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Internet

Computing

in **SCIENCE & ENGINEERING**

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Best of RESPECT,

Part 1

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6 Guest Editors' Introduction

Tiffany Barnes, Jamie Payton, George K. Thiruvathukal, Kristy Elizabeth Boyer, and Jeff Forbes

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10 The Impact of the Exploring Computer Science Instructional Model in Chicago Public Schools

Lucia Dettori, Ronald I. Greenberg, Steven McGee, and Dale Reed

The Exploring Computer Science instructional model has been expanded to many high schools in the Chicago Public Schools system. Initial results show students value the ECS course experience and have increased awareness of and interest in the field of computer science.

18 Collaboration and Gender Equity in Game-Based Learning for Middle School Computer Science

Philip Sheridan Buffum, Megan Frankosky, Kristy Elizabeth Boyer, Eric N. Wiebe, Bradford W. Mott, and James C. Lester

Game-based learning environments can deliver robust learning gains and have a significant capacity to engage students, but they can unintentionally disadvantage students with less prior game experience. An experimental pilot study investigates the nature of collaboration in a game-based learning environment, measuring such a system's effectiveness at supporting all students during computer science learning.

29 Addressing Negative Racial and Gendered Experiences That Discourage Academic Careers in Engineering

William H. Robinson, Ebony O. McGee, Lydia C. Bentley, Stacey L. Houston II, and Portia K. Botchway

Engineering faculty members play a multifaceted role in the profession in that they help discover, promote, and disseminate advancements in technology. However, many potential faculty members are dissuaded from entering academia. Graduate mentoring programs need programmatic innovation to address racial, gender, and other identity-based biases in engineering and academia.

40 Representation of Women in Postsecondary Computing: Disciplinary, Institutional, and Individual Characteristics

Stuart H. Zweben and Elizabeth B. Bizot

The results of an in-depth study of two decades of data from the Integrated Postsecondary Education Data System database highlight trends in the participation of women in postsecondary academic computing programs at the bachelor's, master's, and doctoral levels.

58 What Influences Female Interest and Persistence in Computing? Preliminary Findings from a Multiyear Study

Wendy M. DuBow and Laurie James-Hawkins

Preliminary findings from a multiyear study of young women who showed interest in applying for a high school computing award suggest some provocative differences and similarities between the circumstances and perceptions of those who have continued in computing and those who have not.



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www.debutart.com/illustration/andrew-baker

STATEMENT OF PURPOSE

Computing in Science & Engineering (CiSE) aims to support and promote the emerging discipline of computational science and engineering and to foster the use of computers and computational techniques in scientific research and education. Every issue contains broad-interest theme articles, departments, news reports, and editorial comment. Collateral materials such as source code are made available electronically over the Internet. The intended audience comprises physical scientists, engineers, mathematicians, and others who would benefit from computational methodologies. All articles and technical notes in *CiSE* are peer-reviewed.

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FUSION SIMULATIONS

68 Visualization Techniques for Studying Large-Scale Flow Fields from Fusion Simulations

Franz Sauer, Yubo Zhang, Weixing Wang, Stephane Ethier, and Kwan-Liu Ma

A joint study between computer scientists and fusion scientists resulted in the development of visual tools for studying patterns in flow fields from large-scale magnetic confinement fusion simulations. These tools aid scientists in managing the visual complexity of large trajectory datasets and are crucial in locating and understanding subtle features of interest.

FINANCIAL ENGINEERING

Computational Finance Using QuantLib-Python

Jayanth R. Varma and Vineet Virmani

QuantLib is a reliable C++ open source library for pricing derivatives. Its Python extension, QuantLib-Python, lets users harness the power of C++ with the ease of IPython notebooks for use in both classrooms and student projects.

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