Project Summary

Intellectual Merit. Science educators often argue that women and minority communities are underrepresented in science, mathematics, engineering, and especially computer science [Stross 2008, AAUW 2000, Thom 2001; Beech 1991]. While there is widespread agreement about the demographics of STEM (Science, Technology, Engineering, and Mathematics) education, what is less certain is how to overcome this situation. Strategies that focus simply on changing what happens in the classroom seem incomplete, and the results are less than conclusive [McLeod 1995]. At the same time, short-term summer camp immersion experiences have also proven ineffective as a stand-alone solution [Jayaratne et. al. 2003], and while social and economic conditions often present a barrier to participation, there are no simple solutions to what are, societal-wide problems.

This proposed project offers a multifaceted, modular approach to overcome these disadvantages. Based on ten years experience of running summer science camps for girls and the latest research findings, *the proposed project is a modular pedagogical strategy that focuses on women computer scientists as leaders.* The approach will feature a four-week long computer science summer camp for 7th and 8th grade girls – **G²CS** (Girls Gather for Computer Science) – with original curriculum that utilizes active learning and focuses on computational thinking, a mentoring program, a multi-media approach and interactive web site, as well as a ten-year commitment to the students involved. Using female computer science leaders as instructors and removing students from their usual surroundings and preoccupations free young women to concentrate on the science, and imagine themselves as scientists. The camp will run for three years and systematic follow-on activities within electronic environments will create an ongoing community of students, their families, mentors and teachers as well as partners. The focus in this particular project is on overcoming the lack of young women in computer science, though the modular approach will be suitable for use in a variety of scientific fields.

Broader Impact. The project is a partnership between Pacific University and Oregon's nationally recognized public broadcasting station, Oregon Public Broadcasting (OPB). Other partners include the Berglund Center for Internet Studies at Pacific, the Intel Corporation, the educational media company Flying Rhinoceros, Vernier Software & Technology, leaders from tribal groups, local Latino community representatives, and local school district heads. The outcomes of the project include video coverage of the camp, featuring young scientists and their mentors at work, game-like "interactives" for the camp web site, and a broad collection of media tools. The web site will be used for extensive dissemination of the curriculum and techniques to other communities and regions. A wide range of electronic tools will be put in place to ensure that the new learning methodology is accessible, useful, and a permanent resource at no-cost to a national audience.

Thus our intent is the careful development of a nationally-acclaimed computer science learning model, *aimed at small colleges without substantial scientific and technological infrastructure.* The students specifically impacted will be selected from the surrounding communities, including Native American and Latino girls. Pacific has a significant percentage of Pacific Island students, rendering it a DHHS-named 'minority serving' institution. Students from these Pacific Islands will be among those involved as mentors. With careful attention to detail, this initiative will offer up a national model for dealing with the obstacles to learning for certain community members, especially those in a rural or minority context. The project will offer a full ensemble of media resources to the wider teaching public, including an interactive web site, video clips, model curriculum, pod casts, blogs, and a best-practices wiki arena, where the most effective ideas can be displayed. Conference presentations and publications will cement these achievements in place, and make them even more accessible. Finally, the impact of the project on participants' teachers, friends, and family will be powerful.