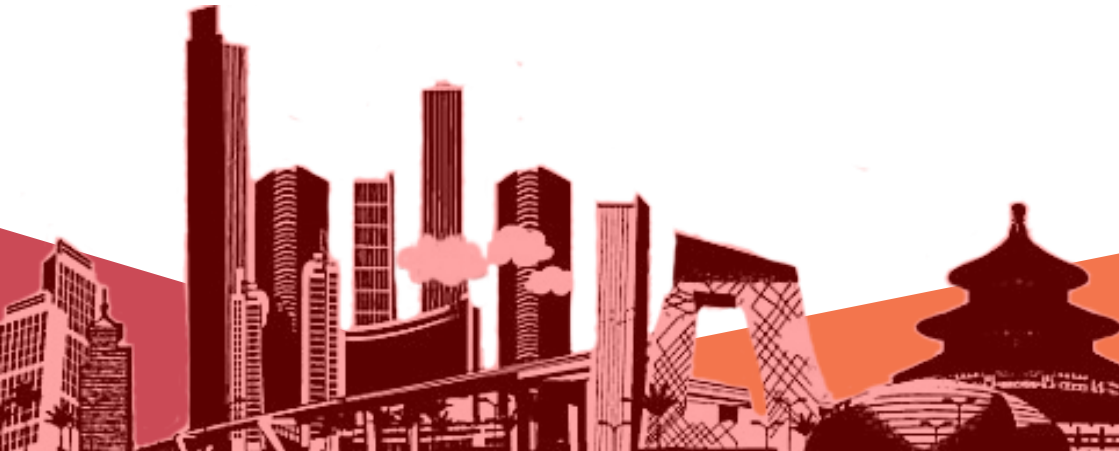
IEEE IEEE COMPUTER SOCIETY IEEE VGTC SIGCHI BSIG

ISMAR 2019

BEIJING

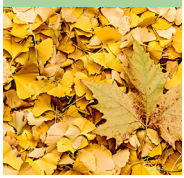
The 18th IEEE International Symposium on
Mixed and Augmented Reality

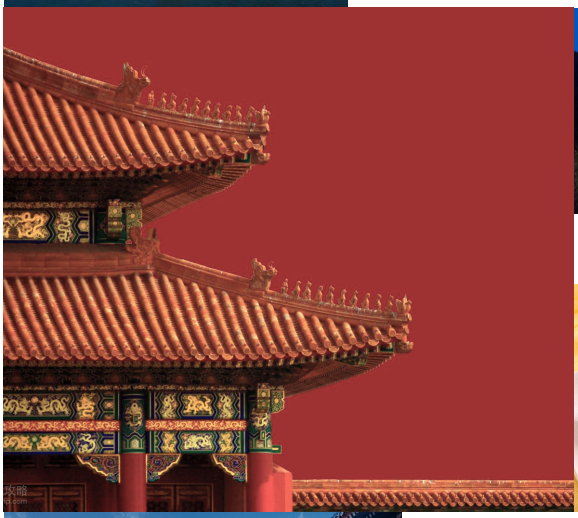
Oct 14-18, 2019

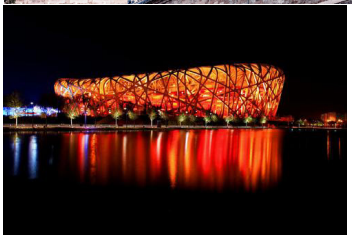


ISMAR 2019

SUMMARY







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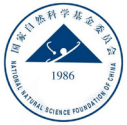


Welcome to IEEE ISMAR 2019

It is our great pleasure to welcome you to the 18th IEEE International Symposium on Mixed and Augmented Reality (ISMAR 2019). ISMAR 2019 will be held on October 14-18 in Beijing, the capital of China and a city with great history, outstanding beauty and delicious cuisines, and this is the first time that ISMAR comes to China in its history of more than 20 years.

With the increasing interest and significance of the research on mixed and augmented reality, there is a growing demand for international exchange and collaboration. Over the years, ISMAR has established itself as the premier academic conference in the field. Cutting-edge technologies and applications will be discussed in ISMAR 2019, which will include 50 oral presentations, 109 poster presentations, 24 demonstrations, 1 SLAM challenge, 1 doctoral consortium, 6 workshops, 3 tutorials, 9 exhibitors, 12 sponsors and more than 400 participants.

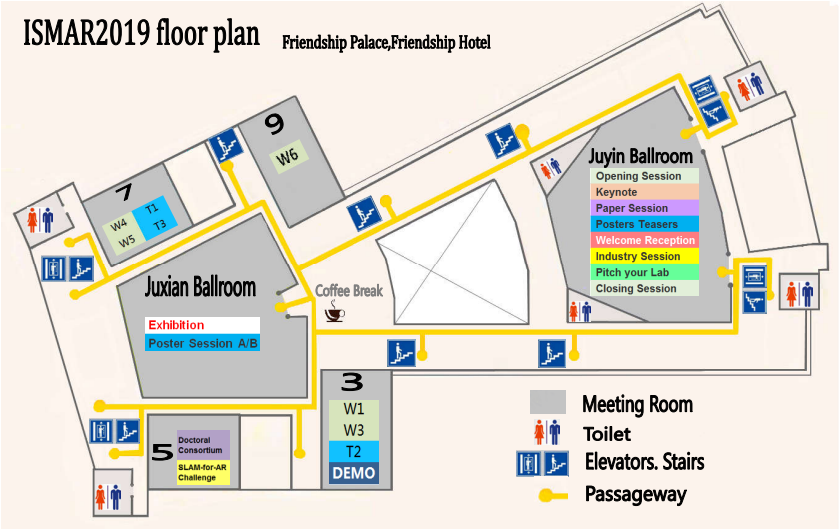
We are very excited to have invited 3 visionary speakers to give keynote talks. They are Academician Wen Gao of Peking University, Prof. Xiaoou Tang of the Chinese University of Hong Kong, and Dr. techn. Dieter Schmalstieg of Graz University of Technology.

We are extremely grateful to numerous volunteers and sponsors, including the organizing and program committee members and reviewers, IEEE, Beijing Society of Image and Graphics, Beijing Institute of Technology, Beihang University and many corporate supporters, who have made this conference possible. We would also like to express our sincere gratitude to the National Natural Science Foundation of China and Beijing Association for Science and Technology for their invaluable support.

