

Introduction to the ICME2010 Special Issue

THIS special issue is dedicated to the 2010 IEEE International Conference on Multimedia and Expo (ICME) which was held in Singapore on July 19–23, 2010. ICME was revamped in 2010 by raising the acceptance criteria, adopting a double blind review process, and increasing the paper length. As a result, the conference quality was improved significantly. All in all, ICME 2010 received 630 regular papers and 48 special session papers from over 39 countries submitted to the main conference. After rigorous review, eventually 180 regular papers and 36 special session papers were included in the main conference. Among the regular paper submissions, the top 15% were accepted as oral presentations and additional 15% were accepted as poster presentations. The papers presented at ICME2010 cover a wide range of topics and are representative of the research trends and advances in multimedia. Given that both the IEEE TRANSACTIONS ON MULTIMEDIA (TMM) and ICME are sponsored by the same societies, we believe that it is beneficial to the research community at large to have a special issue that allows the top conference papers to be published quickly in the Transactions.

All the papers accepted for oral presentations at ICME2010 were invited to submit an extended version to this special issue. In total, we received 59 complete submissions. All the papers received at least three reviews. The reviewers were instructed to follow the same review criteria as those for regular TMM papers. In addition, it is required that the extended version must contain at least 30% new content compared to the conference version. After all the reviews were received, the guest editors held a teleconference meeting to make final decisions for all the submitted papers. Out of the 59 submissions, due to the tight publication schedule for the special issue, only 15 papers that received an AQ decision (Accept with Mandatory Minor Revisions) were considered to be included in the special issue. A number of papers that received an RQ decision (Revise and Resubmit) were converted into regular TMM paper submissions.

The revised versions of all the 15 AQ papers were received by the due date stipulated. When the authors of the AQ papers submitted their revised versions, they were asked to submit a document stating their response and action to each specific comment of the reviewers. The guest editors checked the documents carefully before they accepted the papers. At the end, all the 15 papers were accepted and included in this special issue. These papers cover a wide range of topics in multimedia including user interface, content understanding, mobility, 3-D processing, storage, and forensics.

It is an honor for us to serve as the guest editors of the first ICME special issue. Its success is attributed to the tremendous support and dedication from many people in the multimedia research community. We would like to thank all the authors for submitting such high-quality papers to this special issue and all the reviewers for working so hard to provide thoughtful and

timely reviews. Without their efforts, it would have been impossible to ensure the paper quality of this special issue. In addition, we would like to thank both the ICME steering committee and TMM steering committee for their strong support of this special issue. In particular, we would like to thank Drs. Wenjun Zeng and Philip A. Chou for providing many helpful suggestions throughout the process. We would like to thank Drs. Sheila S. Hemami and Mihaela van der Schaar, the past and current Editors-in-Chief of TMM, for their support and assistance during the course of organizing this special issue. Last but not least, we would like to give our special thanks to Ms. Rebecca Wollman for her invaluable professional assistance in the paper review and production process.

ZICHENG LIU, *Guest Editor*
Microsoft Research
Redmond, WA USA

MING-TING SUN, *Guest Editor*
Department of Electrical Engineering
University of Washington
Seattle, WA USA

CHIA-WEN LIN, *Guest Editor*
Department of Electrical Engineering
National Tsing Hua University
Hsinchu, Taiwan

ZHENGYOU ZHANG, *Guest Editor*
Microsoft Research
Redmond, WA USA

ZHU LIU, *Guest Editor*
AT&T Labs Research
Middletown, NJ USA

HOMER H. CHEN, *Guest Editor*
College of Electrical Engineering and Computer
Science
National Taiwan University
Taipei, Taiwan

YAP-PENG TAN, *Guest Editor*
Division of Information Engineering, School of
Electrical and Electronic Engineering
Nanyang Technological University, Singapore

OSCAR C. AU, *Guest Editor*
Department of Electronic and Computer
Engineering
Hong Kong University of Science and Technology
Hong Kong, China



Zicheng Liu (SM'05) received the B.S. degree in mathematics from Huazhong Normal University, Wuhan, China, the M.S. degree in operational research from the Institute of Applied Mathematics, Chinese Academy of Sciences, Beijing, and the Ph.D. degree in computer science from Princeton University, Princeton, NJ.

He is a senior researcher at Microsoft Research, Redmond, WA. He has worked on a variety of topics including combinatorial optimization, linked figure animation, and microphone array signal processing. His current research interests include activity recognition, face modeling and animation, and multimedia collaboration. Before joining Microsoft Research, he worked at Silicon Graphics as a member of technical staff for two years where he developed a trimmed NURBS tessellator which was shipped in both OpenGL and OpenGL-Optimizer products. He has published over 70 papers in peer-reviewed international journals and conferences, and holds over 40 granted patents. He has coauthored a book entitled *Face Geometry and Appearance Modeling* (Cambridge, U.K., Cambridge Univ. Press, 2011).

