

## **NSF UCLA FOCUS PROJECT OUTCOMES REPORT**

### **Frontier Opportunities in Computing for Underrepresented Students**

2/2007 – 2/2013

#### INTELLECTUAL MERIT

1. The FOCUS project seeks to contribute to the national and local understanding of the academic and non-academic mechanisms that prevent URM students from entering the computing disciplines.
2. The project will yield new insight into how peer-supportive behaviors within learning communities can sustain and increase URM retention, performance and preparation for computing careers and/or advanced study.

To provide direct support and facilitate students' academic integration, FOCUS implemented a wide range of support efforts geared toward the promotion of underrepresented students in computer science. Participation in these efforts varied from student to student. The assessment component of the project explored three distinct perspectives. First, a portrait of student experiences through multi-time point longitudinal surveys and quantitative measures assessed changes in the value and meaning of those experiences, and documented students' academic achievement and success. Second, data from interviews with graduate student mentors highlighted strengths and challenges with respect to the FOCUS mentorship component. And third, findings from faculty and staff informed results of student assessments and shed further light on the strengths, challenges, and evolution of the FOCUS project.

Data was collected utilizing both qualitative and quantitative methods. Assessment efforts focused on two specific interventions: 1) two summer bridge programs: Computer Immersion Summer Experiences (CISE) and Summer Bridge Program; and 2) the CS31: Introduction to Computer Science course, which was paired with tutoring. Data was collected from students using multi-time point surveys to capture the students' pre-, mid- and post-year experiences. In addition, the research team conducted semi-structured interviews with program participants from each cohort.

The FOCUS project had positive effects on students in 5 immediate areas: self-esteem and confidence, sense of community, cooperative work with faculty and research opportunities, internship and professional development opportunities, and academic performance.

Faculty and staff shared insights that paralleled findings from student interviews. Both faculty and staff shared the observation that CISE and Summer Bridge programs nurtured strong bonds while building a sense of community among students. CISE was also cited as spurring increased confidence among entering students, but the positive effects were said to have waned over subsequent quarters. Faculty and staff participants further discussed the importance of finding a way to extend CISE in order to

provide more lasting benefits to students. With respect to research participation, their responses agreed with earlier student comments suggesting that the benefits depended largely on the entering student's level of preparedness. Two major FOCUS events mentioned with respect to professional development were industry tours and career fairs. The tours were said to offer a glimpse into computer science careers and create opportunities for internships, which in turn motivated students to achieve strong grades. As with some of the previous themes, faculty and staff mentioned CISE as having a major impact on academic performance. They noted the need for additional programming, similar to CISE, which would extend the benefits on academic performance seen among entering students.

## BROADER IMPACTS

1. FOCUS project brought together UCLA researchers, industry, university and community college leaders, graduate and undergraduate students into a community of practice and integrates teaching and learning and by involving the NSF research faculty/graduate students in mentoring URM students.
2. The overriding project goal is to broaden the participation, retention and performance of URM students pursuing baccalaureate degrees in computing disciplines. In the attached images, this evidence is presented.

The FOCUS project formed partnerships with the regional NSF STEP-UP project (grant No. 0431697), the UCLA Center for Excellence in Engineering and Diversity (CEED), several community colleges, and several industries to provide a comprehensive academic and non-academic support system—learning communities build around transition and bridging programs, mentor networks, industry and research internships. The FOCUS outcomes can inform NSF STEP projects on how to improve the retention and performance of URM computer science students. The project was successful in addressing in particular several problems and challenges of URM: offsetting the significant attrition of URM particularly after the first year at UCLA, improving their interest, enthusiasm, and confidence in the field; improving their GPA; getting summer internships in industry, nurturing their activities and professional development for securing good industry jobs and earning admission to graduate school for those interested; providing undergraduate research experiences to appreciate graduate programs; and increase the number of URM pursuing advanced degrees.