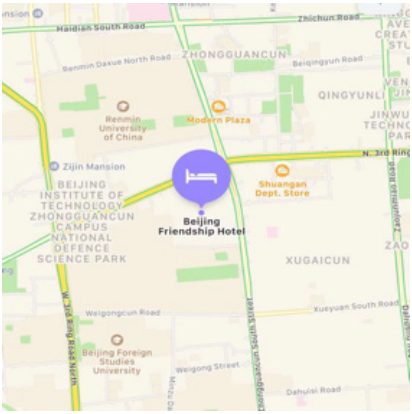
We hope that each and every participant will find ISMAR 2019 to be an engaging, inspiring, insightful, informative, and, last but not least, enjoyable conference!

Qinping Zhao, Beihang University
Yongtian Wang, Beijing Institute of Technology
Henry B.L. Duh, La Trobe University

Space Layout



Public Transportation



	Beijing Capital International airport (35 km)	Beijing Daxing International Airport (59 km)	Beijing West Railway Station (12 km)	Beijing South Railway Station (20 km)
By airport bus	Take airport bus line 4 (Gongzhufen line, between 06:00-last 02:00) about 30 minutes / 7 stops. Then walk 720 metres to the Friendship Hotel (about 11 minutes).	Take airport bus Beijing south railway station line, transfer to Metro Line 4 and follow the direction under Beijing South Railway Station, or take a taxi.		
By taxi	Take about 50 minutes to arrive and cost about 120 RMB.	Take about 80 minutes to arrive and cost about 260 RMB.	Take about 25 minutes to arrive and cost about 50 RMB.	Take about 35 minutes to arrive and cost about 75 RMB.
By subway	Take the airport subway line to Sanyuanqiao, transfer to Metro Line 10 to Haidian Huangzhuang, and then transfer to Metro Line 4 (Tiangongyuan direction). Get off at Renmin University and take the southwest exit D. Walk 287 meters to the Friendship Hotel (about 5 minutes). Cost 30 RMB.	Take the new airport subway line to Caoqiao, transfer to Metro Line 10 to Haidian Huangzhuang, and transfer to Metro Line 4 ((Tiangongyuan direction). Get off at Renmin University and take the southwest exit D. Walk 287 meters to the Friendship Hotel (about 5 minutes). Cost 35 RMB.	Take Metro Line 9 to National Library, and transfer to Metro Line 4 (Anheqiao North direction). Get off at Renmin University and take the southwest exit D. Walk 287 meters to the Friendship Hotel (about 5 minutes). Cost 4 RMB.	Take Metro Line 4 (Anheqiao North direction). Get off at Renmin University and take the southwest exit D. Walk 287 meters to the Friendship Hotel (about 5 minutes). Cost 5 RMB.

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Program

Day 1 Monday - Oct 14th (Friendship Palace, Friendship Hotel)

Time	Meeting Room 3	Meeting Room 5	Meeting Room 7	Meeting Room 9
09:00-10:30	W3: Mixed Reality and Accessibility	Doctoral Consortium	W4: Augmenting Cities and Architecture with Immersive Technologies	W6: AR & MR Technology for Ubiquitous Educational Learning Experience
10:30 - 11:00	Coffee Break			
11:00-12:30	W3: Mixed Reality and Accessibility	Doctoral Consortium	W4: Augmenting Cities and Architecture with Immersive Technologies	W6: AR & MR Technology for Ubiquitous Educational Learning Experience
12:30 - 13:30	Lunch Break			
13:30-15:00	W3: Mixed Reality and Accessibility	SLAM-for-AR Challenge	T1. OpenARK — Tackling Augmented Reality Challenges via an Open-Source Software Development Kit	W6: AR & MR Technology for Ubiquitous Educational Learning Experience
15:00 - 15:30	Coffee Break			
15:30-17:00	W3: Mixed Reality and Accessibility	SLAM-for-AR Challenge	T1. OpenARK — Tackling Augmented Reality Challenges via an Open-Source Software Development Kit	W6: AR & MR Technology for Ubiquitous Educational Learning Experience

Day 2
Tuesday - Oct 15th
(Friendship Palace, Friendship Hotel)

Time	Juying Ballroom
09:00-09:30	Opening Session
09:30-10:30	Keynote 1: Academician Wen Gao
10:30-11:00	Coffee Break
11:00-12:15	S1: Tracking and Reconstruction
12:15-13:15	Lunch Break
13:15-14:45	S2: Modeling and Rendering
14:45-15:15	Coffee Break
15:15-16:30	S3: Acquisition and Manipulation
16:30-17:30	Posters Teasers Group
17:30-19:30	Poster Group A
19:30-21:00	Welcome Reception
10:00-19:30	EXHIBITION JUXIAN BALLROOM

Day 3
Wednesday - Oct 16th
(Friendship Palace, Friendship Hotel)

Time	Juying Ballroom
08:30-09:30	S4: Spatial Augmented Reality and Near Eye Displays
09:30-10:00	Coffee Break
	Poster Group B
10:00-11:00	Keynote 2: Prof. Xiaoou Tang
11:00-12:30	Industry Session
12:30-13:30	Lunch Break
	Poster Group B
13:30-14:45	S5: Perception and Presence
14:45-15:15	Coffee Break
	Poster Group B
15:15-16:30	S6: Locomotion
16:30-17:15	Pitch your Lab
18:30-20:30	Banquet(Seafood buffet) Olympic Village night Bird's nest
10:00-17:30	Demo-Meeting Room 3
10:00-17:30	EXHIBITION JUXIAN BALLROOM

Day 4
Thursday - Oct 17th
(Friendship Palace, Friendship Hotel)

Time	Juying Ballroom
08:30-09:45	S7: Multimodal and Long Term Usage
09:45-10:15	Coffee Break
10:15-11:15	Keynote 3: Dr.techn. Dieter Schmalstieg
11:15-12:30	S8: Collaboration and Entertainment
12:30-13:30	Lunch Break
13:30-14:45	S9: Selection and Text Entry
14:45-15:15	Coffee Break
15:15-16:45	S10: Training and Learning
16:45-17:30	Closing Session
10:00-15:30	Demo-Meeting Room 3
10:00-15:30	EXHIBITION JUXIAN BALLROOM

Day 5 Friday - Oct 18th (Friendship Palace, Friendship Hotel)

Time	Meeting Room3	Meeting Room5	Meeting Room7
09:00 - 10:30	W1: Mixed/Augmented Reality and Mental Health	W2: Extended Reality for Good (XR4Good)	T3: Bridging the gap between research and practice in AR
10:30 - 11:00	Coffee Break		
11:00 - 12:30	W1: Mixed/Augmented Reality and Mental Health	W2: Extended Reality for Good (XR4Good)	T3: Bridging the gap between research and practice in AR
12:30 - 13:30	Lunch Break		
13:30 - 15:00	T2: Interaction Paradigms in MR – Lessons from Art	W2: Extended Reality for Good (XR4Good)	W5: XR-aided Design (XRAD): next generation of CAD tools
15:00 - 15:30	Coffee Break		
15:30 - 17:00	T2: Interaction Paradigms in MR – Lessons from Art	W2: Extended Reality for Good (XR4Good)	W5: XR-aided Design (XRAD): next generation of CAD tools

