

**2017 Annual Report (June 2016 – May 2017)**  
**Multimedia Systems and Applications Technical Committee**  
**IEEE Circuits and Systems Society**

Chairman: Dr. Zicheng Liu  
Chair-Elect: Dr. Shao-Yi Chien

### **TC Activity Summary**

In the past year, MSA TC members have shown strong leadership in the multimedia research community. Our members have played key roles (e.g. general chairs/program chairs) in organizing many international conferences on multimedia including ICME2016, ECCV2016, APSIPA ASC 2016, WF-IOT 2016, Umedia 2016, ISM 2016, ACM MM 2016, VCIP 2017, ICCV 2017, ICME2018, etc. Our members are also very active in serving as associate editors and EiCs of many IEEE and non-IEEE journals such as TMM, TCSVT, JETCAS, Multimedia Magazine, JVCI, etc. Many members have received prestigious awards and we just name a few here. Prof. Jay Kuo received the Capocelli Prize in 2017 Data Compression Conference. He also received the IEEE Leon K. Kirchmayer Graduate Teaching Award and IS&T Raymond C. Bowman Award. Prof. Shao-Yi Chien received the Ten Outstanding Young Persons Award of Taiwan. Dr. Marta Mrak received the 2017 best paper award of TCSVT. Prof. Nam Ling received the 2016 UMedia best paper award. Dr. Yuan received the 2016 T-MM best paper award.

MSA TC members have continued to advance the state of the art in multimedia by organizing grand challenges, special theme tracks, and publishing high quality papers on the top journals and conferences. In particular, we have seen a lot of activities in machine learning and AI. In ACM Multimedia 2016, Dr. Lei Zhang organized the MS-Celeb-1M Challenge: “Recognizing One Million Celebrities in the Real World”, and Dr. Tao Mei organized the Grand Challenge of Video to Language. Dr. Yen-Kuang Chen organized the special theme track of Internet of Video Things at ISCAS 2017. Prof. Ce Zhu organized a special issue on deep learning with applications to visual representation and analysis. Prof. Chris Lee organized a workshop on intelligent cloud computing for neurodegenerative disease. Dr. Mei organized a special issue on video analysis with deep learning. There are research works on face recognition, person re-identification, object detection, multimodal group behavior analysis, hand segmentation, cooking and eating activity analysis, social network analytics, multi-instance multi-label learning, and theoretical analysis of convolutional neural networks.

## **1. TC Activities June 2016 – May 2017:**

### **1.1. New Election Results**

- ICME steering committee members: Chia-Wen Lin (voting), Ying Li (voting), Wenwu Zhu (non voting), Zicheng Liu (non-voting)
- New members (term: 2017/9~2021/8): Benoit Huet, Ching-Yung Lin, Enrico Magli, Jian Zhang, Jingdong Wang, Lei Zhang, Luciano Volcan Agostini, Pascal Frossard, Tong Zhang, Weisi Lin, Yong Rui, Zhu Li
- New affiliate members: Chang-Su Kim, Ichiro Ide, Jiaying Liu, Jiwen Lu, Jui-Hsin (Larry) Lai, Ngai-Man (Man) Cheung, Toshihiko Yamasaki, Yu-Gang Jiang, Wanqing Li, Zhongxuan Luo, Jie Liang, Jianfei Cai, Chris Lee, Jörn Ostermann

## 1.2. Subcommittees

- TC by-law/P&P sub-committee: Zicheng Liu (Chair), Yen-Kuang Chen, Chia-Wen Lin, Samson Cheung, Joern Ostermann, Anthony Vetro, Yap-Peng Tan
- Technical vision sub-committee: Jian Zhang (Chair), Yen-Kuang Chen, Shao-Yi Chien, JongWon Kim, Yong Rui, Wenjun Zeng
- Membership and election sub-committee: Yap-Peng Tan (Chair), Wenjun Zeng, Enrico Magli, Ying Li
- Award and nomination sub-committee: Anthony Vetro (Chair), Ming-Ting Sun, Ling Guan, Homer Chen, and Pascal Frossard
- T-MM Subcommittee: Ching-Yung Lin (Chair), C.-C. Jay Kuo, Ming-Ting Sun, Yong Rui, Moncef Gabbouj, Anthony Vetro, Pascal Frossard, Wenjun Zeng, Yen-Kuang Chen, Zicheng Liu, Chia-Wen Lin
- On-line community sub-committee:
- TC Newsletters: Shao-Yi Chien

## 2. Technical Committee Meetings:

The Multimedia Systems and Applications Technical Committee in the IEEE Circuits and Systems Society annually organized two TC meetings, which were held in ISCAS and ICME. The details of TC Meetings are enlisted in the following:

