximized, and access and equity for all students can be ensured. This is especially true for the many students from underrepresented backgrounds who, more than any other demographic group, attend community colleges to obtain their degrees. Undergraduate research experiences (UREs) have been studied extensively for their contribution to student outcomes, and the positive results of those studies support the designation of a URE as a high-impact educational practice (Kuh 2008). The development and implementation of successful undergraduate research programs have presented, until recently, significant challenges for community colleges, because of issues such as the lack of an institutional research culture, high faculty teaching loads, competitiveness in establishing external funding streams, and limitations of space for some disciplines.

Several recent initiatives have focused on finding ways to address these issues. In 2006, the Council on Undergraduate Research and the National Council on Instructional Administrators initiated six regional conversations with community colleges. A 2009 effort funded by the National Science Foundation (NSF) engaged faculty from 95 colleges to support the development of undergraduate research opportunities at US community colleges. Around the same time, the Community College Undergraduate Research Initiative (CCURI) was established at Finger Lakes Community College in Canandaigua, NY. Initially focused on supporting the development of UREs at six regional partner institutions, CCURI has grown into a network of 124 community colleges in 38 states and two countries. The rapid expansion of undergraduate research opportunities for community college students that occurred during this time is evidenced by the 2019 Community College Undergraduate Research Experience Summit in Washington, DC, that was sponsored by the American Association of Community Colleges and NSF. The meeting brought together 120 thought leaders in a think-tank approach to gain insights and plan for future

expansions of this high-impact practice at community colleges (Patton and Hause 2020).

This issue of SPUR highlights some innovative approaches of community college faculty and staff to broaden participation in undergraduate research at community colleges. It opens with three articles that offer strategies for measuring the impact of a URE on students in a variety of institutional settings and classroom formats. These assessment articles reflect the widely adopted strategy of embedding UREs into the curriculum as course-based undergraduate research experiences (CUREs) or as summer undergraduate research experiences (SUREs). Infusing or embedding the experience also helps to address issues of faculty teaching loads and space limitations. Virginia Balke and colleagues (Delaware Technical Community College) report on their effort to measure a diverse suite of student impacts in a bioscience/biotechnology program, which employed institutional research data to examine the effect of the program on student enrollment, completion, and graduation rates. Retrospective qualitative data from participant interviews provided insights into the achievement of gains in student persistence. Kristen Genet (Anoka-Ramsey Community College) describes a URE offered as both a face-to-face (seated) and asynchronous online experience in a large introductory course in environmental sciences. Online solutions have increased in popularity not only as a result of the COVID-19 pandemic but also as a strategy to address issues of access and equity in communities served by the institution. Student impact data were collected via the validated Undergraduate Research Student Self-Assessment (URSSA) instrument. As the author describes, the URSSA data uncovered inequities that were addressed in an iterative process of program development and improvement. Matthew Loeser (Yakima Valley College) and colleagues profile the development and assessment of UREs at a rural, Hispanic-serving institution. The authors argue for partnerships in scaling and sustaining an undergraduate research program at a community college. They also employed the URSSA instrument to measure student impact and used a comparison group of STEM students to report gains for SURE participants on their campus. Taken together, these three articles emphasize the importance of using validated data sources and offer suggestions for sustainability and adaptability of an undergraduate research program.

The next three articles represent a snapshot of known best practices in delivering UREs in diverse settings and feature strategies for utilizing partnerships with high schools, four-year institutions, and public university systems. Joan

Petersen (Queensborough Community College, CUNY) and colleagues detail an effort to employ a comprehensive suite of tools and strategies to institutionalize undergraduate research across multiple academic departments. The authors underscore the need for strong internal supports as well as external and “top-down” support structures to sustain an undergraduate research program at a community college. In offering suggestions for nurturing successful UREs, the article continues the themes of establishing partnerships and embedding the experiences into the curriculum. Ardi Kveven (Everett Community College) describes a unique dual-enrollment program where students engage in undergraduate research beginning in their third year of high school. More than 500 students have participated in the Ocean Research College Academy (ORCA) program over the past 17 years. This unique partnership features an undergraduate research experience scaffolded across multiple courses as part of a larger academic program. The author offers a comprehensive list of suggestions for individuals and institutions interested in replicating the model. Jared Ashcroft (Pasadena City College) and colleagues then revisit the critical importance of partnerships in highlighting a program in California with a focus on enhancing equity and diversity in undergraduate research experiences. Critical race theory forms the foundation of this unique program that was adapted from the 2014 National Institutes of Health initiative Building Infrastructure Leading to Diversity (BUILD). In addition to discussing the various student, faculty, and institutional outcomes of the program, the authors detail some best practices in forming partnerships involving community colleges and universities.

The eight vignettes in this issue show the diversity of undergraduate research at community colleges and offer a variety of practices and strategies that have been employed to scale the experience and broaden participation in UREs. Kaatje van der Hoeven Kraft (Whatcom Community College) and Karen M. Kortz (Community College of Rhode Island) present an example of the integration of a service-learning experience into a CURE that not only provides a research experience for students but also establishes meaningful and lasting connections to the local community. Amiko Matsuo (South Seattle College) describes a unique service-learning URE in which fine arts students at Allan Hancock College participate in a cooperative work-experience project with a community partner. Angelo Kolokithas (Northeast Wisconsin Technical College) provides an example of the adoption and adaptation of

established, large-scale, multisite research programs to accelerate the scaling of an undergraduate research experience at a community college. The Tiny Earth Initiative has global reach and involves a crowdsourcing approach to antibiotic discovery. A well-established and time-tested curriculum and supportive network of practitioners help to overcome barriers associated with establishing a novel student research program. Todd Pagano (Rochester Institute of Technology) and colleagues highlight the importance of access and equity in undergraduate research experiences with their vignette describing the CUREs developed for Deaf and Hard-of-Hearing students in a Laboratory Science Technology program at the National Technical Institute for the Deaf (NTID). Naomi Stubbs (LaGuardia Community College, CUNY) describes the implementation of a URE in a humanities program where participants in a collaborative faculty-led project reported gains across a variety of critical skills. Beatriz Villar-Fernandez (Northampton Community College) and colleagues address an often overlooked challenge to ensuring equity and access to the undergraduate research experience with their focus on developing and sustaining UREs at branch campuses. Scott L. Walker (Northwest Vista College) showcases an undergraduate research agenda that aligns with well-established “marketable skills” that are highly valued by employers. Finally, Madeline Patton and Ellen Hause discuss the 2019 Community College Undergraduate Research Experience Summit, describing the structure of the meeting and some key recommendations produced as part of the conference activities.

This collection of articles and vignettes capture the diverse nature of the undergraduate research experience at US community colleges as well as the continued growth and scaling of UREs. Broadening participation in undergraduate research for *all* students has become an educational priority, and the increasing role played by community colleges in addressing this priority is evident throughout this issue.

#### References

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