

# Guest Editorial: Special Section on Computing Education & Learning Technologies

FABRIZIO LAMBERTI, TIZIANA MARGARIA, AND HENRY C. B. CHAN

Technology and education have wandered many separate but rarely intersecting paths throughout the 20th Century. In the 21st Century, the convergence of cost effective computing and networking products, methodologies, and services is finally enabling more researchers and practitioners than ever before to explore innovative ways to use computer technologies to manage and enhance the teaching and learning experience.

Recognizing the importance of these trends, this Special Section solicited submissions belonging to one or all of the three mainstream learning domains, i.e., contents, methodologies, and technologies, addressing the above convergence in matters related, for example, to openness (e.g., source, access, and educational resources), online and hybrid or blended individualized and group instruction, collaborative methodologies, adaptive learning, Big Data and cloud computing applications in education, mobile learning, educational technology standards and social issues (e.g., privacy and security).

Additionally, authors of selected full papers accepted for presentation at the Symposium on Computer Education and Learning Technologies (CELT 2016) of the 40th IEEE Computer Society International Conference on Computers, Software & Applications (COMPSAC 2016) were invited to submit extended version of their works for review.

The Special Session received 12 submissions, and two papers were ultimately accepted for publication.

The first paper by “Highlighter: automatic highlighting of electronic learning documents” by E. Baralis and L. Cagliari deals with the problem of providing electronic textual document used as teaching material with highlights tailored to specific categories of learners. To this aim, the authors present a highlighting tool that, by leveraging text classification techniques, uses manually annotated contents to automatically predict ad hoc highlights. Experimental results confirm the high accuracy that can be obtained today by computer-based highlighting approaches on benchmark datasets.

The second paper by Y. D. Barve *et al.* titled “PADS: Design and implementation of a cloud-based, immersive learning environment for distributed systems algorithms” is an extended version of a work presented at CELT 2016. In this work, the authors present a cloud platform based on principles from Software Product Lines (SPLs) and model-driven engineering (MDE) designed to improve teaching and learning of distributed systems algorithms. The idea is to model a collection of algorithms as variants of a product line, and

to automate the synthesis of these variants using MDE. A prototype implementation is presented, which is successfully applied to use cases based on known algorithms for peer-to-peer file sharing, coordination and consensus management.

We are aware of the fact that, indeed, papers selected for this Special Section represent just a small fraction of the huge amount of work that is being carried out in the field of computing education & learning technologies. Notwithstanding, we hope that they will succeed in stimulating the readers to further dig into the richness of this incredible research field.

We wish to thank both the authors and the reviewers for their great contribution to this Special Section. We are grateful to the Editor-in-Chief, Prof. Fabrizio Lombardi for allowing us to serve as Guest Editors and for the courteous guidance and support offered throughout the whole process.

FABRIZIO LAMBERTI

Politecnico di Torino, Italy

TIZIANA MARGARIA

University of Limerick and Lero, Ireland

HENRY C. B. CHAN

The Hong Kong Polytechnic University, Hong Kong



**FABRIZIO LAMBERTI** received the MSc and PhD degrees in computer engineering from Politecnico di Torino university, Italy. Currently, he is an associate professor in the Department of Control and Computer Engineering of Politecnico di Torino. He has published more than 150 papers in international books, journals and conference proceedings mainly in the areas of learning technologies, computer graphics, human-computer interaction, and intelligent systems. He is a senior member of the IEEE and the IEEE Computer Society and a member of the IEEE Computer Society Technical Committee on Visualization and Graphics. He serves as secretary/treasurer for the IEEE Computer Society, Italy Chapter. He is currently an associate editor of the *IEEE Transactions on Emerging Topics in Computing* and the *IEEE Consumer Electronics Magazine*.



**TIZIANA MARGARIA** received the Laurea in Ingegneria Elettronica and the PhD degree in computer and systems engineering from the Politecnico di Torino. She is currently a full professor of software systems and head of the Department of Computer Science and Information Systems, University of Limerick (Ireland). She is Principal Investigator with Lero, the Irish Software Research Centre and at Confirm, the Irish Research Centre for Smart Manufacturing, where she heads research projects on Scientific Workflows and model-driven HW/

SW Cybersecurity. She is (co-) author of more than 200 internationally refereed papers, Managing editor of STTT (Springer Verlag), founder of the TACAS and ISoLA conference series. She is fellow of the Irish Computer Society and fellow of the SDPS, the Society for the Design and Process Science. In education, she is a founder of FM-SEET, the Formal Methods in SW Engineering Education and Training Workshop, she is involved in the OER initiative, and co-chair of CELT - the IEEE COMPSAC Symposium on Computing Education and Learning Technologies.



**HENRY C. B. CHAN** received the BA and MA degrees from the University of Cambridge, United Kingdom, and the PhD degree from the University of British Columbia, Canada. He is currently an associate professor and associate head of the Department of Computing, The Hong Kong Polytechnic University (PolyU). His research interests include networking/communications, cloud computing, electronic commerce, and computing education. He was the recipient of the 2015 IEEE Computer Society's Computer Science and Engineering Undergraduate Teaching Award for his outstanding contributions to computing education through teaching, mentoring students, and service to the education community. He received four President's awards from PolyU. He was the chair of the IEEE Hong Kong Section in 2012, and the IEEE Hong Kong Section Computer Society Chapter from 2008 to 2009.