### 2.1. Upcoming TC Meeting in ISCAS 2017

Date: 30 May

Time: 12:30—13:30

Location: Essex C, Baltimore Marriott Waterfront

Chairman: Zicheng Liu

Secretary: Shao-Yi Chien

## 3. Members submitted Annual Reports:

First Name	Last Name	Affiliation	Email
Zicheng	Liu	Microsoft Research, USA	zliu@microsoft.com
Shao-Yi	Chien	National Taiwan University, Taiwan	sychien@ntu.edu.tw
Chia-Wen	Lin	National Tsing Hua University	cwlin@ee.nthu.edu.tw
Lei	Zhang	Microsoft, USA	leizhang@microsoft.com
Li	Zhu	Univ of Missouri, USA	lizhu@umkc.edu
Wen-Huang	Cheng	Academia Sinica, Taiwan	whcheng@citi.sinica.edu.tw
Nicu	Sebe	University of Trento, Italy	sebe@disi.unitn.it
C.-C. Jay	Kuo	University of Southern California	cckuo@sipi.usc.edu
Yen-Kuang	Chen	Intel Corp., USA	y.k.chen@ieee.org
Enrico	Magli	Politecnico di Torino, Italy	enrico.magli@polito.it
Ying	Li	IBM, USA	yingli@us.ibm.com
Susanto	Rahardja	Northwestern Polytechnical University, China	susantorahardja@ieee.org
Ichiro	Ide	Nagoya University, Japan	ide@i.nagoya-u.ac.jp
Ngai-Man	Cheung	Singapore University of Technology and Design, Singapore	ngaiman_cheung@sutd.edu.sg
Tao	Mei	Microsoft Research Asia	tmei@microsoft.com
Junsong	Yuan	Nanyang Technological University	jsyuan@ntu.edu.sg
Anthony	Vetro	Mitsubishi Electric Research Labs	avetro@merl.com
Ivan	Bajic	Simon Fraser University, Canada	ibajic@ensc.sfu.ca
Jian	Zhang	University of Technology, Sydney	jian.zhang@uts.edu.au
Samson	Cheung	University of Kentucky	cheung@engr.uky.edu
Ce	Zhu	University of Electronic Science and	eczhu@uestc.edu.cn

		Technology of China	
Jianfei	Cai	Nanyang Technological University	asjfc@ntu.edu.sg
Rongshan	Yu	Institute for Infocomm Research (I2R), Agency for Science, Technology and Research (A*STAR), Singapore	ryu@i2r.a-star.edu.sg
Marta	Mrak	British Broadcasting Corporation (BBC)	marta.mrak@bbc.co.uk
Gwo Giun Chris	Lee	National Cheng Kung University	cle@mail.ncku.edu.tw
Weisi	Lin	Nanyang Technological University	wslin@ntu.edu.sg
Pau-Choo	Chung	National Cheng Kung University	pcchung@ee.ncku.edu.tw
Nam	Ling	Santa Clara University	nling@scu.edu
Wenwu	Zhu	Tsinghua University	wwzhu@tsinghua.edu.cn
Tong	Zhang,	Intel Corp., USA	tong2.zhang@intel.com
Jie	Chen	U. Alberta, Canada	jc65@ualberta.ca
Qi	Tian	U. Texas San Antonio	qi.tian@utsa.edu

## 4. Accomplished Technical Activities (June 2016 to May 2017)

### Conference organizations:

- ISCAS 2016: Ying Li (Area chair), Susanto Rahardja (Session Chair), Jianfei Cai (Track Co-chair), Ivan Bajić (RCM), Ce Zhu (RCM), Rongshan Yu (RCM)
- ICME 2016: Anthony Vetro (Technical Program Co-Chair), Chia-Wen Lin (Publication Chair), Zicheng Liu (Local Chair), Shao-Yi Chien (Social Media Chair), Wen-Huang Cheng (Workshop Organizer -- MMC), Enrico Magli (Workshop organizer – MM-SPARSE), Ying Li (Finance Co-Chair), Junsong Yuan (Publication Chair), Ivan Bajić (Student Program Co-Chair), Samson Cheung (Area Chair, Chair of Workshop), Qi Tian (Best paper committee)
- ACM Multimedia 2016: Ichiro Ide (Area Chair), Lei Zhang (Grand Challenge), Tao Mei (Open Source Software Challenge Chair), Zicheng Liu (Area Chair), Qi Tian (Area Chair)
- MMSP 2016: Jianfei Cai (Area Chair)
- ECCV 2016: Nicu Sebe (Program Chair), Qi Tian (area chair)
- ISCAS 2017: Yen-Kuang Chen (special theme track organizer), Zicheng Liu (Track Chair), Shao-Yi Chien (Track Co-Chair), Jianfei Cai (Track Co-chair), Susanto Rahardja (Session Chair)
- VCIP 2016: Enrico Magli (area chair), Qi Tian (Area Chair, Best paper committee)
- VCIP 2017: Ying Li, Zhu Li (General Chair), Weisi Lin (TPC Chair)
- BigMM 2016: Ying Li (Panel Co-Chair)
- ICASSP 2017: Susanto Rahardja (International Committee), Nam Ling (Exhibit Chair and Demo Chair)
- MVA 2017: Ichiro Ide (Local Arrangement Chair)
- ICIP 2016: Samson Cheung (Area Chair), Ce Zhu (Area Chair)
- IEEE World Forum on Internet of Things (WF-IOT) 2016 (TPC co-chair,)
- FG 2017: Zicheng Liu (Area Chair)
- CVPR2017: Zicheng Liu (Area Chair)
- Umedia 2016: Nam Ling (General Co-Chair)
- ICIEA 2016: Nam Ling (Int'l Advisory Committee)
- ISM 2016: Tong Zhang (Program Co-chair)
- Bay Area Multimedia Forum (BAMMF): Tong Zhang (co-organizer and host)
- ICSC'17 (IEEE Conference on Semantic Computing): Tong Zhang (Panel Co-Chair)
- IEEE Biomedical Circuits and Systems 2016: Jie Chen (Live demo chair).
- PCM 2016,: Qi Tian (TPC chair)

### IEEE and Other Journal Editorships:

- IEEE Transactions on Multimedia: EiC: Wenwu Zhu; Steering committee members: C.-C. Jay Kuo, Zicheng Liu; AEs: Enrico Magli, Susanto Rahardja, Tao Mei, Qi Tian, GE: Qi Tian.
- IEEE Multimedia Magazine: AE: Tao Mei
- IEEE Transactions on Circuits & Systems for Video Technology: Deputy EiC: Shipeng Li; AEs: Junsong Yuan, Ce Zhu, Weisi Lin
- IEEE Transactions on Circuits and System I