(lunches on Oct. 14-18 will be provided by the organizer on the first floor)

Keynote 1: AVS3 -- A New Generation of Video Coding Standard for Super High Vision and VR/AR

(Juying Ballroom, Oct 15th, 09:30 - 10:30)

Academician Wen Gao

Peking university

Abstract

4K video format is becoming a majority in TV device market, and 8K video format is in coming, by two major driving forces from industries. The first is the flat panel industry which makes the panel resolution higher and higher, and the second is the video broadcasting industry which makes content more and more rich, like super high vision, HDR, VR and AR. Whatever when content becomes rich, it result a sharp increase in data. So, a more efficient video coding standard will be the key in this case. Actually video coding standards have play the key role in TV industry in last three decades, such as MPEG1/2 created digital TV industry from 1993, MPEG4 AVC/H.264 and AVS+ supported HDTV industry from 2003, HEVC/H.265 and AVS2 supported 4KUHD TV from 2016. Now, 8KUHD is coming, which supposes to support VR/AR, with 4-10 times data size compared to last generation. Therefore a new generation of video coding standard is expected to be created for this new demand.

AVS3 is the third generation video coding standard developed by China Audio and Video Coding Standard Workgroup (AVS), which targets to the emerging 8KUHD and VR/AR applications. And the first phase of AVS3 was released in March 2019. Compared to the previous AVS2 and HEVC/H.265 standards, AVS3 can achieve about 30% bitrate saving. Recently, Hisilicon announced the world first AVS3 8K video decoder chip at IBC2019, which supports 8K and 120P(fps) real time decoding. That indicates the opening of a new era of 8K and immersive video experience. This talk will give a brief introduction to the AVS3 standard, including the development process, key techniques, and the applications. This talk will report the recent developments of video coding standard, specifically on new algorithms of coding tools, VR/AR, and deep learning.

Biography

Wen Gao now is a Boya Chair Professor at Peking university. He also serves as the president of China Computer Federation (CCF) from 2016.

He received his Ph.D. degree in electronics engineering from the University of Tokyo in 1991. He joined with Harbin Institute of Technology from 1991 to 1995, and Institute of Computing Technology (ICT), Chinese Academy of Sciences (CAS) from 1996 to 2005. He joined the Peking University in 2006.

Prof. Gao works in the areas of multimedia and computer vision, topics including video coding, video analysis, multimedia retrieval, face recognition, multimodal interfaces, and virtual reality. His most cited contributions are model-based video coding and face recognition. He published seven books, over 220 papers in refereed journals, and over 600 papers in selected international conferences. He is a fellow of IEEE, a fellow of ACM, and a member of Chinese Academy of Engineering.

Keynote 2: AI + AR: Magic in the AIR

(Juying Ballroom, Oct 16th, 10:00 - 11:00)

Prof. Xiaoou Tang

The Chinese University of Hong Kong

Abstract

With the rapid development of hardware and software technologies, Augmented Reality (AR) is maturing and getting more involved in a variety of aspects in people's lives and work. Essential goal of AR is to fuse the digital elements into real world in a seamless way, and to make this happen, understanding then structuralizing the physical world becomes the prerequisites task. Today's AI technology make it possible for us to accurately comprehend the real world. With the combination of AI and AR, brand-new perceptual enriched experience will be created.

In this talk, we take an ordinary working day of SenseTime employee as an example, to showcase how AI+AR is changing the way we live and work, from daily morning makeups, to human-morphic digital receptionist; from AR enabled route navigation, to multi-player interactive gaming experiences. AI is enlarging the boundary of AR application scenarios, while laying solid cornerstones to the further commercialization of AR.

Biography

Prof. Xiaoou Tang is the founder of SenseTime, a leading artificial intelligence (AI) company focused on computer vision and deep learning. Prof. Tang is also a professor at the Department of Information Engineering at the Chinese University of Hong Kong, the Associate Director of the Shenzhen Institute of Advanced Technology of the Chinese Academy of Science.

Professor Tang is an IEEE fellow, a general chair of the ICCV in 2019 and the Editor-in-Chief of the International Journal of Computer Vision (IJCV), one of the two leading journals on computer vision. Professor Tang received the Best Paper Award at the IEEE Conference on Computer Vision and Pattern Recognition (CVPR) in 2009 and the Outstanding Student Paper Award at the AAAI in 2015. From 2005 to 2008, Prof. Tang was Director of Visual Computing at Microsoft Research Asia.

Professor Tang received a Ph.D. degree from the Massachusetts Institute of Technology in 1996. He holds an M.S. degree from the University of Rochester and a B.S. degree from the University of Science and Technology of China.

Keynote 3: A Research Agenda for Situated Visualization

(Juying Ballroom, Oct 17th, 10:15 - 11:15)

Dr.techn. Dieter Schmalstieg

Institute of Computer Graphics
Vision at Graz University of Technology

Abstract

What could be the killer application for augmented reality? On the one hand, tech giants such as Microsoft and Apple, make huge investments into augmented reality technology. On the other hand, there are very few commercial success stories about augmented reality application beyond Pokemon Go. What are we missing? This talk will investigate the potential of situated visualization as a new use case for augmented reality technology. Visualization is now an established field and distinct from its enabling technology, computer graphics. It deals with the problem of helping the user in understanding vast and complex data, building on findings from perception and cognition to achieve its goals. However, visualization has largely been confined to desktop computing and not really entered the realm of mobile computing. With augmented reality, we can situate visualizations in a real-world context. This talk will describe some initial explorations into situated visualization and attempt to define a research agenda for this important new direction.

Biography

Dieter Schmalstieg is full professor and head of the Institute of Computer Graphics and Vision at Graz University of Technology, Austria. His current research interests are augmented reality, virtual reality, computer graphics, visualization and human-computer interaction. He received Dipl.-Ing. (1993), Dr. techn. (1997) and Habilitation (2001) degrees from Vienna University of Technology. He is author and co-author of over 300 peer-reviewed scientific publications with over 17,000 citations, with over twenty best paper awards and nominations. His organizational roles include associate editor in chief of IEEE Transactions on Visualization and Computer Graphics, associate editor of Frontiers in Robotics and AI, member of the steering committee of the IEEE International Symposium on Mixed and Augmented Reality, chair of the EUROGRAPHICS working group on Virtual Environments (1999-2010), key researcher of the K-Plus Competence Center for Virtual Reality and Visualization in Vienna and key researcher of the Know-Center in Graz. In 2002, he received the START career award presented by the Austrian Science Fund. In 2012, he received the IEEE Virtual Reality technical achievement award for seminal contributions to the field of Augmented Reality. He was elected as a senior member of IEEE, as a member of the Austrian Academy of Sciences and as a member of the Academia Europaea. In 2008, he founded the Christian Doppler Laboratory for Handheld Augmented Reality.

