Welcome to the second 2013 issue of the IEEE Transactions on Learning Technologies (TLT). With this issue, we are pleased to introduce nine new Associate Editors joining our Editorial Board. Over the last several years, we have seen an increased volume of high-quality submissions. In addition, as technology-enhanced learning spreads to new areas, devices, and modalities, the diversity of these submissions has also been increasing. To accommodate that, we have invited leading researchers in several important areas, such as adaptive educational systems, mobile learning, dialogue-based learning, computing education, game-based learning, and learning objects. We are excited that they have accepted our offer to be on TLT’s board and I hope that you will share our excitement when you see the names and biographies of the new board members listed on the following pages.

The six papers in this issue indicate the diversity of the field, in research methods, technologies, pedagogies, and nationalities of the research teams.

The paper “Intelligent Performance Assessment of Students’ Laboratory Work in a Virtual Electronic Laboratory Environment,” by Ifeyinwa E. Achumba, Djamel Azzi, Victor L. Dunn, and Gloria A. Chukwudebe, presents an interesting development at the crossroads of two popular research areas—virtual labs and intelligent tutoring systems. It explores the application of Bayesian networks, a technology typically associated with intelligent tutoring and student modeling, to support dynamic performance assessment of students interacting with a virtual electronic lab. The presented data demonstrates the feasibility of student performance assessment in this kind of lab from their observed behavior.

The paper “Preparing for Future Learning with a Tangible User Interface: The Case of Neuroscience,” by Bertrand Schneider, Jenelle Wallace, Paulo Blikstein, and Roy Pea, describes and evaluates a low-cost system with a tangible user interface for learning neuroscience. Students can manipulate a tabletop replica of parts of the human brain, overlaid with displayed information about connections between brain regions. A crossover design study with 28 adult participants compared learning from text and from the interactive tabletop. It showed a significant difference in favor of the tabletop, and also that students who used the table and then read a text on the same topic outperformed those who learned from text followed by the table.

In their paper “GreedEx: A Visualization Tool for Experimentation and Discovery Learning of Greedy Algorithms,” J. Ángel Velázquez-Iturbide, Ouafae Debdi, Natalia Esteban-Sánchez, and Celeste Pizarro, a team from Universidad Rey Juan Carlos, is focused on discovery learning of advanced algorithms. The authors share the results of several years of research on a GreedEx visualization tool that was created to support this learning approach. The paper provides details about the system, reviews main stages of its evolution, and presents the results of its evaluation.

In “CASE: A Configurable Argumentation Support Engine,” Oliver Scheuer and Bruce M. McLaren address the challenge of providing automated support for students learning how to argue through diagrams. Tutorial agents analyze patterns of student activity and then provide hints and feedback. Teachers or researchers can configure the pedagogic patterns and behaviors of the agents to support students in understanding argument topics and develop their problem solving and collaboration processes.

The paper “Organizational Learning from the Perspective of Knowledge Maturing Activities” is the result of a large-scale collaboration of 11 researchers from seven different institutions. It presents an extensive study of organizational learning practices based on data collected through telephone interviews with representatives from 126 European organizations. The study is focused on knowledge maturing activities and presents interesting insights that could be useful for researchers well beyond the field of organizational learning.

In “A Practice-Oriented Review of Learning Objects,” Jane Sinclair, Mike Joy, Jane Yin-Kim Yau, and Stephen Hagan offer a practice-oriented survey of reusable learning objects (RLOs) covering the state-of-the-art, maturity of the field, research findings, and controversies. Taking a user’s perspective, it addresses how to find relevant RLOs, how to assess their quality, and, for teachers, how reuse RLOs for successful teaching.

Enjoy your reading and consider TLT for sharing the results of your exciting projects!

Peter Brusilovsky, Editor-in-Chief
Mike Sharples, Associate Editor-in-Chief
Tom Boyle is an emeritus professor at London Metropolitan University. His primary research interest is in establishing principles for technology-enhanced learning that leads to clear, measurable improvements in learning. Underpinning this at a deeper theoretical level is a concern with establishing the conceptual base for an enduring discipline of learning technology. These twin concerns have fed into contributions to a number of areas of research and development. Over the past decade, these areas have included reusable learning objects, reusable learning design, interactive multimedia, authoring tools, mobile learning, and layered learning design. He was the director of the Learning Technology Research Institute (LTRI) at London Metropolitan University from 2000-2012. The LTRI has conducted a wide range of national and European-funded projects on technology-enhanced learning. From 2005-2010, he was the director of the Centre for Excellence in Teaching and Learning (CETL) in Reusable Learning Objects. He has published widely on learning technology, including a book, Design for Multimedia Learning (1997), and extensive refereed and invited papers. Recent invited and keynote papers have been presented at conferences in South America, Hong Kong, Saudi Arabia, Singapore, and Kuwait.

