

A Multi-tiered Mentoring Model (M3) for Increasing Minority and Women Participation in Computing

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This Broadening Participation in Computing (BPC) Demonstration project will pilot a multi-tiered mentoring model (M3) that partners one of the most diverse university campuses in the US with a large urban school system that educates predominantly minority (98% African American) and underserved (about 30% below the national poverty line) students. The project will provide high-level instruction in computational thinking across three different age groups. M3 will incubate a culture of computing interest among minority students who otherwise would not be aware or have access to potential career choices in these burgeoning areas that are critical to the economic progress of the US. The participants will include: (1) middle and high school students from minority backgrounds, (2) their teachers; (3) minority and majority college students with secondary science education or computer science majors, (4) University educators from four interdisciplinary units (Computer Science, and the schools of Education, Engineering, and Medicine); and (5) a learning design firm dedicated to enhancing computing education through media and technology.

The M3 project has six specific aims: (1) Recruit a cadre of minority and women middle and high school students into the computing pipeline by presenting engaging technology experiences with mentors; (2) Expose pre-service secondary education students to pedagogical and technical aspects of computing education, through interdisciplinary peer mentorship; (3) Extend the coverage of computational thinking among high school teachers in predominantly minority schools with opportunities to both learn and teach computer science topics; (4) Support undergraduate computer science minority student retention by providing contextualized and meaningful opportunities to create tools for computing education under faculty mentorship; (5) Engage K-12 administrators and family members of participants through information awareness sessions that highlight the benefits of careers in computing; and (6) Evaluate the effects of M3 on student self-efficacy, teacher and student aptitude and interest, and historical tracking of career choices among participants.

This demonstration project has potential for local impact by serving 180 high school students, 60 middle school students, 18 university students, and 12 high school teachers. As a pilot project, the results have potential for broader impact by influencing future mentoring models adopted between urban universities and their local school systems. The impact includes recruiting of new students into computer science, retention of current computer science majors, and sustainability of the project by training current and future high school educators who will be equipped to introduce computational concepts into their schools.