Paper Session

S1. Tracking and Reconstruction

(Oct 15th, 11 :00 - 12:15, Juying Ballroom)
Session Chair: Rafael Radkowski

11:00 - 11:15 Hierarchical Topic Model Based Object Association for Semantic SLAM., Jianhua Zhang, Mengping Gui, Qichao Wang, Ruyu Liu, Junzhe Xu, and Shengyong Chen. (TVCG)

11:15 - 11:30 Towards SLAM-based Outdoor Localization using Poor GPS and 2.5D Building Models., Ruyu Liu, Jianhua Zhang, Shengyong Chen, and Clemens Arth.

11:30 - 11:45 Camera Relocalization with Ellipsoidal Abstraction of Objects., Vincent Gaudillière, Gilles Simon, and Marie-Odile Berger.

11:45 - 12:00 Efficient 3D Reconstruction and Streaming for Group-Scale Multi-Client Live Telepresence., Patrick Stotko, Stefan Krumpen, Michael Weinmann, and Reinhard Klein.

12:00 - 12:15 Tangible and Visible 3D Object Reconstruction in Augmented Reality., Yi-Chin Wu, Liwei Chan, and Wen-Chieh Lin.

S2. Modeling and Rendering

(Oct 15th, 13:15 - 14:45, Juying Ballroom)
Session Chair: Lili Wang

13:15 - 13:30 Real-Time View Planning for Unstructured Lumigraph Modeling., Okan Erat, Markus HÖll, Karl Haubenwallner, Christian Pirchheim, and Dieter Schmalstieg. (TVCG)

13:30 - 13:45 3D Virtual Garment Modeling from RGB Images., Yi Xu, Shanglin Yang, Wei Sun, Li Tan, Kefeng Li, and Hui Zhou.

13:45 - 14:00 Spatially-Varying Diffuse Reflectance Capture Using Irradiance Map Rendering for Image-Based Modeling Applications., Kasper Skou Ladefoged, and Claus B. Madsen.

14:00 - 14:15 Augmented Environment Mapping for Appearance Editing of Glossy Surfaces., Takumi Kaminokado, Daisuke Iwai, and Kosuke Sato.

14:15 - 14:30 Coherent rendering of virtual smile previews with fast neural style transfer., Valentin Vasiliu, and Gábor Sörös.

14:30 - 14:45 Real-Time Mixed Reality Rendering for Underwater 360° Videos., Stephen Thompson, Andrew Chalmers, and Taehyun James Rhee.

S3.Acquisition and Manipulation

(Oct 15th, 15:15 - 16:30, Juying Ballroom)
Session Chair:Feng Xu

15:15 - 15:30 AR HMD Guidance for Controlled Hand-Held 3D Acquisition., Daniel Andersen, Peter Villano, and Voicu Popescu. (TVCG)

15:30 - 15:45 VR Props: An End to End Pipeline for Transporting Real Objects into Virtual and Augmented Environments., Catherine Taylor, Darren Cosker, Robin McNicholas, and Chris Mullany.

15:45 - 16:00 Manipulating 3D Anatomic Models in Augmented Reality: Comparing a Hands-Free Approach and a Manual Approach, Shirin Sadri, Shalva A. Kohen, Carmine Elvezio, Shawn H. Sun, Alon Grinshpoon, Gabrielle Loeb, Naomi Basu, and Steven Feiner.

16:00 - 16:15 DepthMove: Leveraging Head Motions in the Depth Dimension to Interact with Virtual Reality Head-Worn Displays., Difeng Yu, Hai-Ning Liang, Xueshi Lu, Tianyu Zhang, and Wenge Xu.

16:15 - 16:30 VPModel: High-Fidelity Product Simulation in a Virtual-Physical Environment., Xin Min, Wenqiao Zhang, Shouqian Sun, Nan Zhao, Siliang Tang, and Yueting Zhuang. (TVCG)

S4. Spatial Augmented Reality and Near Eye Displays

(Oct 16th, 08:30 - 08:45, Juying Ballroom)
Session Chair: Bruce Thomas

08:30 - 08:45 Animated Stickies: Fast Video Projection Mapping onto a Markerless Plane through a Direct Closed-Loop Alignment., Shingo Kagami, and Koichi Hashimoto. (TVCG)

08:45 - 09:00 Projection Distortion-based Object Tracking in Shader Lamp Scenarios., Niklas Gard, Anna Hilsmann, and Peter Eisert. (TVCG)

09:00 - 09:15 Towards a Switchable AR/VR Near-eye Display with Accommodation-Vergence and Eyeglass Prescription Support., Xinxing Xia, Yunqing Guan, Andrei State, Praneeth Chakravarthula, Kishore Rathinavel, Tat-Jen Cham, and Henry Fuchs. (TVCG)

09:15 - 09:30 Varifocal Occlusion-Capable Optical See-through Augmented Reality Display based on Focus-tunable Optics., Kishore Rathinavel, Gordon Wetzstein, and Henry Fuchs. (TVCG)

S5. Perception & Presence

(Oct 16th, 13:30 - 14:45, Juying Ballroom)

Session Chair: Steven Feiner

13:30 - 13:45 FVA: Modeling Perceived Friendliness of Virtual Agents Using Movement Characteristics., Tanmay Randhavane, Aniket Bera, Kyra Kapsaskis, Kurt Gray, and Dinesh Manocha. (TVCG)

13:45 - 14:00 Studying Exocentric Distance Perception in Optical See-Through Augmented Reality., Etienne Peillard, Ferran Argelaguet Sanz, Jean-Marie Normand, Anatole Lécuyer, and Guillaume Moreau.

14:00 - 14:15 Influence of Personality Traits and Body Awareness on the Sense of Embodiment in Virtual Reality., Diane Dewez, Rebecca Fribourg, Ferran Argelaguet Sanz, Ludovic Hoyet, Daniel R Mestre, Mel Slater, and Anatole Lécuyer.

14:15 - 14:30 Is Any Room Really OK? The Effect of Room Size and Furniture on Presence, Narrative Engagement, and Usability During a Space-Adaptive Augmented Reality Game., Jae-eun Shin, Hayun Kim, Callum Parker, Hyung-il Kim, Seo Young Oh, and Woontack Woo.

