

Crafting the Future of Software Engineering Education in CC2020: A Workshop

Richard J. LeBlanc
Department of Computer Science
and Software Engineering
Seattle University
Seattle, Washington USA
leblanc@seattleu.edu

Nancy R. Mead
Software Engineering Institute
Carnegie Mellon University
Pittsburgh, Pennsylvania USA
nrm@sei.cmu.edu

John Impagliazzo
Engineering and Applied Sciences
Hofstra University
Hempstead, New York USA
john.impagliazzo@hofstra.edu

Abstract—Several national and international computing and engineering organizations are in the process of developing a new curricular document tentatively titled ‘Computing Curricula 2020’ (CC2020). This curricular project, based on its predecessor CC2005, intends to reflect the state-of-the-art in computing education and practice as well as the future of the computing educational field for the 2020s. This workshop provides an overview of the CC2005 report and its transition to the CC2020 project. It also provides unique perspectives from three members of the CC2020 task force. The workshop authors and participants will engage in lively discussions on ways to include software engineering as a significant component of the project and extend its influence in global undergraduate computing education for the future. The authors anticipate full audience involvement and participation in formulating this vision.

Keywords—software engineering education, CC2020, CC2005, future software engineering education

I. INTRODUCTION

In 2015, the Association for Computing Machinery (ACM) began explorations for the update of the broadly influential document: *Computing Curricula 2005*, tagged as CC2005 [1]. ACM, the Association for Information Systems (AIS), and the IEEE Computer Society (IEEE-CS) were sponsors of the 2005 document. In 2016, ACM decided to go forward with the new project. It established an exploratory committee to ascertain the need for a new report; it invited AIS and IEEE-CS to join in its development and it labeled the project CC2020. Funding is now in place and the project is moving forward with zest and with determination.

ACM and IEEE-CS became the principal sponsors of the CC2020 project. Other professional organizations have joined in the effort with additional sponsorship; these include the Association for Information Systems (AIS), and Association for Information Technology Professionals, Education Special Interest Group (AITP/EDSIG). Project collaborators include Special Interest Group for Computer Human Interaction (SIGCHI), Information Processing Society of Japan (IPSJ), Information-Technology Promotion Agency (IPA) of Japan, the Chinese Computing Federation (CCF), the Conferencia Latinoamericana de Informática (CLEI) “Latin-American Conference on Informatics,” and Computer Society of India (CSI). CC2020 supports a task force of thirty professionals from academia and industry from around the world. A subset of this

task force forms a steering committee of fifteen members. Currently, the task force represents fourteen countries and six continents.

II. PROJECT PURPOSE, GOAL, FOCUS, AND OUTCOME

Computing Curricula 2020 is a joint project launched by professional computing societies to examine the current state of curricular guidelines for academic programs granting undergraduate degrees in computing. It also provides a vision for the future of computing. The team of this international project represents organizations from academia, industry, and government.

A. Project Goal

The goal of the initiative is to produce a comprehensive report that compares and contrasts curricular guidelines to situate and contextualize them in the landscape of computing education. Ultimately, the project strives to help programs to prepare graduates both academically and professionally to meet the challenges of the 2020s.

B. Project Focus

The situation and context of degree granting computing programs are influenced by geography, varied conceptions of computing as disciplines, as professions, and as cultures. Geographically and culturally the project considers regions of the world by involving organizational representatives from a variety of countries. While currently published curricular guidelines (i.e., computer engineering, computer science, information systems, information technology, software engineering) and emerging curricular models (i.e., cybersecurity, data science) comprise CC2020’s central domain of interest, the CC2020 deliverables are intended to inform the prospects for rethinking existing or shaping new computing degree programs and disciplines.

C. Project Outcome

The objective of the CC2020 task force is to produce a comprehensive resource to inform academia, industry, governments, and students on the status and future of computing programs. The task force plans to prepare a comparative analysis of computing disciplines as represented in current curricular

guidelines. It also plans to provide an integrative perspective of the disciplines within the computing landscape as well as illustrating shared and distinctive characteristics of discipline specific computing programs.

Ultimately, the project plans to contribute to a vision of the future of computing. The project intends to develop interactive tools for academia and industry to prototype models of knowledge and skill development useful for exploring future curricular opportunities.

III. WORKSHOP PLAN

This workshop will inform participants on the goals of the CC2020 project and give them an opportunity to learn more about the project structure.

A. Workshop Structure

The workshop organizers will present a high-level summary of the CC2005 report and summarize the aspirations of the CC2020 project. They will initiate an exploration of ways the software engineering education community becomes a viable contributor to the pending CC2020 report. The organizers expect lively audience input and viewpoints through small group discussions and vigorous dialogue among the participants. They expect to hear broad perspectives on future of software engineering curricular developments and the role of software engineering within other disciplines.

B. Workshop Goal

The salient goal of the workshop is to develop a set of attributes that would reflect a strong software engineering education presence in the pending CC2020 report. In that manner, software engineering will have a prominent presence in the future of computing education.

IV. WORKSHOP PRESENTERS

The workshop presenters, together with their brief backgrounds, are as follows.

Richard J. LeBlanc (Seattle University) is a task force member of the CC2020 project. After co-chairing the steering committee that produced the SE2004 software engineering curricular report [2], he was an active member of the CC2005 project task force. He also served on the steering committee that produced the final information technology (IT2008) report [3] and on the CS2013 [4] steering committee, where he chaired the software engineering area subcommittee and conducted activities for the same. He is the moderator of this workshop.

Nancy R. Mead (Carnegie Mellon University) is a task force member of the CC2020 project. She is a Fellow and principal researcher at the Software Engineering Institute (SEI), and Adjunct Professor of Software Engineering at CMU. She is currently involved in the study of security requirements engineering and the development of software assurance curricula. She has more than 150 publications and invited presentations. She is a Fellow and Life Member of IEEE and the IEEE Computer Society, and a Distinguished Educator of the ACM. She serves on the editorial boards for several journals and is a member of numerous advisory boards and committees.

John Impagliazzo (Hofstra University) is a steering committee member of the CC2020 project. He was chair of the steering committee that produced the computer engineering curricular report (CE2016) [5] and was a principal co-author of the committee that produced the CE2004 [6] report. He was an active member of the CC2005 project, allowing him to be a valued contributor to the CC2020 project. He is also a member of the committee of a parallel project for information technology (IT2017) [7]. An IEEE Fellow, an IEEE Life Member, an ACM Distinguished Educator, he will present a brief overview of the CC2005 document and how it evolved over recent years.

V. FORMAT AND AUDIENCE

Because the CC2020 project is emerging, there should be many diverse opinions on the content of the related report. This workshop provides a forum for vigorous discussion and opinion. Hence, a venue for diverse views on the subject and audience participation is essential and most welcome. This 90-minute workshop plans to engage software engineering educators and practitioners so they provide suggestions that could be part of the pending CC2020 report.

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