- IEEE Transactions on Circuits and Systems-II
- IEEE Journal on Emerging and Selected Topics in Circuits and Systems: EiC: Yen-Kuang Chen; Deputy EiC:; Senior Editors:; Guest Editors:
- IEEE Transactions on Image Processing: AEs: Chia-Wen Lin, Junsong Yuan, Ce Zhu, Jianfei Cai, Weisi Lin
- IEEE Transactions on Signal Processing: AE, Gwo Giun Chris Lee
- IEEE Transactions on Biomedical Circuits and Systems: Pau-Choo Chung
- IEEE Signal Processing Magazine, Senior Editorial Board Members: C.-C. Jay Kuo
- IEEE Journal of Selected Topics on Signal Processing, Senior Editorial Board Members: C.-C. Jay Kuo
- IEEE Signal Processing Magazine: AEs: Ivan Bajić
- IEEE Access: AE: Rongshan Yu
- IEEE Internet of Things Journal: Steering Committee Member: Rongshan Yu
- Journal of Visual Communications and Image Representation (JVCI): Editor-in-Chief: Zicheng Liu; Editorial on board: Ying Li, Susanto Rahardja
- International Journal of Multimedia Information Retrieval (IJMIR): Editorial on board: Ying Li
- ITE Transactions on Media Technology and Applications (MTA): AE: Ichiro Ide
- Pattern Recognition Special Issue on Video Analysis with Deep Learning: GE: Tao Mei
- Signal Processing: Image Communication: Ce Zhu (Area Editor, Guest Editor), Marta Mrak (Area Editor)
- Multidimensional Systems and Signal Processing (Springer): AE: Nam Ling
- Human-centric Computing and Information Sciences (Springer): AE: Nam Ling
- IEEE Journal of Translation Engineering in Health and Medicine, AE, SC member, Jie Chen
- IEEE Trans. Biomedical Circuits and Systems, AE, Jie Chen

#### **Distinguished Lecturer:**

- Distinguished Lecturer of the IEEE Circuit and System Society:
  - Yen-Kuang Chen (2016-2017)
  - Weisi Lin (2016—2017)
  - Lexin Xie (2016-2017)
  - Jie Chen (2016-2017)
- APSIPA Distinguished Lecturer Award (2016.12): Zhu Li

#### **Keynote Speeches:**

- Nicu Sebe: International Conference on Internet Multimedia Computing and Service (ICIMCS 2015), Xi'an, August 2016.
- Nam Ling, "Applying Machine Learning to Sparse Coding in Image Compression," Keynote Speech, the 19th International Conference on Computer and Information Technology (ICCIT), Dhaka, Bangladesh, Dec 18 - 20, 2016.
- Nam Ling, "Rate-Distortion Optimization for Sparse Coding in Image and Video Compression," Keynote Speech, the 2016 International Workshop on Signal Processing with Applications in Scene Investigation, Xi'an, China, Nov 21-22, 2016.
- Tong Zhang, "Intel Architecture powered machine learning," Keynote Speech, Intel Vertical Summit, Zhuhai, China, Oct. 2016.
- Qi Tian, "Person Re-Identification: Benchmarks and Our Solutions", Keynote, ICISCE 2016

#### **Other IEEE services (e.g., CAS BoG, Region presidents, VP, ... ) :**

- **CAS BoG:**
- Award review committee member of IEEE Transactions on Circuits and Systems for Video Technology Best Paper Award: Yen-Kuang Chen
- Award review committee member of IEEE CAS Young Author Award: Yen-Kuang Chen
- CAS Fellow Evaluation Committee: Anthony Vetro
- IEEE SPS Vancouver Chapter: Ivan Bajić (Chair)
- IEEE Region 10 Executive Committee: Gwo Giun Chris Lee
- IEEE Tainan Section BoG: Gwo Giun Chris Lee
- CIS VP for Members Activities: Pau-Choo Chung
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### **Awards and Honors (e.g., Fellow, best paper awards, outstanding services, etc...):**

- New IEEE Fellow (Class of 2017) : Enrico Magli, Lap-Pui Chau, Ce Zhu
- Ten Outstanding Young Persons Award of Taiwan (Republic of China): Shao-Yi Chien
- The Capocelli Prize in 2017 Data Compression Conference (DCC): C.-C. Jay Kuo
- IEEE Leon K. Kirchmayer Graduate Teaching Award: C.-C. Jay Kuo
- IS&T Raymond C. Bowman Award: C.-C. Jay Kuo
- IEEE Circuits and Systems Society John Choma Education Award: C.-C. Jay Kuo
- ACM Distinguished Scientist: Tao Mei
- IAPR Fellow: Tao Mei
- The 2017 CSVT Transactions Best Paper Award: Marta Mrak
- Umedia Best Paper Award (2016): Nam Ling
- Fuzhou University Chair Professorship (2017 - ): Nam Ling
- Changjiang Chaired Professor by Ministry of Education of China: Qi Tian
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### **Upcoming Event and Future Conference Activities**

- ICME 2017: Zicheng Liu (Steering Committee member), Ce Zhu (Technical Program Co-Chair), Gwo Giun Chris Lee (TPC Track Chair), Enrico Magli (Area chair), Samson Cheung (Area Chair), Anthony Vetro (Hot3D Workshop Co-Chair)
- VCIP 2017: Ying Li (General Co-Chair), Weisi Lin (TP Chair), Zicheng Liu (Advisory Committee member), Qi Tian (Tutorial Chair)
- MMSP 2017: Ivan Bajić (Area Chair), Samson Cheung (Area Chair), Ce Zhu (Area Chair), Jianfei Cai (Area Chair), Marta Mrak (industry and demo chair)
- GlobalSIP 2017: Ivan Bajić (Student Program Co-Chair)
- ISM 2017: Ivan Bajić (Publicity Co-Chair)
- ICMR 2017: Nicu Sebe (General Chair)
- ICCV 2017: Nicu Sebe (Program Chair)
- SoICT 2017: Program chair: Ichiro Ide
- ICME 2018: Junsong Yuan (Program Co-Chair)
- SiPS 2018 (Capetown, South Africa): Nam Ling

## **5. TC Significant Activities List**

**[Please list your 2 (or less) most significant activities in the past year (March 2016--May 2017), including paper, special session, special issue, workshop, conference, award, important position, etc]**

- **Chia-Wen Lin**

[Paper] Chao Zhou, Chia-Wen Lin, and Zongming Guo, "mDASH: A Markov decision based rate adaptation approach for dynamic HTTP streaming," *IEEE Trans. Multimedia*, vol. 18, no. 4, pp. 738–751, Apr. 2016.