14:30 - 14:45 Effects of "Real-World" Visual Fidelity on AR Interface Assessment: A Case Study Using AR Head-up Display Graphics in Driving., Coleman J Merenda, Joseph L Gabbard, Chihiro Suga Sug, and Teruhisa Misu.

S6. Locomotion

(Oct 16th, 15:15 - 16:30, Juying Ballroom)

Session Chair: Guofeng Zhang

15:15 - 15:30 Sick Moves! Motion Parameters as Indicators of Simulator Sickness (TVCG)

15:30 - 15:45 Walking Your Virtual Dog: Analysis of Awareness and Proxemics with Simulated Support Animals in Augmented Reality., Nahal Norouzi, Kangsoo Kim, Myungho Lee, Ryan Schubert, Austin Erickson, Jeremy Bailenson, Gerd Bruder, and Greg Welch.

15:45 - 16:00 Prediction of Discomfort due to Egomotion in Immersive Videos for Virtual Reality., Suprith Balasubramanian, and Rajiv Soundararajan.

16:00 - 16:15 Accurate and Fast Classification of Foot Gestures for Virtual Locomotion., Xinyu Shi, Junjun Pan, Zeyong Hu, Juncong Lin, Shihui Guo, Minghong Liao, Ye Pan, and Ligang Liu.

16:15 - 16:30 Estimation of Rotation Gain Thresholds Considering FOV, Gender, and Distractors., Niall L Williams, and Tabitha C. Peck. (TVCG)

S7. Multimodal and Long Term Usage

(Oct 17th, 08:30 - 09:45, Juying Ballroom)

Session Chair: Daisuke Iwai

08:30 - 08:45 Face/On: Multi-Modal Haptic Feedback for Head-Mounted Displays in Virtual Reality., Dennis Wolf, Michael Rietzler, Leo Hnatek, and Enrico Rukzio. (TVCG)

08:45 - 09:00 Non-Visual Cues for View Management in Narrow Field of View Augmented Reality Displays., Alexander Marquardt, Christina Trepkowski, Tom David Eibich, Jens Maiero, and Ernst Kruijff.

09:00 - 09:15 Is It Cold in Here or Is It Just Me? Analysis of Augmented Reality Temperature Visualization for Computer-Mediated Thermoception., Austin Erickson, Ryan Schubert, Kangsoo Kim, Gerd Bruder, and Greg Welch.

09:15 - 09:30 DeepTaste: Augmented Reality Gustatory Manipulation with GAN-based Real-time Food-to-Food Translation., Kizashi Nakano, Daichi Horita, Nobuchika Sakata, Kiyoshi Kiyokawa, Keiji Yanai, and Takuji Narumi.

09:30 - 09:45 Mixed Reality Office System Based on Maslow's Hierarchy of Needs: Towards the Long-Term Immersion in Virtual Environments., Jie Guo, Dongdong Weng, Zhenliang Zhang, Haiyan Jiang, Yue Liu, Been-Lirn Duh, and Yongtian Wang.

S8. Collaboration and Entertainment

(Oct 17th, 11:15 - 12:30, Juying Ballroom)

Session Chair: Kiyoshi Kiyokawa

11:15 - 11:30 Conveying spatial awareness cues in xR collaborations., Andrew Irlitti, Thammathip Piumsomboon, Daniel Jackson, and Bruce H Thomas. (TVCG)

11:30 - 11:45 Improving Information Sharing and Collaborative Analysis for Remote GeoSpatial Visualization Using Mixed Reality., Tahir Mahmood, Willis Fulmer, Neelesh Mungoli, Jian Huang, and Aidong Lu.

11:45 - 12:00 Sharing Manipulated Heart Rate Feedback in Collaborative Virtual Environments., Arindam Dey, Hao Chen, Ashkan F. Hayati, Mark Billinghurst, and Robert W. Lindeman.

12:00 - 12:15 ObserVAR: Visualization System for Observing Virtual Reality Users using Augmented Reality., Santawat Thanyadit, Parinya Punpongsanon, and Ting-Chuen Pong.

12:15 - 12:30 Understanding Users' Preferences for Augmented Reality Television., Irina Popovici, and Radu-Daniel Vatavu.

S9. Selection and Text Entry

(Oct 17th,13:30 - 14:45, Juying Ballroom)

Session Chair: Ian Williams

13:30 - 13:45 ReconViguRation: Reconfiguring Physical Keyboards in Virtual Reality., Daniel Schneider, Alexander Otte, Travis Gesslein, Philipp Gagel, Bastian Kuth, Mohamad Shahm Damlakhi, Oliver Dietz, Eyal Ofek, Michel Pahud, Per Ola Kristensson, Jörg Müller, and Jens Grubert. (TVCG)

13:45 - 14:00 Pointing and Selection Methods for Text Entry in Augmented Reality Head Mounted Displays., Wenge Xu, Hai-Ning Liang, Anqi He, and Zifan Wang.

14:00 - 14:15 Performance Envelopes of Virtual Keyboard Text Input Strategies in Virtual Reality., John J Dudley, Hrvoje Benko, Daniel Wigdor, and Per Ola Kristensson.

14:15 - 14:30 Enhanced Geometric Techniques for Point Marking in Model-Free Augmented Reality., Wallace S Lages, Yuan Li, Lee Lisle, Tobias Höllerer, and Doug Bowman.

14:30 - 14:45 The Importance of Intersection Disambiguation for Virtual Hand Techniques., Alec G Moore, Marwan Kodeih, Anoushka Singhania, Angelina Wu, Tassneen Bashir, and Ryan P. McMahan.

S10. Training and Learning

(Oct 17th,15:15 - 16:45, Juying Ballroom)

Session Chair: Michele Fiorentino

15:15 - 15:30 Annotation vs. Virtual Tutor: Comparative Analysis on the Effectiveness of Visual Instructions in Immersive Virtual Reality., Hyeopwoo Lee, Hyejin Kim, Diego Vilela Monteiro, Youngnoh Goh, Daseong Han, Hai-Ning Liang, Hyun Seung Yang, and Jinki Jung.

15:30 - 15:45 Investigating Cyclical Stereoscopy Effects over Visual Discomfort and Fatigue in Virtual Reality while Learning., Alexis D. Souchet, Stéphanie Philippe, Floriane Ober, Aurélien Lévêque, and Laure Leroy.

15:45 - 16:00 A Comparison of Desktop and Augmented Reality Scenario Based Training Authoring Tools., Andrés N Vargas González, Senglee Koh, Katelynn Kapalo, Patrick Garrity, Robert Sottilare, Mark Billinghurst, and Joseph LaViola.

16:00 - 16:15 Measuring Cognitive Load and Insight: A Methodology Exemplified in a Virtual Reality Learning Context., Jonny Collins, Holger Regenbrecht, Tobias Langlotz, Yekta Said Can, Cem Ersoy, and Russell Butson.