Susan Bull had an undergraduate focus on linguistics, received the master’s degree in communication in computing, and received the PhD degree in artificial intelligence in education from the University of Edinburgh, United Kingdom, in 1997. After research appointments at the University of Brighton, United Kingdom, and University of Saskatchewan, Canada, she is now with the School of Electronic, Electrical, and Computer Engineering at the University of Birmingham, United Kingdom, where she leads the research on adaptive learning environments. Her research interests are in adaptive and intelligent learning environments, with a particular interest in open learner models, learning analytics, visualization, collaborative learning, metacognition, and misconceptions. She has undertaken research on these issues in a range of domains, including STEM and language learning. She is currently contributing in two European projects in the areas of 1) supporting learners, teachers, and other stakeholders through planning, formative assessment, and teacher inquiry using state-of-the-art technology-enhanced learning approaches, and 2) supporting individual and pair learning with empathic embodied virtual and robotic tutors. She has been a member of the executive committee of the Artificial Intelligence in Education Society since 2006, and served as the program cochair for the previous International Artificial Intelligence in Education Conference in 2011. She is currently the program cochair for the 2013 Artificial Intelligence in Education subconference of the International Conference on Computers in Education. She has been involved in other organizational and program committee roles for a range of conferences and workshops in the areas of adaptive and intelligent learning environments, technology-enhanced learning, and user modeling, and has more than 130 peer-reviewed conference and journal contributions.

Gwo-Jen Hwang received the PhD degree in computer science and information engineering from the National Chiao Tung University in Taiwan in 1991. He is currently a chair professor at the National Taiwan University of Science and Technology. Dr Hwang serves as an editorial board member and a reviewer for more than 30 academic journals of educational technology and e-learning. He has also been the principal investigator of more than 80 research projects funded by the National Science Council and Ministry of Education in Taiwan. His research interests include mobile and ubiquitous learning, digital game-based learning, adaptive learning, and artificial intelligence in education. Dr. Hwang has published more than 400 academic papers, including 150 papers in such professional journals as IEEE Transactions on Education, British Journal of Educational Technology, Computers & Education, Educational Technology & Society, Innovations in Education and Teaching International, Interactive Learning Environment, and Computer-Assisted Learning, among others. Owing to his academic research and innovative inventions in e-learning, he received the annual most Outstanding Researcher Award from the National Science Council in 2007 and 2010. Moreover, he has served as the chair of the Special Interest Group of Mobile and Ubiquitous Learning in the Information Technology Education Division of the National Science Council in Taiwan since he was elected in 2007.

Patrick Jermann started his career at TECFA (University of Geneva) developing an online learning environment featuring innovative CSCL scripts. He then worked for three years as a research associate at the University of Pittsburgh in the Learning Research and Development Center (LRDC). There, he designed and developed online environments dedicated to online lesson planning for the Institute for Learning while at the same time conducting experiments toward his doctoral dissertation. In 2003, he joined the CRAFT team at EPFL (Swiss Institute of Technology, Lausanne) as a researcher and coordinator of e-learning projects. He obtained his doctorate in 2004 in computer support for interaction regulation in collaborative problem-solving from the University of Geneva. In 2009, he obtained an Ambizione Grant from the Swiss National Science Foundation to conduct a three year research program on multimodal collaborative interaction modeling.
Rob Koper studied educational psychology with a focus on the use of ICT in education. He is also the dean of the Centre for Learning Sciences and Technologies (celtec.org), the research centre of the Open University of the Netherlands (OU) that aims to research, develop, test, and provide solutions for the advancement of learning at work, at school, at home, and on the move. His personal research concentrates on professional development in self-organized distributed learning networks. In the past, he developed the Educational Modelling Language (the predecessor of IMS Learning Design). He is involved in many different national and international (e.g., European Union) projects and is currently involved in designing and implementing a new educational distance teaching system for all the bachelor’s & master’s programs and the continuing education of the OU, a new university strategy for the use of open educational resources. He has published more than 200 scientific publications in the field of technology-enhanced learning and serves on many editorial boards or scientific conference committees.