Dr. Liu has served in the technical committees for many international conferences. He was the co-chair of the 2003 ICCV Workshop on Multimedia Technologies in E-Learning and Collaboration, the technical co-chair of 2006 IEEE International Workshop on Multimedia Signal Processing, and the technical co-chair of 2010 International Conference on Multimedia and Expo. He is an associate editor of *Machine Vision and Applications* journal.



Ming-Ting Sun (S'79–M'81–SM'89–F'96) received the B.S. degree from National Taiwan University in 1976, the M.S. degree from the University of Texas at Arlington in 1981, and the Ph.D. degree from University of California, Los Angeles, in 1985, all in electrical engineering.

He joined the University of Washington in August 1996, where he is a Professor. Previously, he was the Director of the Video Signal Processing Research Group at Bellcore. He has been a chaired/visiting professor at Tsinghua University, Tokyo University, National Taiwan University, National Cheng Kung University, National Chung Cheng University, National Sun Yat-sen University, and Hong Kong University of Science and Technology. He holds ten patents and has published over 200 technical papers, including 14 book chapters in the area of video and multimedia technologies. He co-edited a book *Compressed Video Over Networks* (Boca Raton, FL: CRC, 2000).

Dr. Sun was the Editor-in-Chief of the IEEE TRANSACTIONS ON MULTIMEDIA (TMM) and a Distinguished Lecturer of the Circuits and Systems Society from 2000 to 2001. He received an IEEE CASS Golden Jubilee Medal in 2000, and was the general co-chair of the Visual Communications and Image Processing 2000 Conference. He was the Editor-in-Chief of the IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS FOR VIDEO TECHNOLOGY (TCSVT) from 1995 to 1997. He received the TCSVT Best Paper Award in 1993. From 1988 to 1991, he was the chairman of the IEEE CAS Standards Committee and established the IEEE Inverse Discrete Cosine Transform Standard. He received an Award of Excellence from Bellcore for his work on the digital subscriber line in 1987.



Chia-Wen Lin (S'94–M'00–SM'04) received the Ph.D. degree in electrical engineering from National Tsing Hua University (NTHU), Hsinchu, Taiwan, in 2000.

He is currently an Associate Professor with the Department of Electrical Engineering, NTHU. He was with the Department of Computer Science and Information Engineering, National Chung Cheng University (CCU), Taiwan, during 2000–2007. Prior to joining academia, he worked for the Information and Communications Research Laboratories, Industrial Technology Research Institute (ICL/ITRI), Hsinchu, Taiwan, during 1992–2000, where his final post was Section Manager. From April 2000 to August 2000, he was a Visiting Scholar with Information Processing Laboratory, Department of Electrical Engineering, University of Washington, Seattle. He has authored or coauthored over 90 technical papers. He holds more than 20 patents. His research interests include video content analysis and video networking.

Dr. Lin is an Associate Editor of the IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS FOR VIDEO TECHNOLOGY and the *Journal of Visual Communication and Image Representation*. He has served as a Guest Co-Editor of three special issues for the IEEE TRANSACTIONS ON MULTIMEDIA, the *EURASIP Journal on Advances in Signal Processing*, and the *Journal of Visual Communication and Image Representation*, respectively. He served as Technical Program Co-Chair of the IEEE International Conference on Multimedia & Expo (ICME) in 2010, and Special Session Co-Chair of the IEEE ICME in 2009. He was a recipient of the 2001 Ph.D. Thesis Awards presented by the Ministry of Education, Taiwan. His paper won the Young Investigator Award presented by SPIE VCIP 2005. He received the Young Faculty Awards presented by CCU in 2005 and the Young Investigator Awards presented by National Science Council, Taiwan, in 2006.



Zhengyou Zhang (SM'97–F'05) received the B.S. degree in electronic engineering from Zhejiang University, Hangzhou, China, in 1985, the M.S. degree in computer science from the University of Nancy, Nancy, France, in 1987, and the Ph.D. degree in computer science and the Doctorate of Science (*Habilitation à diriger des recherches*) from the University of Paris XI, Paris, France, in 1990 and 1994, respectively.