16:15 - 16:45 Acceptance and Effectiveness of a Virtual Reality Public Speaking Training., Fabrizio Palmas, Jakub Cichor, David A. Plecher, and Gudrun Klinker.

Poster Teasers Group (Oct 15th, 16:30 - 17:30, Juxian Ballroom)
Poster Group A (Oct 15th, 17:30 - 19:30, Juxian Ballroom)

Board ID	Paper title and authors
A01	Low-Cost Real-Time Mental Load Adaptation for Augmented Reality Instructions - A Feasibility Study. Dennis Wolf, Tobias Wagner, and Enrico Rukzio.
A02	A Scalable and Long-term Wearable Augmented Reality System for Order Picking. Wei Fang, Siyao Zheng, and Zhen Liu.
A03	Augmented Reality-based Peephole Interaction Using Real Space Information. Masashi Miyazaki, and Takashi Komuro.
A04	Exploring the use of Augmented Reality in a Kinesthetic Learning Application Integrated with an Intelligent Virtual Embodied Agent. Muhammad Zahid Iqbal, Eleni Mangina, and Abraham G. Campbell.
A05	Filtering Mechanisms of Shared Social Surrounding Environments in AR. Alaeddin Nassani, Gun Lee, Mark Billinghurst, and Robert W. Lindeman.
A06	Design of an AR based System for Group Piano Learning. Minya Cai, Muhammad Alfian Amrizal, Toru Abe, and Takuo Suganuma.
A07	Merging Live and Static 360 Panoramas inside 3D Scene for Mixed Reality Remote Collaboration. Theophilus Hua Lid Teo, Gun Lee, Mark Billinghurst, and Matt Adcock.
A08	Kuroko Paradigm: Implications Augmenting Physical Interaction with AR Avatars. Tianyang Gao, and Yuta Itoh.
A09	SceneCam: Improving Multi-Camera Remote Collaboration Using Augmented Reality. Troels AmmitsbØl Rasmussen, and Weidong Huang.
A10	AR Tips: Augmented First-Person View Task Instruction Videos. Gun Lee, Seungjun Ahn, William Hoff, and Mark Billinghurst.
A11	A High-Precision Localization Device for Outdoor Augmented Reality. Marco Stranner, Philipp Fleck, Dieter Schmalstieg, and Clemens Arth.
A12	Smart Haproxy: A Novel Vibrotactile Feedback Prototype Combining Passive and Active Haptic in AR Interaction. Mengmeng Sun, Weiping He, Li Zhang, and Peng Wang.
A13	A User Experience Study of Locomotion Design in Virtual Reality Between Adult and Minor Users. Zhijiong Huang, Yu Zhang, Kathryn C. Quigley, Ramya Sankar, and Allen Y Yang.
A14	A Deformation Method in a Wrapping Manner for Virtual Gingiva Based on Mass-Spring Model. Tian Ma, Yun Li, Jiaojiao Li, and Yuancheng Li.
A15	New System to Measure Motion-to-Photon Latency of Virtual Reality Head Mounted Display. Hang Xun, Yongtian Wang, and Dongdong Weng.
A16	Hololens AR - Using Vuforia-based Marker Tracking together with Text Recognition in an Assembly Scenario. Sebastian Knopp, Philipp Klimant, Robert Schaffrath, Eric Voigt, Rayk Fritzsche, and Christoph Allmacher.
A17	A Preliminary Exploration of Montage Transitions in Cinematic Virtual Reality. Ruochen Cao, James A. Walsh, Andrew Cunningham, Carolin Reichherzer, Subrata Dey, and Bruce H Thomas.
A18	WARP: Contributional Tracking Architecture towards a World Wide Augmented Reality Platform. Alexander Michael Sosin, and Yuta Itoh.
A19	Consolidating the Research Agenda of Augmented Reality Television with Insights from Potential End-Users. Irina Popovici, and Radu-Daniel Vatavu.
A20	A Low-Cost Drift-Free Optical-Inertial Hybrid Motion Capture System for High-Precision Human Pose Detection. Yue Li, Dongdong Weng, Dong Li, and Yihan Wang.
A21	SafeAR: AR Alert System Assisting Obstacle Avoidance for Pedestrians. HyeongYeop Kang, Geonsun Lee, and JungHyun Han.
A22	Easy Extrinsic Calibration of VR System and Multi-Camera based Marker-less Motion Capture System. Kosuke Takahashi, Dan Mikami, Mariko Isogawa, Sun Siqi, and Yoshinori Kusachi.
A23	Automatic Viewpoint Switching for Multi-view Surgical Videos. Tomohiro Shimizu, Kei Oishi, Hideo Saito, Hiroki Kajita, and Yoshifumi Takatsume.
A24	An MR Remote Collaborative Platform based on 3D CAD Models for Training in Industry. Peng Wang, Xiaoliang Bai, Mark Billinghurst, Shusheng Zhang, Dechuan Han, Hao Lv, Weiping He, Yuxiang Yan, Xiangyu Zhang, and Haitao Min.
A25	Location-based Augmented Reality In-situ Visualisation Applied for Agricultural Fieldwork Navigation. Mengya Zheng, and Abraham G. Campbell.
A26	Food Talks: Evaluating Visual and Interaction Principles for Representing Environmental and Nutritional Food Information in Augmented Reality. Emily Groves, Andreas Sonderegger, Delphine Ribes, and Nicolas Henchoz.

Poster Teasers Group (Oct 15th, 16:30 - 17:30, Juxian Ballroom)
Poster Group A (Oct 15th, 17:30 - 19:30, Juxian Ballroom)

A27 Integrating AR and VR for Mobile Remote Collaboration. Hao Tang, Jeremy Venerella, Lakpa W Sherpa, Tyler J Franklin, and Zhigang Zhu.

A28 Visual and Proprioceptive Evaluation for Virtual Bicycle Ride. Xinli Wu, Qiang Zhou, Xin Li, Wenzhen Yang, and Zhigeng Pan.

A29 PostAR: Design A Responsive Reading System with Multiple Interactions for Campus Augmented Poster. Shuo Liu, Seogsung Jang, and Woontack Woo.

A30 Enhancing Rock Painting Tour Experience with Outdoor Augmented Reality. Qi Zhang, Xiaoyang Zhu, Haitao Yu, and Yongshi Jiang.

A31 VesARlius: An Augmented Reality System for Large-Group Co-Located Anatomy Learning. Felix Bork, Alexander Lehner, Daniela Kugelmann, Ulrich Eck, Jens Waschke, and Nassir Navab.

