

Panel - Computer Scientists Wanted! Strategies for Increasing Interest in Computer Science

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Abstract – Diverse strategies have been used to improve student awareness and interest in computer science. Research suggests that by focusing on rich interdisciplinary subfields of the computing discipline, computer science courses will be more appealing to women and other underrepresented groups. Inspired by these findings, the panelists use application areas and games in a variety of venues to engage students in the study of computer science. Experiences with a middle school outreach program in Appalachia will be described. Additionally new courses including an introduction to scientific modeling, seminars on social networking and gaming, and a course in digital storytelling will be discussed. Open discussion with the audience will follow the panelists' remarks.

Index Terms – CSET Programs, Enrollments, Introductory Courses, Outreach

INTRODUCTION

There is great interest in the computer science and engineering education community in improving student awareness and interest in the discipline. Many theories have been put forward about how to best engage today's students. In a survey [1], the number one positive influence that played into the male selection of computer science as a major was an interest in computer games. For women, the top influence was a desire to use computer science in another field. Preliminary research [2] also suggests that by focusing on rich interdisciplinary subfields of the computing discipline, computer science courses will be more appealing to women and other underrepresented groups. The panelists built on these theories to use application areas and games in a variety of venues to engage students in the study of computer science.

GOALS AND OBJECTIVES

The primary objectives of this panel are to discuss mechanisms for increasing student interest in computer science and engineering in order to

- increase awareness of mechanisms being employed at various institutions.
- share successes and failures experienced.
- discuss improvements that could be adopted in the future.

Experiences of both panelists and attendees will be explored.

PANEL DISCUSSION TOPICS

The panelists' presentations will describe experiences with various mechanisms designed to create interest in computer science and increase enrollments.

I. Interdisciplinary First Year Seminar Course

At the University of Mary Washington, we designed and offered a variety of interdisciplinary first year seminar courses including a seminar on games and one on social networks. These courses emphasize communication, group interaction, and key application areas that are reported as engaging introductions to computer science. Through the exploration of rich application areas, we hope to increase the interest of students of both genders. Students had a positive reaction to the courses and after taking one of the courses the percentage of students who said the likelihood that computer science would be their major increased.

II. Introduction to Scientific Modeling Course

At Denison University, we developed a new introductory computer science course focusing on scientific modeling. The course introduces programming and computer science by focusing on a number of interesting scientific problems and techniques such as random walks, monte carlo simulation, genetic algorithms, cellular automata, agent based simulation, networks, percolation theory, and bioinformatics.

Why a focus on scientific modeling? First, while students typically have little or no experience with writing programs in high school, they are familiar with science and the scientific method, which bears a close resemblance to the problem solving methods we teach in an introductory class. Using compelling scientific examples may provide a comfortable bridge between the known and the unknown for some students, and entice others who may not have thought about computer science before. The course can also open collaborative opportunities with both science students and their instructors, many of whom are becoming increasingly interested in computational methods.

III. Middle School Outreach in Appalachia

The VITAL (Virtual Immersive Technologies and Arts for Learning) Lab at Ohio University has been working on the NSF-funded STEAM (Science and Technology Enrichment for Appalachian Middle-schoolers) project for the past three

years. This project engages engineering graduate students and works with school educators to develop appealing digital educational environments and change the culture of learning in the eight participating Appalachian middle schools through weekly school visits. STEAM has developed over two dozens educational games. These games helped engage young students, exposed them to science concepts and computer science applications, and could potentially attract them to engineering and computer science disciplines in the future.

IV. Digital Storytelling Course

At the University of Mary Washington an introductory computing course focusing on digital storytelling using free and open-source software was created. The course was designed to fulfill an arts and literature general education requirement while engaging students in algorithmic development and increasing student knowledge about technology and computer science. Students were exposed to algorithmic development through the process of storyboarding. After the initial offering 36% of the students went on to take an introductory programming course and increased student interest in the computer science discipline.

ANTICIPATED AUDIENCE

This panel session will be of interest to computer science and engineering faculty interested in exploring mechanisms to increase student interest in these fields.

EQUIPMENT AND MATERIALS

We will require a computer or a laptop connection that is connected to a projector.

Attendees will receive a handout about each outreach mechanism discussed by the presenters.

BIOGRAPHIES OF PANELISTS

Dr. Karen Anewalt, chair and associate professor of Computer Science at the University of Mary Washington, earned her Ph.D. in Computer Science from The College of William and Mary. Her primary interests are networks, web programming, and computer science education. She is a steering committee member for the Consortium for Computing Sciences Eastern Region.

Dr. Jessen Havill, associate professor in the Department of Mathematics and Computer Science at Denison University, has over twelve years of teaching experience. His interests include online algorithms, algorithm analysis, networks, and computer science education.

Dr. Chang Liu is an assistant professor with the School of Electrical Engineering and Computer Science at Ohio University. Chang obtained his doctoral degree from the Department of Information and Computer Science at the University of California, Irvine. He has worked in the component applications group at Microsoft Research, the Visual C++ group at Microsoft, the Personal Security Manager group at AOL/Netscape, and the Quest team at Microelectronics and Computer Technology Corporation.

Dr. Jennifer Polack-Wahl, Associate Professor of Computer Science, earned a Ph.D. in Computer Science and Engineering from the University of South Florida. She is the chair of the Virginia Central Chapter of the Institute for Electrical and Electronics Engineers education society. Her research interests include graphics, computer games, visualization, and computer science education.

REFERENCES

- [1] Carter, L., "Why Students With an Apparent Aptitude for Computer Science Don't Choose to Major in Computer Science", *ACM SIGCSE Bulletin*, Vol 38, No 1., 2006.
- [2] Alt, C., Astrachan, O., Forbes, J., Lucic, R., Roger, S., "Social Networks Generate Interest in Computer Science", *ACM SIGCSE Bulletin*, Vol 38, No 1., 2006.

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