He is a Principal Researcher with Microsoft Research, Redmond, WA, and manages the multimodal collaboration research team. Before joining Microsoft Research in March 1998, he was with INRIA (French National Institute for Research in Computer Science and Control), France, for 11 years and was a Senior Research Scientist from 1991. In 1996–1997, he spent a one-year sabbatical as an Invited Researcher with the Advanced Telecommunications Research Institute International (ATR), Kyoto, Japan. He has published over 200 papers in refereed international journals and conferences, and has coauthored the following books: *3-D Dynamic Scene Analysis: A Stereo Based Approach* (New York: Springer-Verlag, 1992); *Epipolar Geometry in Stereo, Motion and*

Object Recognition (Norwell, MA: Kluwer, 1996); *Computer Vision* (Beijing, China: Chinese Academy of Sciences, 1998, 2003, in Chinese); *Face Detection and Adaptation* (San Rafael, CA: Morgan and Claypool, 2010), and *Face Geometry and Appearance Modeling* (Cambridge, U.K., Cambridge Univ. Press, 2011). He has given a number of keynotes in international conferences.

Dr. Zhang is the Founding Editor-in-Chief of the IEEE TRANSACTIONS ON AUTONOMOUS MENTAL DEVELOPMENT, an Associate Editor of the *International Journal of Computer Vision*, and an Associate Editor of *Machine Vision and Applications*. He served as Associate Editor of the IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE from 2000 to 2004, an Associate Editor of the IEEE TRANSACTIONS ON MULTIMEDIA from 2004 to 2009, among others. He has been on the program committees for numerous international conferences in the areas of autonomous mental development, computer vision, signal processing, multimedia, and human-computer interaction. He served as a Program Co-Chair of the *International Conference on Multimedia and Expo (ICME)*, July 2010, a Program Co-Chair of the *ACM International Conference on Multimedia (ACM MM)*, October 2010, and a Program Co-Chair of the *ACM International Conference on Multimodal Interfaces (ICMI)*, November 2010. He is serving as General Co-Chair of the *IEEE International Workshop on Multimedia Signal Processing (MMSp)*, October 2011.



Zhu Liu (M'00–SM'05) received the B.S. and M.S. degrees in electronic engineering from Tsinghua University, Beijing, China, in 1994 and 1996, respectively, and the Ph.D. degree in electrical engineering from Polytechnic University, Brooklyn, NY (now part of New York University), in 2001.

He joined AT&T Labs-Research, Middletown, NJ, in 2000, and is currently a Principal Member of Technical Staff in the Video and Multimedia Technologies and Services Research Department. He is an adjunct professor of the Electrical Engineering Department of Columbia University, New York. His research interests include multimedia content analysis, multimedia databases, video search, pattern recognition, machine learning, and natural language understanding. He holds 13 U.S. patents and has published more than 60 papers in international conferences and journals.

Dr. Liu is on the editorial board of the IEEE TRANSACTIONS ON MULTIMEDIA and the *Peer-to-Peer Networking and Applications Journal*.



Homer H. Chen (S'83–M'86–SM'01–F'03) received the Ph.D. degree in electrical and computer Engineering from University of Illinois at Urbana-Champaign, Urbana, IL.

Since August 2003, he has been with the College of Electrical Engineering and Computer Science, National Taiwan University, Taipei, Taiwan, where he is Irving T. Ho Chair Professor. Prior to that, he held various R&D management and engineering positions with U.S. companies over a period of 17 years, including AT&T Bell Labs, Rockwell Science Center, iVast, and Digital Island. He was a U.S. delegate for ISO and ITU standards committees and contributed to the development of many new interactive multimedia technologies that are now part of the MPEG-4 and JPEG-2000 standards. His professional interests lie in the broad area of multimedia signal processing and communications.

Dr. Chen is an Associate Editor of the IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS FOR VIDEO TECHNOLOGY. He served as an Associate Editor of the IEEE TRANSACTIONS ON IMAGE PROCESSING from 1992 to 1994, a Guest Editor of the IEEE TRANSACTIONS ON CIRCUITS AND

SYSTEMS FOR VIDEO TECHNOLOGY in 1999, and an Associate Editor of *Pattern Recognition* from 1989 to 1999.



Yap-Peng Tan (M'97–SM'04) received the B.S. degree from National Taiwan University, Taipei, Taiwan, in 1993, and the M.A. and Ph.D. degrees from Princeton University, Princeton, NJ, in 1995 and 1997, respectively, all in electrical engineering.

He was the recipient of an IBM Graduate Fellowship from IBM T. J. Watson Research Center, Yorktown Heights, NY, from 1995 to 1997 and was with Intel and Sharp Labs of America from 1997 to 1999. In November 1999, he joined the School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore, where he is presently an Associate Professor and Head of the Division of Information Engineering. His current research interests include image and video processing, content-based multimedia analysis, computer vision, and pattern recognition. He is the principal inventor/co-inventor of 15 U.S. patents in the areas of image and video processing.

Dr. Tan currently serves as the secretary of the Visual Signal Processing and Communications (VSPC) Technical Committee of the IEEE Circuits and Systems Society, a member of the Multimedia Signal Processing (MMSP) Technical Committee of the IEEE Signal Processing Society,

and a voting member of the ICME Steering Committee. He is an editorial board member of the *EURASIP Journal on Advances in Signal Processing* and *EURASIP Journal on Image and Video Processing*, an associate editor of the *Journal of Signal Processing Systems*, and was the General Co-Chair of the IEEE 2010 International Conference on Multimedia and Expo.