50-word summary: MPEG-DASH has been widely deployed for video streaming services over the Internet. This paper proposes a novel Markov decision-based rate adaptation scheme for DASH to maximize the quality of user experience under time-varying channel conditions. Experiments demonstrate the good performance of the method in both objective and subjective visual quality.

[Paper] Yu Mao, Gene Cheung, Chia-Wen Lin, and Yusheng Ji, "Image classifier learning from noisy labels via generalized graph smoothness priors," in *Proc. IEEE Workshop on Image, Video, and Multidimensional Signal Processing (IVMSP)*, Bordeaux, France, July 2016.

50-word summary: This paper proposes an approach of image classifier learning from noisy labels. In the method, an undirected graph is constructed using nearest-neighbor search in terms of the similarity between images and graph smoothness priors are used to regularize image classification. This paper won the Best Student Paper Award of IEEE IVMSP 2016.

- **Shao-Yi Chien**

[Paper] [10] Wei-Chih Tu, Shengfeng He, Qingxiong Yang, and Shao-Yi Chien, "Real-Time Salient Object Detection With a Minimum Spanning Tree," in *Proc. the 29th IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Jun. 2016, Las Vegas, USA.

50-word summary: A real-time salient object detection system based on the minimum spanning tree is presented in this paper. The minimum spanning tree representation inherently reveals the object geometry information and largely reduces the search space of shortest paths. The proposed algorithm achieves the leading performance compared to the state-of-the-art methods in terms of efficiency and accuracy.

[Award] Shao-Yi Chien, Ten Outstanding Young Persons Award of Taiwan (Republic of China)

50-word summary: This is an important award for young persons under 40 in Taiwan (Republic of China). Only ten persons are selected for all the fields for one year. Prof. Shao-Yi Chien was awarded in the technology development category because of his contribution in multimedia system and IC design.

- **Lei Zhang**

[Paper] Yandong Guo, Lei Zhang, Yuxiao Hu, Xiaodong He, and Jianfeng Gao. "Ms-Celeb-1M: A dataset and benchmark for large-scale face recognition." In *European Conference on Computer Vision*, 2016.

50-word summary: Face recognition is a fundamental problem in computer vision. This paper proposes a benchmark task to recognize one million celebrities from their face images, and provides a concrete measurement set and the largest training dataset to facilitate research in the area. Since its publish in ECCV'16, the paper has got 20+ citations.

[Grand Challenge] MS-Celeb-1M: Recognizing One Million Celebrities in the Real World. Grand Challenge in ACM Multimedia 2016

50-word summary: To motivate and challenge the academic and industrial research community, we organized a grand challenge in conjunction with ACM Multimedia 2016. The grand change is to encourage researchers to develop the best face recognition techniques to recognize one million people entities identified from Freebase. The challenge was well received with 20+ registered teams.

- **Zhu Li**

[Award] Zhu Li, APSIPA Distinguished Lecturer Award, 2016.12

[Paper]: L. Li, Z. Li, B. Li, D. Liu, and H.-Q. Li, "Pseudo Sequence based 2-D hierarchical reference structure for Light-Field Image Compression", *IEEE Data Compression Conference (DCC)*, Snow Bird, 2017.

- **Wen-Huang Cheng**

[Paper] Wei-Cih Jhou and Wen-Huang Cheng, "Animating Still Landscape Photographs Through Cloud Motion Creation," *IEEE Transactions on Multimedia*, vol. 18, no. 1, pp. 4-13, January 2016. 50-word summary: Animating photographs can create an engaging viewing experience and has long been an active area of multimedia research. This work addresses the generation of dynamic imagery from a still photo through automatic motion creation. Experimental results demonstrate that our approach can produce visually convincing results. Please see <http://mclab.citi.sinica.edu.tw/demo/dynamicimagery.htm> for video demonstrations.

[Conference Organization]

3rd IEEE International Workshop on Mobile Multimedia Computing (MMC 2016) In conjunction with the 2016 IEEE International Conference on Multimedia & Expo (ICME 2016)

<http://mclab.citi.sinica.edu.tw/open/mmc2016/>

Organizers: Wen-Huang Cheng, Kai-Lung Hua, Klaus Schoeffmann, Wolfgang Huerst

50-word summary: The intimate presence of mobile devices in our daily life, such as smartphones and various wearable gadgets like smart watches, has dramatically changed the way we connect with the

world around us. The MMC workshop aims to bring together researchers and professionals from worldwide academia and industry for showcasing, discussing, and reviewing the whole spectrum of technological opportunities, challenges, solutions, and emerging applications in mobile multimedia.

- **Nicu Sebe**

[Paper] X. Alameda-Pineda, J. Staiano, R. Subramanian, L. Batrinca, E. Ricci, B. Lepri, O. Lanz, and N. Sebe, SALSA: A Novel Dataset for Multimodal Group Behavior Analysis, *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 38(8):1706-1720, August 2016.

