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# Developing Chapter One

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## **An Overview of Undergraduate Research in the CUNY Community College System**

Avrom J. Caplan and Effie S. MacLachlan

### **Introduction**

The City University of New York (CUNY) is the largest urban public university system in the United States. Its 24 institutions include 11 senior colleges and seven community colleges, an honors college, and several graduate and professional schools. Of the nearly 240,000 undergraduates enrolled at CUNY in the fall of 2012, 40 percent (96,500) were attending one of the seven community colleges. The range in the number of students enrolled in each of these community colleges is also quite large (see Table 1), with fewer than 300 students at the new Guttman Community College and more than 24,000 at the Borough of Manhattan Community College. Given the diversity of New York City, it is not surprising that CUNY is also a very ethnically diverse institution, with nearly 53 percent of students of African American or Hispanic origin across all institutions. The percentages are even higher at the seven community colleges, where more than 66 percent of students are African American or Hispanic.

In this chapter, we aim to provide an overview of undergraduate research initiatives at the CUNY community colleges. The importance of undergraduate research as a pedagogical tool is becoming increasingly recognized, and there is strong evidence to support the claim that this high-impact practice increases students' success in STEM (science, technology, engineering, and mathematics) disciplines (Graham, Frederick, Byars-Winston, Hunter, and Handelsman 2013; Hunter, Laursen, and Seymour 2006; Russell, Hancock, and McCullough 2007; Seymour, Hunter, Laursen, and DeAntoni 2004). However, the mission of community colleges historically has differed from that of their four-year counterparts—with a greater

**Table 1. CUNY Community College Enrollment, Fall 2012**

Name	Enrollment *	Borough
Bronx Community College	11,287	Bronx
Borough of Manhattan Community College	24,537	Manhattan
Guttman Community College	289	Manhattan
Hostos Community College	6,455	Bronx
Kingsborough Community College	18,934	Brooklyn
LaGuardia Community College	19,287	Queens
Queensborough Community College	15,711	Queens

\* Enrollment includes full-time and part-time students in the fall of 2012.

emphasis placed on teaching. This situation is, to a certain extent, a function of the need to prepare students for transfer to four-year colleges and also a function of the very large number of students enrolled in developmental-education courses, which is part of a nationwide trend (Bailey 2009).

Nevertheless, CUNY community college faculty are part of a single academic community in which scholarly and creative activities can include research as one of the requirements for tenure and promotion. In light of this, CUNY community colleges are an excellent testing ground for faculty and administrators interested in developing models for engaging students in research as part of students' preparation for transferring to a senior college.

### **Role of Institutional Planning in Promoting Undergraduate Research**

Two main factors drive undergraduate research initiatives at CUNY community colleges: 1) the faculty themselves, acting on their own initiative, and 2) efforts on the part of the administration to institutionalize undergraduate research. Institutionalization is reflected in the degree to which each college incorporates research as an overarching pursuit in its annual Performance Management Plan (PMP). The PMP establishes the performance targets for all the colleges and schools in the university. These PMP reports, in tandem with the more narrative, institution-specific strategic plans that some colleges produce, can provide a useful window into tracking the institutionalization of a system-wide aim, such as the promotion of undergraduate research.

Some CUNY community colleges are explicit about incorporating student research into their PMP, such as the Borough of Manhattan Community College (BMCC), whose PMP report sets the objectives of "promoting student mentored research across the disciplines," and "purchasing new equipment for academic departments and supporting faculty

and student research.” BMCC’s 2008-2013 strategic plan, *A Bridge to the Future*, asserts that faculty “research and great teaching are integral to the success of our students and not mutually exclusive,” and says BMCC’s continued success depends on its “ability to create opportunities for research and foster ongoing professional development for its faculty, staff and students.”

Similarly, Kingsborough Community College (KCC) states that “particular emphasis will be placed on preparing faculty for grant writing and administration that focuses on scholarly research and mentoring students in the research process.”

KCC has also issued a separate strategic-priorities statement for 2012-2016, and one of the priorities listed is increasing student-learning opportunities in research, among other areas, and expanding opportunities for faculty mentoring and for faculty-student research undertakings.

In its 2011-2012 Year-end Performance Report, LaGuardia Community College (LGCC) celebrated its success in increasing the number of faculty and students conducting research in its newly constructed research labs. The Department of Natural Sciences at LGCC, which houses a new research lab, hosts its own webpage promoting undergraduate research. This webpage states, “LaGuardia attaches great importance to Undergraduate Research, and opportunities for such research activities are regularly available in the Department. ... Undergraduate research is a key element of science education in the modern world, and it is a valuable asset for students to progress in their academic and/or professional careers.”