Lauri Malmi received the MSc and DTech degrees in computer science from the Helsinki University of Technology, Finland. He worked as a lecturer and researcher in computer science from 1986 to 2001, and thereafter as a professor of computer science at the Helsinki University of Technology, currently known as Aalto University. His main research area is computing education research, where he is leading the Learning + Technology Research Group (LeTech). The main focus of the group has been the development and evaluation of advanced learning environments and learning tools for programming education. These have included tools for automatic assessment and feedback, as well as program and algorithm simulation and visualization tools. His additional research interests include qualitative investigations of how students understand programming concepts and processes, and surveys in computing and engineering education research literature. He led the National Center of Excellence in Education at the Helsinki University of Technology from 2001-2006. He chaired Koli Calling, the International Conference in Computing Education Research in 2004 and 2008, and he is a frequent PC member for the International Computing Education Research Workshop (ICER), Koli Calling, and the Program Visualization Workshop. He is currently a member of the editorial board of the ACM Transactions on Computing Education, ACM Inroads, Informatics in Education, and the IEEE Transactions of Learning Technologies. He is also a board member of the SEFI Engineering Education Research Working Group and Nordic Network in Engineering Education. He has led several international doctoral consortia in computing education research and he has a continuous interest in improving research training in computing and engineering education research.

Antonija (Tanja) Mitrovic received the MSc and PhD degrees in computer science from the University of Nis, Serbia, in 1991 and 1994, respectively. She is now a professor in the Department of Computer Science and Software Engineering in the College of Engineering at the University of Canterbury, New Zealand, and the leader of the Intelligent Computer Tutoring Group (ictg.canterbury.ac.nz). Her research focuses on constraint-based intelligent tutoring systems, especially on the aspects of modeling students’ cognitive, metacognitive, and affective states. She has coauthored more than 180 peer reviewed journal and conference papers. She is a member of AAAI, ACM, AIED, IEEE and APSCE, and an associate editor of the following journals: International Journal of Artificial Intelligence in Education, IEEE Transactions on Teaching and Learning Technologies, and Research and Practice in Technology-Enhanced Learning. She is the president-elect of the International Society for Artificial Intelligence in Education. She has received the AAEE Engineering Education Excellence Award in 2007, the Distinguished Research Award from APSCE in 2011, and the James Chen Annual Award for the best paper published in the User Modeling and User-Adapted Interaction journal in 2011.
Carolyn P. Rosé received the BS degree in information and computer science (magna cum laude) from the University of California at Irvine in 1992. She earned the MS degree in computational linguistics in 1994 and the PhD degree in language and information technologies in 1997 from Carnegie Mellon University. She was the recipient of a Carnegie Scholar Award in 1994. She was a research associate at the Learning Research and Development Center doing pioneering work in the area of tutorial dialogue systems until 2003 when she accepted a faculty position in the School of Computer Science at Carnegie Mellon University, where she is now an associate professor with a joint appointment between the Language Technologies Institute and the Human-Computer Interaction Institute. The goal of her research is to develop technology capable of shaping conversation and supporting effective participation in conversation to achieve a positive impact on human learning, growth, and well-being. In order to pursue this goal, she invokes approaches from computational discourse analysis and text mining, conversational agents, and computer supported collaborative learning. On those topics she has published over 140 peer-reviewed articles in journals and conference proceedings. She was awarded an Honorable Mention at ACM SIG-CHI in 2006 and 2007, as well as other award or award nominations at AI in Education, the Intelligent Tutoring Systems Conference, Computer Supported Collaborative Learning, and the International Conference of the Learning Sciences. She serves on the executive committee of the Pittsburgh Science of Learning Center and is coleader of its social and communicative factors of learning research thrust. She also serves as the secretary/treasurer of the International Society of the Learning Sciences and as an elected member of the CSCL Committee. She serves on the editorial boards of the International Journal of Computer Supported Collaborative Learning, the Journal of Educational Data Mining, the Journal of Dialogue and Discourse, and now the IEEE Transactions on Learning Technologies.

Martin Wolpers received the PhD degree in electrical engineering and information technology from the Leibnitz University Hannover, Germany. He is head of the research group Context and Attention in Personalised Learning Environments within the Fraunhofer Institute for Applied Information Technology - FIT in Sankt Augustin, Germany. He is also a visiting professor at the Katholieke Universiteit Leuven, Belgium. He has been coordinator of large European projects like the IP Role, the eContentPlus project MACE, and NoE PROLEARN. Furthermore, he is currently vice president of the European Association of Technology-Enhanced Learning (EA-TEL). He helped organize a number of conferences and workshops, among them the European Conference on Technology Enhanced Learning (EC-TEL).