

CPATH CDEF: Resparking Innovation in Computing Education

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Project Summary

Project objectives. The broad objective is to support US competitiveness by stimulating a greater supply of talented, innovative young people in computing. Our claim is that the current “operating model” for computing curriculum is outdated: prospective students find more value in other curricula. This project aims to design a new operating model and, with support from the ACM Education Board, get CS&E departments to experiment with the model. The new model will be true to fundamental computing principles, emphasize innovation by individual faculty, students, and departments, and support faculty in their roles as mentors and coaches. A key aspect is that this project will design support networks and structures that can be administered by ACM to sustain the ideas from the workshops. The workshops will support the leadership development of at least two dozen innovative junior leaders of the field.

Project Approach. The Principal Investigator will organize three invited workshops and a comprehensive final report. (1) A **Great Principles Workshop** will seek agreement on a presentation of fundamental principles of computing, commitments from experts to write principle stories, and establishment of an ACM Great Principles Library populated initially with materials written by the commissioned experts. (2) A **Stimulating Innovation in Curriculum Workshop** will recognize innovators and publicize their innovations, initiate an Innovator’s Portal containing innovation descriptions and guidelines for other departments to imitate, initiate an Innovation Practice Workshop to help faculty learn foundational innovation and coaching practices, and develop a support network for innovators. (3) As an exploration of an alternative operating model, a **Project-Based Learning Workshop** will explore the intricacies of a project-based curriculum and help those who want to adopt project-based learning in their own departments. This workshop will be held at Neumont University in Salt Lake City; they have developed a successful project-based BS CS curriculum. (4) After the workshops the PI will integrate workshop findings and recommendations into A **Report on a New Operating Model for Computing Curricula** and work with the ACM Education Board to implement the recommended support structures.

Intellectual Merit. The project will add to our knowledge in several ways. (a) Articulating the great principles of computing. (b) Uncovering and inspiring computing curriculum innovations and ongoing experimentation. (c) Developing a new “operating model” for teaching and applying computer science. (d) Expanding the set of departments using project based learning.

Broader Impacts. This project will help participating CS&E departments reestablish themselves as hotbeds of innovation attractive to students. The principles framework will enhance computing’s reputation as a well-grounded science and engineering field.