The new Guttman Community College, which welcomed its second entering class in fall 2013, represents a groundbreaking model of community college education and, as such, it is difficult to compare its programming to the more-established community colleges in the CUNY system. Guttman’s primary aim is “to serve as a laboratory for research-based innovation in community college education,” including providing “experiential learning opportunities” for its students and making “use of the city as an extension of the classroom.”

These examples serve to illustrate that student research is part of the institutional culture, but its implementation as a strategy is dependent on dedicated faculty with the skills to obtain external support, as described below.

### **Individual Faculty Efforts Drive Participation in Undergraduate Research**

The teaching load for faculty at CUNY community colleges is a contract-based 27 contact hours, which translates into 13.5 contact hours per week per semester. New untenured faculty are eligible for 24 contact hours of re-assigned time (spread over their first five years) in order to engage in scholarly and creative activities. The resources made available to community college

faculty include teaching labs or other shared space, and many research-active faculty members engage undergraduates in research projects. For faculty who promote undergraduate research, these conditions present an opportunity for broadening participation and developing creative ways to introduce authentic research initiatives into the curriculum.

University resources allocated to community colleges for research initiatives include grants administered by the faculty union, the Professional Staff Congress (PSC). PSC grants are awarded annually and range from \$3,500 to \$12,000. These awards support all academically relevant research in the natural sciences, social sciences, and humanities. In addition, the Office of the Vice Chancellor for Research administers an annual internal grant competition, which provides \$15,000 grants to support collaborative research projects among two or more community college faculty members.

CUNY community colleges expect their faculty to engage in scholarly activity to qualify for promotion and tenure, which gives junior professors, in particular, an additional incentive to pursue creative avenues for engaging in meaningful research. Faculty across the community colleges engage their students in research projects that are supported by grants from federal agencies such as the National Institutes of Health (NIH) and the National Science Foundation (NSF). Both agencies acknowledge the importance of research at community colleges for enhancing students' success (Patton, 2011). Faculty at CUNY community colleges have received several large institutional grants, including from the NIH Bridges to Baccalaureate Program, the NSF Science Technology Enhancement Program (STEP), and the NSF Research Experience for Undergraduates (REU) grants. Other faculty members have been successful in obtaining funding for individual research projects from NSF. The following describes some of these grants and how they were structured for CUNY's community colleges.

Professor Patricia Schneider at Queensborough Community College (QCC) has been teaching biology and administering student research projects since 1995. In 2002, she received an award from the NIH Bridges to the Baccalaureate program, which is designed specifically to encourage community college students, especially those from underrepresented minority groups, to enter research careers in the biomedical sciences. Schneider's continuing record of success as principal investigator has led to several grant renewals. The central function of the NIH program is the placement of QCC students in research labs both at QCC and at CUNY senior colleges. Since most transferring CUNY community college students go on to a four-year CUNY college, the Bridges program is an excellent way for the students to develop relationships with labs that will provide them with ongoing support after transfer. The program is comprehensive and develops students' skills in scientific communication by requiring them to

write reports and attend professional conferences. The mentoring program is well established and provides continuity by employing graduate students who benefitted from the program themselves as undergraduates.

It is striking that more than 80 percent of the QCC students who were part of the Bridges program graduated and transferred to a senior college. By contrast, the baccalaureate graduation rate of these students is modest, at 39 percent (P. Schneider, personal communication, June 18, 2013). This outcome suggests that the Bridges programming is successful in lighting the research spark in these students, but that more support may be needed to retain them in the four-year college environments—despite their having had the opportunity to develop ties with members of the research community.

Bridges to Baccalaureate grants have also been awarded to other community colleges in collaboration with CUNY four-year colleges: LGCC partners with The City College of New York and Hunter College, and KCC partners with Medgar Evers College. The Medgar Evers/KCC partnership offers research internships primarily during the summer months. Students are encouraged to present their work at conferences such as the NIH's Annual Biomedical Research Conference for Minority Students. The NIH has funded the Medgar Evers/KCC Bridge Program since 2000, and it trains 20 students per year. The success of participants is demonstrated by their recruitment by colleges outside of the CUNY system, from which many obtain scholarships.