Oscar C. Au received the B.A.Sc. degree from the University of Toronto, Toronto, ON, Canada, in 1986, and the M.A. and Ph.D. degrees from Princeton University, Princeton, NJ, in 1988 and 1991, respectively.

After being a postdoctoral researcher in Princeton University for one year, he joined the Hong Kong University of Science and Technology (HKUST) as an Assistant Professor in 1992. He is/has been a Professor of the Department of Electronic and Computer Engineering, Director of Multimedia Technology Research Center (MTrec), and Director of the Computer Engineering (CEPG) Program in HKUST. His main research contributions are on video and image coding and processing, watermarking and light weight encryption, and speech and audio processing. Research topics include fast motion estimation for MPEG-1/2/4, H.261/3/4 and AVS, optimal and fast sub-optimal rate control, mode decision, transcoding, denoising, deinterlacing, post-processing, multi-view coding, scalable video coding, distributed video coding, subpixel rendering, JPEG/JPEG2000, HDR imaging, compressive sensing, halftone image data hiding, GPU-processing, software-hardware co-design, etc. He has published about 300 technical journals and conference papers. His fast motion estimation algorithms were accepted into the ISO/IEC 14496-7 MPEG-4 international video coding standard and the China AVS-M standard. His light-weight encryption and error resilience algorithms are accepted into the China AVS standard. He has five U.S. patents and is applying for over 60 more on his signal processing techniques. He has performed forensic investigation and stood as an expert witness in the Hong Kong courts many times.

Dr. Au is a Board of Governor member of the Asia Pacific Signal and Information Processing Association (APSIPA). He is/was an Associate Editors of the IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS FOR VIDEO TECHNOLOGY (TCSVT), IEEE TRANSACTIONS ON IMAGE PROCESSING (TIP), and IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS, PART 1 (TCAS1). He is on the Editorial Boards of *Journal of Signal Processing Systems*, *Journal of Multimedia*, and *Journal of Franklin Institute*. He is/was the Chairman of CAS Technical Committee on Multimedia Systems and Applications (MSATC) and a member of CAS TC on Video Signal Processing and Communications (VSPC), CAS TC on DSP, SP TC on Multimedia Signal Processing (MMSP), and SP TC on Image, Video and Multidimensional Signal Processing (IVMSP). He served on the Steering Committee of IEEE TRANSACTIONS ON MULTIMEDIA (TMM), and IEEE International Conference of Multimedia and Expo (ICME). He also served on the organizing committee of IEEE International Symposium on Circuits and Systems (ISCAS) in 1997, IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) in 2003, the ISO/IEC MPEG 71st Meeting in 2005, International Conference on Image Processing (ICIP) in 2010, and other conferences. He was General Chair of Pacific-Rim Conference on Multimedia (PCM) in 2007, and chaired both IEEE ICME and Packet Video Workshop in 2010. He won best paper awards in SiPS 2007 and PCM 2007. He was an IEEE Distinguished Lecturer (DLP) in 2009 and 2010, and has been keynote speaker three times.

Dr. Au is a Board of Governor member of the Asia Pacific Signal and Information Processing Association (APSIPA). He is/was an Associate Editors of the IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS FOR VIDEO TECHNOLOGY (TCSVT), IEEE TRANSACTIONS ON IMAGE PROCESSING (TIP), and IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS, PART 1 (TCAS1). He is on the Editorial Boards of *Journal of Signal Processing Systems*, *Journal of Multimedia*, and *Journal of Franklin Institute*. He is/was the Chairman of CAS Technical Committee on Multimedia Systems and Applications (MSATC) and a member of CAS TC on Video Signal Processing and Communications (VSPC), CAS TC on DSP, SP TC on Multimedia Signal Processing (MMSP), and SP TC on Image, Video and Multidimensional Signal Processing (IVMSP). He served on the Steering Committee of IEEE TRANSACTIONS ON MULTIMEDIA (TMM), and IEEE International Conference of Multimedia and Expo (ICME). He also served on the organizing committee of IEEE International Symposium on Circuits and Systems (ISCAS) in 1997, IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) in 2003, the ISO/IEC MPEG 71st Meeting in 2005, International Conference on Image Processing (ICIP) in 2010, and other conferences. He was General Chair of Pacific-Rim Conference on Multimedia (PCM) in 2007, and chaired both IEEE ICME and Packet Video Workshop in 2010. He won best paper awards in SiPS 2007 and PCM 2007. He was an IEEE Distinguished Lecturer (DLP) in 2009 and 2010, and has been keynote speaker three times.