

SIGCSE 2009 Poster Proposal

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Statement of Topic: Leveraging Pods as a Pedagogy Tool to Facilitate Multicultural Collaborative Undergraduate Research in Multi-University Partnerships.

Significance of the Topic: There has been recent focus on programs that transition students—particularly minority and women computer science undergraduate students—into graduate programs toward careers in academia and research labs. As such, there is a need to establish a culture among multiple universities as an incubator that keeps the undergraduate students at a focal point in the research experience. This work proposes *Pods* as a response to this need.

Pods serve to provide undergraduates the ability to engage in research activity in a collaborative environment as a means to encourage progression into graduate school. In our instantiation, a pod connects Historically Black Colleges and Universities (HBCUs) with Research Universities (RU) to create a dual-feeder pipeline that encourages exchange of personnel (students and faculty) and research ideas. A pod is comprised of multiple undergraduate students, at least one graduate student, and at least one faculty member from both the HBCU and RU. Engaging multiple undergrads helps establish a joint experience important to undergrads, while the undergrad-grad-faculty hierarchy encourages distribution of responsibility. Having an appropriate mix of undergraduate and graduate students is an important consideration in allowing enough undergraduates the opportunity to obtain research experience while providing the mentorship of graduate students. Inherent in this composition structure of pods is the challenge of effective communication between faculty and students across universities. During the academic year, pods work at their home university, generally with a kickoff meeting at the RU to set agenda, highlight equipment, and establish personal relationships. During the summers, pods congregate at the RU to take advantage of its equipment and infrastructure.

The value in the use of pods is multifaceted. It exposes the students to research at other high research activity universities; it fosters faculty-student exchange and prepares the students for graduate study; it facilitates a common research methods course with participation from all universities and it aids in developing working relationships between minority and majority universities. These attributes are important when developing a program with the goal of creating a pipeline to increase the number of minority and women graduate students.

To keep this vehicle functioning, several questions require consideration. Participating universities must work out a model for funding the pod: through seed monies, through existing grants, or through joint grant authorship. Communication mechanisms must be established in the pod structure: faculty-faculty communication is vital, but communication between students (often through Web 2.0 technologies) is important as well. Visits between universities help facilitate communication, but also can become costly. Roles for

each member and time commitments should be established at the start of each term, but with built-in flexibility for the inevitable student drops, unplanned absences, and other issues. Finally, it is important that all people involved establish metrics for success for each individual and for the group—whether they be publications, presentations, research grants, or other important end products.

Content: The goal of this poster is to raise awareness so these questions may be addressed and promote the use of pods as an effective computer science educational mechanism. By using a poster, we are able to provide better visuals of how well the groups work together, how they benefit from multimedia experiences, and how the visits set the stage for deeper understanding of research. We believe the pod is a promising approach to increasing minority graduate students that needs nurturing by other computer science education researchers.

As such, this poster will contain descriptions of key pod elements, pictures of pods in action, pictures from pod visits and talks, pod evaluation criteria, and approaches to the key questions for future application of pods.

Abstract: There has been recent focus on programs that transition more minority and women computer science undergraduate students into graduate programs. One such program is the Alliance for the Advancement of African-American Researchers in Computing (A4RC), which uses pods as a tactic to facilitate collaborative research for computer science undergraduates. The use of pods is instrumental, but in its growth period. This investigation provides indicators of pod success and makes a case for the need of greater application of this approach. Raising awareness of this pedagogy tool and encouraging more widespread application, will prove its value and lead to increased evidence and financial support.