50-word summary: Propose a novel dataset facilitating multimodal social scene analysis in a natural, indoor environment coping with low-resolution images, lighting variations, numerous occlusions, reverberations and interfering sound sources. We facilitate multimodal analysis by using static surveillance cameras and sociometric badges comprising the microphone, accelerometer, bluetooth and infrared sensors.

[Paper] A. Sartori, D. Culibrk, Y. Yan, R. Job, and N. Sebe, Computational Modeling of Affective Qualities of Abstract Paintings, *IEEE Multimedia*, 23(3):44-54, July-September 2016.

50-word summary: In this study, we show how concepts from art theory can be used to design a computational model that lets a computer predict whether an abstract painting elicits positive or negative emotions in the observer. Our model can be used to generate abstract paintings eliciting intended emotional responses in observers.

- **C.-C. Jay Kuo**

[Award] IEEE Leon K. Kirchmayer Graduate Teaching Award:

50-word summary: The IEEE Graduate Teaching Award was established by the Board of Directors in 1990 and renamed in honor of Leon K. Kirchmayer in 2002. Dr. Kirchmayer was well known and revered throughout the world for his commitment to students and education. This award honors teachers of electrical and electronics engineering and the related disciplines. Recipient selection is administered through the Technical Field Awards Council of the IEEE Awards Board.

[Award] IEEE Circuits and Systems Society John Choma Education Award

50-word summary: The IEEE CAS John Choma Education Award honors the individual with exceptional contributions to education in a field within the scope of the CAS Society. Contributions are quantifiable by publication of textbooks, research supervision of both graduate and undergraduate students, short course development and personal participation in continual education within the field. The award is based on quality, continuity and originality of contribution.

- **Yen-Kuang Chen**

[Editorial] YK Chen continued to serve as the Editor-in-Chief of The IEEE Journal on Emerging and Selected Topics in Circuits and Systems (JETCAS)

50-word summary: The IEEE Journal on Emerging and Selected Topics in Circuits and Systems (JETCAS) is a periodical sponsored by the IEEE Circuit and System Society (CAS- S) which focuses on the publication of special issues on emerging topics that will likely grow over time in scientific and professional importance. Such topics should be preferably interdisciplinary and target works which are expected to become valuable references within and outside CAS- S and even the IEEE. Currently, it publishes 4 special issues every year.

[Award] YK Chen continued to serve as Distinguished Lecturer of the IEEE Circuit and System Society (CAS- S)

50-word summary: Distinguished Lecturer is to serve the needs of the members of the CAS Society to enhance their professional knowledge and vitality by keeping them informed of the latest research results and their practical applications. YK delivered three DL talks in 2016 and one talk in 2017 (so far): California, USA, Tainan, Taiwan, Thessaloniki, Greece, and Oregon, USA. YK are invited to give three more DL talks for the rest of the year.

[Conference Organization] YK Chen organized the special theme track of Internet of Video Things at IEEE International Symposium on Circuits and Systems (ISCAS) 2017.

50-word summary: The IoVT special theme track at IEEE International Symposium on Circuits and Systems (ISCAS) is intended to highlight new trends and technical solutions for Internet of Video Things. It includes two lecture sessions and one panel discussion.

- **Enrico Magli**

[Paper] G. Fracastoro, S. Fosson, E. Magli “Steerable Discrete Cosine Transform,” in IEEE Transactions on Image Processing, v. 26, n. 1, pp. 303-314, Jan. 2017.

50-word summary: This paper presents an extension to the discrete cosine transform, allowing to rotate pairs of basis functions in order to achieve directionality. Optimization algorithms are proposed to select optimal angles, and improved image/video compression results are shown in the paper.

[Paper] D. Valsesia, E. Magli, “Binary adaptive embeddings from order statistics of random projections”, IEEE Signal Processing Letters, v. 24 n. 1, pp. 111-115, Jan. 2017.

Enrico Magli, IEEE Fellow from Jan. 2017

50-word summary: This letter presents an extension of binary embeddings in the case that a reference signal is known. Theoretical properties are derived and a performance improvement is shown in several applications, e.g. image classification.

- **Susanto Rahardja**

[Paper] H.L. Tan, C.C. Ko and S. Rahardja, “Fast Coding Quad-Tree Decisions using Prediction Residuals Statistics for High Efficiency Video Coding (HEVC)”, IEEE Transactions on Broadcasting, Vol. 62, No. 1, pp. 128-133, Mar. 2016.

50-word summary: In this paper, a method to reduce the high encoding time of High Efficiency Video Coding by pruning the coding quad-trees using prediction residuals statistics. Experimental results from HM16.3-based implementations show that the proposed can on average reduce encoding time by about 44% with about 1.0% coding loss.

- **Ichiro Ide**

[Paper] Hiroya Inoue, Takatsugu Hirayama, Keisuke Doman, Yasutomo Kawanishi, Ichiro Ide, Daisuke Deguchi, Hiroshi Murase: “A classification method of cooking operations based on eye movement patterns”, in *Proc. Ninth Biennial ACM Symposium on Eye Tracking Research and Applications (ETRA2016)*, 205-208, Charleston, SC, USA, Mar. 2016.

50-word summary: This work analyzed the relationship between eye movement patterns and cooking operation. In this paper, we specifically introduced two new symbols to represent the patterns; fixation and eye blink. The important finding presented in this paper is that introducing these two symbols allows us to classify and segment cooking operations more accurately.

[Workshop] The 8th Workshop on Multimedia for Cooking and Eating Activities (CEA2016) in conjunction with ICME2016

50-word summary: This workshop is the longest running workshop series on topics related to cooking and eating in the Computer Science field, which I have been involved in the organization from the beginning. This year, I have served as a Program Chair where I selected three oral presentations (Out of which one paper was selected as the best paper) and three poster presentations out of eight submissions.