The National Science Foundation's Science, Technology, Engineering, and Mathematics Talent Expansion Program (STEP) is similar to the NIH Bridges program in that it provides institutional grants. The focus of such grants is broad, but they are often used to promote research by undergraduates as a high-impact educational practice (note: at the time of writing, this program has been discontinued by the NSF). QCC obtained a STEP grant that was used to train students in chemistry and biology. Student mentees were paid as research assistants and encouraged to attend conferences and publish the results of their studies in the scientific literature. As with the Bridges grant, the QCC STEP program's participants have an extremely high rate of transfer to senior colleges. QCC was also unique in being the first recipient of an NSF Research Experience for Undergraduates grant to be conducted on a community college campus. This grant, with a focus on physics, trained more than 180 students after its initiation in 2007.

Another institutional grant that has enabled significant numbers of community college students to participate in authentic research is the Collegiate Science and Technology Entry Program (CSTEP), which has been funded by the New York State Education Department since 1986. The program is designed to increase the number of students from historically underrepresented and economically disadvantaged backgrounds who

enroll in and complete undergraduate degrees in STEM disciplines. More than 50 colleges in New York State participate in the program, including all of CUNY's community colleges. Many CSTEP programs, for example the one at Kingsborough Community College, are geared toward students' attaining licensure in targeted professions, particularly in health-related fields. CUNY students who are accepted into CSTEP grant projects often engage in undergraduate research with a faculty mentor and also have access to many other forms of academic, financial, and career-related support.

### **The Role of the Grants Officer**

All the programs discussed above have a common feature—they originated with dedicated individual faculty members who persevered in seeking and obtaining funding for programs that would benefit their students. This is a fairly common approach in four-year colleges where the pursuit of external funding is just that: an exercise largely driven by faculty seeking to fund their own research and, by extension, student scholarship. Given the pivotal importance of grant funding to advancing community college students' research, administrators in the sponsored-programs or grants office at community colleges have an important role to play.

Grants officers at community colleges that have achieved success in institutionalizing research often function as both a coach and an advocate. Such officers find themselves providing ongoing professional-development services to faculty by coaching them through the processes of looking for appropriate grant programs and then writing grant applications. They also sometimes find themselves advocating on behalf of faculty—conveying faculty concerns and research requests to senior administration. Thus these officers can also play a major role in program development. This very instrumental dual role can position the grants officer as a central figure in the research life of a community college.

At the Borough of Manhattan Community College, research is part of the college's overall strategic plan, and it has recently hired a director of research development to coordinate and facilitate research activities. Further, BMCC supports the idea that faculty scholarship is integral to effective student-research programs, which in turn requires that resources be expended on promoting research activity and faculty mentoring. BMCC secured funding to renovate dedicated research space, and administrators spearheaded a program to coach faculty in preparing grant proposals. The program, the Presidential Scholars Program, creates a structured mentored environment for faculty to guide them through the grant-writing process.

There is a strong parallel emphasis at BMCC on student research, especially in the STEM disciplines. By their third semester, students can elect to enroll in a research-methods course that utilizes the format of small-group applied research. The course is a prelude to students participating in

faculty-mentored research projects that take advantage of the newly renovated space. The end result is a highly structured research environment that promotes student success.

Despite the success of the programs we have described that support student research at CUNY community colleges, the number of students who can be reached is still relatively small, and largely restricted to already high-achieving students. Broadening participation in undergraduate research will require developing more creative approaches to integrating research into the curriculum. Initiatives that employ genomics education and literature-based approaches are planned, but these programs are just beginning. The Council on Undergraduate Research held a workshop for CUNY community college faculty in the spring of 2012 to specifically address the challenge of integrating research into the curriculum. The workshop was well attended and the participants enthusiastic. But it takes time to create a paradigm that is sustainable and with sufficient assessment procedures in place to measure related student outcomes.

### Summary

CUNY community colleges occupy a unique niche because they are part of a larger geographically focused university system in which all faculty members are governed by a single set of standards for professional development. Research is clearly a part of the wider institutional culture, and dedicated faculty members who obtained support from state and federal funding agencies have conducted successful student-research programs. Close partnerships between community colleges and their four-year counterparts can contribute to positive student outcomes and to the subsequent transfer of students. The main roadblock to broadening participation is the small number of students who can be supported by internal and external grant programs; further efforts to integrate research into the curriculum will be required to overcome this problem.

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