A32 Mental Fatigue of Long-term Office Tasks in Virtual Environment. Ruiying Shen, Dongdong Weng, Shanshan Chen, Jie Guo, and Hui Fang.

A33 Multi-Vehicle Cooperative Military Training Simulation System Based on Augmented Reality. Lei Fan, Jing Chen, and Yuandong Miao.

A34 Industrial Use Case - AR Guidance Using Hololens for Assembly and Disassembly of a Modular Mold, with Live Streaming for Collaborative support. Sebastian Knopp, Philipp Klimant, and Christoph Allmacher.

A35 A Two-point Map-based Interface for Architectural Walkthrough. Kan Chen, and Eugene Lee.

A36 Why Don't We See More of Augmented Reality in Schools?. Manoela Milena Oliveira da Silva, Rafael Roberto, Iulian Radu, Patricia Smith Cavalcante, and Veronica Teichrieb.

A37 Hand ControlAR: An Augmented Reality Application for Learning 3D Geometry. Rui Cao, and Yue Liu.

A38 Words In Kitchen: An Instance of Leveraging Virtual Reality Technology to Learn Vocabulary. Tianyu Jia, and Yue Liu.

A39 Holding Virtual Objects Using a Tablet for Tangible 3D Sketching. Shouxia Wang, Weiping He, Bokai Zheng, Shuo Feng, Xiaoliang Bai, and Mark Billinghurst.

A40 Tie-Brake: Tie-based Wearable Device for Navigation with Brake Function. Yuan Yue, and Hiroaki Tobita.

A41 Augmenting a Psoriasis-patient Doctor-dialogue through Intergrating Real Face and Maps of Psoriasis Pathology. Yiping Jiang, and Dongdong Weng.

A42 InvisibleRobot: Facilitating Robot Manipulationthrough Diminished Reality. Alexander Plopski, Ada Virginia Taylor, Elizabeth Jeanne Carter, and Henny Admoni.

A43 DroneCamo: Modifying Human-Drone Comfort via Augmented Reality. Atsushi Mori, and Yuta Itoh.

A44 Evaluating IVR in Primary School Classrooms. Yvonne Chua, Priyashri Kamlesh Sridhar, Haimo Zhang, Vipula Dissanayake, and Suranga Nanayakkara.

A45 3DUITK: An Opensource Toolkit for Thirty Years of Three-Dimensional Interaction Research. Kieran William May, Lan Hanan, Andrew Cunningham, and Bruce H Thomas.

A46 Compiling VR/AR-Trainings from Business Process Models. Lucas Thies, Christoph Strohmeyer, Jens Ebert, Marc Stamminger, and Frank Bauer.

A47 Towards a Switchable AR/VR Near-eye Display with Accommodation-Vergence and Eyeglass Prescription Support. Xinxing Xia, Yunqing Guan, Andrei State, Praneeth Chakravarthula, Kishore Rathinavel, Tat-Jen Cham, and Henry Fuchs.

A48 Is It Cold in Here or Is It Just Me? Analysis of Augmented Reality Temperature Visualization for Computer-Mediated Thermoception. Austin Erickson, Ryan Schubert, Kangsoo Kim, Gerd Bruder, and Greg Welch.

A49 DepthMove: Leveraging Head Motions in the Depth Dimension to Interact with Virtual Reality Head-Worn Displays. Difeng Yu, Hai-Ning Liang, Xueshi Lu, Tianyu Zhang, and Wenge Xu.

A50 A Shape Completion Component for Non-Rigid SLAM. Yongzhi Su, Vladislav Golyanik, Narek Minaskan, Sk Aziz Ali, and Didier Stricker.

A51 VPModel: High-Fidelity Product Simulation in a Virtual-Physical Environment. Xin Min, Wenqiao Zhang, Shouqian Sun, Nan Zhao, Siliang Tang, and Yueting Zhuang.

A52 ReconViguRation: Reconfiguring Physical Keyboards in Virtual Reality. Daniel Schneider, Alexander Otte, Travis Gesslein, Philipp Gagel, Bastian Kuth, Mohamad Shahm Damlakhi, Oliver Dietz, Eyal Ofek, Michel Pahud, Per Ola Kristensson, Jörg Müller, and Jens Grubert.

A53 Camera Relocalization with Ellipsoidal Abstraction of Objects. Vincent Gaudillière, Gilles Simon, and Marie-Odile Berger.

A54 Efficient 3D Reconstruction and Streaming for Group-Scale Multi-Client Live Telepresence. Patrick Stotko, Stefan Krumpen, Michael Weinmann, and Reinhard Klein.

Poster Teasers Group (Oct 15th, 16:30 - 17:30, Juxian Ballroom)
Poster Group B (Oct 16th, 09:30 - 10:00, 12:15 - 13:15, 14:45 - 15:15)