- **Ngai-Man Cheung**

[U.S. Patent] Oscar Chi Lim Au, Wei Dai, Gene Cheung, Ngai-Man Cheung, Antonio ORTEGA DIEGO. Stream-switching in a content distribution system. U.S. Patent 9462306. 2016.



50-word summary: Stream-switching techniques are applied in a content delivery system. A merge frame is generated as a function of bit-rates, distortion, and a piecewise constant operator. Parameters of the piecewise constant operator are selected to optimize the merge frame.

[Paper] Thanh-Toan Do, Ngai-Man Cheung. Embedding based on function approximation for large scale image search. IEEE Transactions on Pattern Analysis and Machine Intelligence. 2017.

50-word summary: The objective of this paper is to design an embedding method that maps local features describing an image (e.g. SIFT) to a higher dimensional representation useful for the image retrieval problem. In particular, based on the relationship between the linear approximation of a nonlinear function in high dimensional space and the state-of-the-art feature representation used in image retrieval, we propose a new approach based on function approximation.

- **Tao Mei**

[Award] Tao Mei was elected as the Fellow of IAPR and the Distinguished Scientist of ACM for his contributions to large-scale video analysis and applications.

50-word summary: ACM elected 45 Distinguished Members, who are recognized to achieve significant accomplishments or make a significant impact on the computing field. IAPR elected 28 Fellows in the world. The number of fellows elected every two years must not exceed 0.25% of the total IAPR membership.

[Grand Challenge of Video to Language at ACM Multimedia 2016] Tao Mei, Grand Challenge Co-chair, ACM Multimedia, 2016

50-word summary: Video to language has become an emerging research topic in both multimedia and computer vision. This is the first grand challenge for this topic, attracting 77 teams to register and 22 teams to submit their results. A new benchmark dataset named MSR-VTT was released by Microsoft Research Asia.

- **Junsong Yuan**

[Paper] Jiong Yang, Gangqiang Zhao, Junsong Yuan, Xiaohui Shen, Zhe Lin, Brian Price, Jonathan Brandt, "Discovering Primary Objects in Videos by Saliency Fusion and Iterative Appearance Estimation," in IEEE Trans. on Circuits and Systems for Video Technology (T-CSVT), Vol. 26, No. 6, pp. 1070-1083, 2016

50-word summary: we propose a new method for detecting primary objects in unconstrained videos in a completely automatic setting. Here, we define the primary object in a video as the object that presents saliently in most of the frames. We also contribute a new video dataset containing 51 videos for primary object detection with per-frame ground truth labeling.

[Paper] Liuhaio Ge, Hui Liang and Junsong Yuan, Daniel Thalmann, "Robust 3D Hand Pose Estimation in Single Depth Images: from Single-View CNN to Multi-View CNNs," in *Proc. the 29th IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Jun. 2016, Las Vegas, USA.

50-word summary: we propose to first project the hand depth image onto 3 orthogonal planes and utilize these multi-view projections to regress for 2D heat-maps which estimate the joint positions on each plane. These multi-view heat-maps are then fused to produce final 3D hand pose estimation with learned pose priors. We achieve state-of-the-art performance on benchmark datasets.

[Award] Zhou Ren, Junsong Yuan, Jingjing Meng and Zhengyou Zhang, "Robust Part-based Hand Gesture Recognition using Kinect Sensor", in IEEE Trans. on Multimedia (T-MM), Vol. 15, No. 5, pp. 1110-1120, 2013

50-word summary: This paper received 2016 best paper award of IEEE Trans. on Multimedia (T-MM) at ICME 2016, Seattle, USA

- **Ivan V. Bajić**

[Paper] H. Khalilian, I. V. Bajić, and R. G. Vaughan, "Comparison of loudspeaker placement methods for sound field reproduction," *IEEE/ACM Trans. Audio, Speech, and Language Processing*, vol. 24, no. 8, pp. 1364 – 1379, Aug. 2016.

50-word summary: This paper is the first comprehensive study of computational placement of loudspeakers for sound field reproduction. It was selected for the front cover of the July/August double issue of the journal.

- **Jian Zhang**

[paper] Yucheng Wang, Jian Zhang, Zicheng Liu, Qiang Wu, Phil Chou, Zhengyou Zhang. & Yunde Jia. 2016, 'Handling Occlusion and Large Displacement through Improved RGB-D Scene Flow Estimation', *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 26, no. 7, pp. 1265-1278.

**50-words summary:** This paper is to develop an extension on functionality of Kinect by proposing an improved dense scene flow (3D) method based on red-green-blue-depth (RGB-D) data. We model the occlusion status and jointly estimate the scene flow and occluded regions. We use over-parameterized scene flow to model the rotation and translation.

[paper] Shangrong Huang, Jian Zhang, Lei Wang, Xian-sheng Hua, 2016, 'Social Friend Recommendation Based on Multiple Network Correlation', *IEEE TRANSACTIONS ON MULTIMEDIA*, vol. 18, no. 2, pp. 287-299.

**50-words summary:** This paper develops a social media analysis framework by investigating the structure of social networks and an algorithm for network correlation-based social friend recommendation (NC-based SFR). To accomplish this goal, we correlate different “social role” networks, find their relationships and make friend recommendations. We conduct experiments on the Flickr network.

- **Samson Cheung**

[Paper] Wang, Z., Y. Luo, and S.-C. Cheung. 2016. Information-Theoretic Secure Multi-Party Computation With Collusion Deterrence. *IEEE Transactions on Information Forensics and Security*, vol. 12, no. 4, April 2017, pp. 980-995.

50-word summary: With increasing popularity of distributed computing, privacy in computation is critical but most cryptographic approaches are too complex for signal processing. Information-theoretic approaches are much faster but are prone to collusion attacks. This work is the first to use game-theoretic methods to analyze and deter collusion attacks in such settings.

[Paper] Sajid, H. and S.-C. Cheung. 2016. Universal Multimode Background Subtraction. *IEEE Transactions on Image Processing*, vol. 26, no. 7, pp. 3249-3260, July 2017.

50-word summary: The proposed system has one of the best results in the Change Detection (CD-net) public dataset and can achieve real-time performance. The universal nature of system allows it to robustly handle multitude of challenges associated with video change detection such as illumination changes, dynamic background, camera jitter, moving camera etc.

- **Ce Zhu**

[Invited Overview Talk] Ce Zhu, “Towards Global Rate Distortion Optimization in Video Coding: Recent Advances”, Asia-Pacific Signal and Information Processing Association (APSIPA) Annual Summit and Conference (ASC), Dec. 2016, Jeju, Korea

50-word summary: Rate-distortion optimization (RDO) is crucial in video coding which is generally performed on each coding unit independently without considering the strong dependency among coding units, resulting in a substantial loss in coding efficiency. In the talk, the speaker presented their recent work on temporally dependent RDO, demonstrating significant coding gains with little increase of encoding time.

[Special Issue] Ce Zhu (Guest Editor), Special Issue on Deep learning with applications to visual representation and analysis, *Signal Processing: Image Communication*, September 2016

50-word summary: Deep learning has achieved record-breaking performance on a spectrum of visual analysis tasks. However, the full potential of deep learning for visual representation and analysis has yet to be explored with many theoretical and practical issues unsolved. This special issue reports new

research explorations in employing, improving, and designing deep learning algorithms for visual representation and analysis.

- **Jianfei Cai**

[Paper] D. Xu, Q. Duan, J. Zheng, J. Zhang, J. Cai and T. J. Cham, “Shading-based surface detail recovery under general unknown illumination”, IEEE T-PAMI, Feb. 2017.

50-word summary: Reconstructing the shape of a 3D object from multi-view images under unknown, general illumination is a fundamental problem in computer vision and high quality reconstruction is usually challenging especially when fine detail is needed and the albedo of the object is non-uniform. This paper introduces vertex overall illumination vectors to model the illumination effect and presents a total variation (TV) based approach for recovering surface details using shading and multi-view stereo (MVS).

[Paper] H. Yang, J. T. Zhou, J. Cai and Y. S. Ong, “MIML-FCN+: multi-instance multi-label learning via fully convolutional networks with privileged information”, IEEE CVPR 2017.

50-word summary: Multi-instance multi-label (MIML) learning has many interesting applications in computer visions, including multi-object recognition and automatic image tagging, where additional information such as bounding-boxes, image captions and descriptions is often available during training phase, which is referred as privileged information (PI). However, as existing works on learning using PI only consider instance-level PI, they fail to make use of bag-level PI available in MIML learning. Moreover, the existing works are not SGD-compatible and thus they fail to benefit from rapid developments of deep learning. Therefore, in this paper, we propose a two-stream fully convolutional network, named MIML-FCN+, unified by a novel PI loss to solve the problem of MIML learning with privileged bags.

- **Marta Mrak**

#### **Workshop organization: IEEE MMSP 2017**

Marta Mrak has been active in organization of MMSP workshop. Her key activities were in her role of the industry and demo chair, as well as special session organizer. In particular she initiated a special session under title “Enabling convergence of new forms of media”

Special session synopsis: With wide availability of consumer products that provide high quality visual experiences at home as well as content capture from mobile devices, many vibrant examples of fascinating new applications and services can be unleashed. Such products enable new forms of media such as User Generated Content (UGC) to reach not only social media services, but also broadcast programmes, which are typically characterised by high content quality. This challenging media landscape is underpinned by numerous video processing technologies that support efficient media production and delivery. The aim of this special session is to present some of the most recent findings from the research community, to tackle the new exciting challenges required to enable this next generation of multimedia services. Topics that will be covered include but are not limited to: encoding and delivery of UGC and legacy content (fast and efficient video compression of UGC or legacy material, adaptive streaming at low-to-high bitrates, etc.); processing and enhancement of UGC and legacy content (upsampling, super-resolution, image denoising, dynamic range adaptation, etc.); assessment and analysis of UGC and legacy content.

#### **The 2017 CSVT Transactions Best Paper Award**

**Paper: “Video Quality Evaluation Methodology and Verification Testing of HEVC Compression Performance,” IEEE Transactions on Circuits and Systems for Video Technology**

**Year: 2016, Volume: 26, Issue: 1**

**Authors: Thiw Keng Tan, Rajitha Weerakkody, Marta Mrak, Naeem Ramzan, Vittorio Baroncini, Jens-Rainer Ohm, and Gary J. Sullivan**

This paper focuses on video quality assessment metrics and performance evaluation of the latest video compression standard, H.265/HEVC. The formal subjective verification of the HEVC performance presented in this paper was the task given to the authors by the HEVC video codec standardisation group, which was a major effort by several hundred experts from the industry and academia within the JCT-VC group formed jointly by the two international standardisation organisations (ISO/IEC’s MPEG

and ITU-T's VCEG). The paper provides detailed descriptions of the test and analysis methodology, while also introducing new tools and interpretations to the subjective test results using techniques well established in statistical analysis.

Since it was published in January 2016 the paper has been very popular and well received: It appeared coupl of times in the monthly IEEE most popular paper list and has 14,000 full text views in the IEEE Xplore Digital Library (as of May 2017). The paper has become an accepted point of reference in the area it covers, creating a significant impact in various areas that involve distribution of video content.

- **Gwo Giun Chris Lee**

[Workshop] Gwo Giun Lee, Ming-Chyi Pai, Thomas Beach, Kewei Chen, Martin Nordling, Tzu Cheng Chao, "Workshop on Intelligent Cloud Computing for Neurodegenerative Disease", EE Dept.,NCKU, Tainan, Taiwan, Oct. 27<sup>th</sup>, 2016.

Together with Prof. Ming-Chyi Pai, MD, PhD and Neuropsychologist of NCKU, Prof. Thomas Beach, MD, PhD, Neuropathologist and Prof. Kewei Chen, Neuroimaging Scientist of Banner Research Institute and Arizona State University, and Prof. Tzu Cheng Chao, MRI Scientist from CSIE Dept. of NCKU organized a cross-disciplinary workshop with Gwo Giun Lee to address the issues of identification of biomarkers for the prediction of onset of Alzheimer Disease (AD). Gwo Giun Lee was using Convolution Neural Network in Deep Learning as an overall framework for onset of AD based on neuropsychological data provided by Prof. Ming-Chyi Pai, Neuropathological data provided by Prof. Thomas Beach, and Neuroimaging data provided by Prof. Kewei Chen.

- **Weisi Lin**

[Paper] S. Guntuku, J. T. Zhou, S. Roy, W. Lin, I. W. Tsang, "Understanding Deep Representations Learned in Modeling User 'Likes'", IEEE Transactions on Image Processing, 25(9): 3762 - 3774, 2016.

50-word summary: Automatically understanding and discriminating different users' liking for an image is challenging, because the relationship between image features and users' likes is non-linear, influenced by subtle factors. This paper presents a deep bi-modal knowledge representation of images based on their visual content and associated tags (text).

[Paper] K. Gu, S. Wang, H. Yang, W. Lin, G. Zhai, X. Yang, W. Zhang, "Saliency-Guided Quality Assessment of Screen Content Images", IEEE Transactions on Multimedia, 18(6): 1098 - 1110, 2016.

50-word summary: With widespread adoption of multidevice communication, screen content images (SCIs) have become closely related to our daily life. For SCIs, accurate visual-quality assessment, high-efficiency compression, and suitable contrast enhancement have currently attracted increasing attention. In this work, we develop a new objective metric for perceptual quality assessment of distorted SCIs.

- **Pau-Choo Chung**

[Paper] Wei-Cheng Wang, Chien-Yu Chiou, Chun-Rong Huang, Pau-Choo Chung, Wei-Yun Huang "Spatiotemporal Coherence based Annotation Placement for Surveillance Videos" accepted in IEEE Transactions on Circuits & systems for Video Technology 2017

Summary: This paper presents optimization based on multiple criterion for best placing the annotations on the surveillance videos. With the approach, the annotation can be arranged in a way best serving the user view, considering the smoothness, the best clarification, best temporal spatial consistency.

- **Zicheng Liu**

[Paper] Weiyao Lin, Yang Zhou, Hongteng Xu, Junchi Yan, Mingliang Xu, Jianxin Wu, and Zicheng Liu,, "A Tube-and-Droplet-based Approach for Representing and Analyzing Motion Trajectories," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, accepted, 2016

50-word summary: The paper proposes a new representation for motion trajectory analysis based on thermal propagation theory. The representation can be used for trajectory clustering, abnormal event detection, and 3D action recognition.

- **Nam Ling**

[Paper] Jianjun Lei, Bingren Wang, Yuming Fang, Weisi Lin, Patrick Le Callet, Nam Ling, and Chunping Hou, "A Universal Framework for Salient Object Detection," *IEEE Transactions on Multimedia*, Vol. 18, No. 9, pp. 1783 – 1795, September 2016.

50-word summary: Novel universal framework for salient object detection: Rough salient regions are extracted with distance weighting, adaptive binarization, and morphological closing. With superpixel segmentation, a Bayesian decision model is adopted to refine rough saliency map. Iterative optimization is designed to obtain better saliency results. Experiments demonstrate promising performance subjectively and objectively.

[Conference] Delivered keynote at ICCIT'2016 in Dhaka, Bangladesh; General Co-Chair for Umedia 2016 in Moscow, Russia.

50-word summary: These were significant because the work enhanced and promoted IEEE into two countries that have very little IEEE involvement traditionally – Bangladesh and Russia.

- **Wenwu Zhu**

IEEE Transactions on Multimedia, EiC

ICME steering Committee Member

- **Tong Zhang**

[Key Note] "Intel Architecture powered machine learning," Keynote Speech at Intel Vertical Summit, Zhuhai, China, Oct. 2016.

During the last one and half years, I've been representing Intel as the chief machine learning architect to guide all AI related customer engagements and ecosystem development in China and other Asian countries (Japan, Korea, Taiwan, etc.) and served as keynote speaker or panelist in a number of events

- **Jie Chen**

[Paper] Oleksandra Savchenko, Jida Xing, Xiaoyan Yang, Quanrong Gu, Mohamed Shaheen, Min Huang, Xiaojian Yu, Robert Burrell, Prabir Patra and Jie Chen, "Algal Cell Response to Pulsed Waved Stimulation and Its Application to Increase Algal Lipid Production", *Scientific Reports*, 7(42003) 2017  
50-word summary: We report for the first time the physiological changes of algal cells in response to a novel form of mechanical stimulation, or a pulsed wave at the frequency of 1.5 MHz and the duty cycle of 20%.

- **Qi Tian**

[Honor] 2016 Top 10 Most Influential Scholar in Multimedia

50-word summary: The AMiner Most Influential Scholar Annual List names the world's top-cited research scholars from the fields of science and engineering. The 2016 winners are among the most-cited scholars from the top venues of their respective subject fields as of 2016.

[Honor] Changjiang Chaired Professor by Ministry of Education of China (class of 2017)

50-word summary: The Changjiang (Yangtze River) Scholar award, is the highest academic award issued to an individual in higher education by the Ministry of Education of the People's Republic of China. The award is also known as the "Cheung Kong Scholar" award.