Board ID	Paper title and authors
B01	Volumetric Representation of Human Body Parts Using Superquadrics. Ryo Hachiuma, and Hideo Saito.
B02	Deep Consistent Illumination in Augmented Reality. Xiang Wang, Kai Wang, and Shiguo Lian.
B03	Improving Hybrid Tracking System for First-Person Interaction in Immersive CAVE Environment. Yi Lyu, XU Shuhong, Wei Fang, ChengCheng Wu, and Tianzhuang Cheng.
B04	Video Synthesis of Human Upper Body with Realistic Face. Zhaoxiang Liu, Huan Hu, Zipeng Wang, Kai Wang, Jinqiang Bai, and Shiguo Lian.
B05	Joint Inpainting of RGB and Depth Images by Generative Adversarial Network with a Late Fusion approach. Ryo Fujii, Ryo Hachiuma, and Hideo Saito.
B06	InteractionGAN: Image-Level Interaction Using Generative Adversarial Networks. Minjung Son, and Hyun Sung Chang.
B07	Blended-Keyframes for Mobile Mediated Reality Applications. Yu Xue, Diego Thomas, Frédéric Rayar, Hideaki Uchiyama, Rin-ichiro Taniguchi, and Baocai Yin.
B08	The Effect of Two Different Types of Human-computer Interactions on User's Emotion in Virtual Counseling Environment. Ziqi Tu, Dongdong Weng, Dewen Cheng, Ruiying Shen, Hui Fang, and Yihua Bao.
B09	Deep Multi-State Object Pose Estimation for Augmented Reality Assembly. Yongzhi Su, Jason Rambach, Narek Minaskan, Paul Lesur, Alain Pagani, and Didier Stricker.
B10	Real-time 3D Hand Gesture Based Mobile Interactions Interface. Yunlong Che, Yuxiang Song, and Yue Qi.
B11	A Neural Virtual Anchor Synthesizer based on Seq2Seq and GAN Models. Zipeng Wang, Zhaoxiang Liu, Zezhou Chen, Huan Hu, and Shiguo Lian.
B12	Setforge - Synthetic RGB-D Training Data Generation to Support CNN-based Pose Estimation for Augmented Reality. Shu Zhang, Cheng Song, and Rafael Radkowski.
B14	Improving Color Discrimination for Color Vision Deficiency (CVD) withTemporal-domain Modulation. Silviya Hasana, Yuichiro Fujimoto, Alexander Plopski, Masayuki Kanbara, and Hirokazu Kato.
B15	Compact Light Field Augmented Reality Display with Eliminated Stray Light Using Discrete Structures. Cheng Yao, Yue Liu, Dewen Cheng, and Yongtian Wang.
B16	Faithful Face Image Completion for HMD Occlusion Removal. Miao Wang, Xin Wen, and Shi-Min Hu.
B17	Reconstructing HDR Image from a Single Filtered LDR Image Based on a Deep Hybrid HDR Merger Network. Bin Liang, Dongdong Weng, Yihua Bao, Ziqi Tu, and Le Luo.
B18	OSTNet: Calibration Method for Optical See-Through Head-Mounted Displays via Non-Parametric Distortion Map Generation. Kiyosato Someya, Yuichi Hiroi, Makoto Yamada, and Yuta Itoh.
B19	A Projector Calibration Method Using a Mobile Camera for Projection Mapping System. Chun Xie, Hidehiko Shishido, Yoshinari Kameda, and Itaru Kitahara.
B20	Li-Fi for Augmented Reality Glasses: A Proof of Concept. Rene Kirrbach, Michael Faulwaßer, Benjamin Jakob, Tobias Schneider, and Alexander Noack.
B21	Real-Time Hand Model Estimation from Depth Images for Wearable Augmented Reality Glasses. Bill Zhou, Alex Yu, Joseph Menke, and Allen Y Yang.
B22	LE-HGR: A Lightweight and Efficient RGB-based Online Gesture Recognition Network for Embedded AR Devices. Hongwei Xie, Jiafang Wang, Shao Baitao, Mingyang Li, and Jian Gu.
B23	Object Manipulation: Interaction for Virtual Reality on Multi-touch Screen. Jiafei Pan, and Dongdong Weng.
B24	Birds vs. Fish: Visualizing Out-Of-View Objects in Augmented Reality Using 3D Minimaps. Felix Bork, Ulrich Eck, and Nassir Navab.
B25	Realtime Water-hazard Detection and Visualisation for Autonomous Navigation and Advanced Driving Assistance. Juntao Li, and Chuong V Nguyen.
B26	Online Gesture Recognition Algorithm Applied to HUD Based Smart Driving System. Jingyao Wang, Jing Chen, Yuanyuan Qiao, Junyan Zhou, and Yongtian Wang.
B27	Real-time Texturing for 6D Object Instance Detection from RGB Images. Pavel Rojtberg, and Arjan Kuijper.

Poster Teasers Group (Oct 15th, 16:30 - 17:30, Juxian Ballroom)
Poster Group B (Oct 16th, 09:30 - 10:00, 12:15 - 13:15, 14:45 - 15:15)

B28 Dual-Model Approach for Engineering Collision Detection in the CAVE Environment. Yang Xue, Xu Shuhong, Lijun Wang, Chaofan Dai, and Yufen Wu.

B29 Barrier Detection and Tracking from Parameterized Lidar Data. Wen Xing, Lifeng Zhu, and Aiguo Song.

B30 Multi-Level Scene Modeling and Matching for Smartphone-Based Indoor Localization. Lidong Chen, Yin Zou, Yaohua Chang, Jinyun Liu, Benjamin Lin, and Zhigang Zhu.

B31 Indoor Scene Reconstruction: From Panorama Images to CAD Models. Chongyang Luo, Bochao Zou, Xiangwen Lyu, and Haiyong Xie.

B32 A Fast Method for Large-scale Scene Data Acquisition and 3D Reconstruction. Yao Li, Yang Xie, Xijing Wang, Xun Luo, and Yue Qi.

B33 Optimization for RGB-D SLAM based on plane geometrical constraint. Ningsheng Huang, Jing Chen, and Yuandong Miao.

B35 Inter-Brain Connectivity: Comparisons between Real and Virtual Environments Using Hyperscanning. Amit Barde, Nastaran Saffaryazdi, Pawan Withana, Nakul Patel, and Mark Billinghurst.

B36 Less is More: Using Spatialised Auditory and Visual Cues for Target Acquisition in a Real-World Search Task. Amit Barde, Matt Ward, Robert W. Lindeman, and Mark Billinghurst.

B37 FragmentFusion: A light-weight SLAM pipeline for dense reconstruction. Darius Rueckert, Matthias Innmann, and Marc Stamminger.

B38 Mid-Air Haptic Bio-Holograms in Mixed Reality. Teodor Romanus, Sam Frish, Mykola Maksymenko, Loïc Corenthy, William Frier, and Orestis Georgiou.

B39 Perceptual MR Space: Interactive Toolkit for Efficient Environment Reconstruction in Mobile Mixed Reality. Chong Cao, and Jiayi Sun.

B40 Integrating Peripheral Interaction into Augmented Reality Applications. Ovidiu Andrei Schipor, Radu-Daniel Vatavu, and Wenjun Wu.

B41 6DoF Pose Estimation with Object Cutout based on a Deep Autoencoder. Xin Liu, Jichao Zhang, Xian He, Xiuqiang Song, and Xueying Qin.

B42 NEAR: The NetEase AR Oriented Visual Inertial Dataset. Cheng Wang, Yu Zhao, Jiabin Guo, Ling Pei, Yue Wang, and Haiwei Liu.

B43 Visualization-Guided Attention Direction in Dynamic Control Tasks. Jason Orlosky, Chang Liu, Denis Kalkofen, and Kiyoshi Kiyokawa.

B44 Large-Scale Optical Tracking System. Dong Li., Dongdong Weng, Yue Li, and Hang Xun.

B45 HIGS: Hand Interaction Guidance System. Yao Lu, and Walterio Mayol-Cuevas.

B46 FrictionHaptics : Encountered-type Haptic Device for Tangential Friction Emulation. Meguro Ryo, Photchara Ratsamee, Haruo Takemura, Tomohiro Mashita, and Yuki Uranishi.

B47 Utilizing Multiple Calibrated IMUs for Enhanced Mixed Reality Tracking. Adnane Jadid, Linda Rudolph, Frieder Pankratz, and Gudrun Klinker.

B48 Evaluating Text Entry in Virtual Reality Using a Touch-sensitive Physical Keyboard. Alexander Otte, Daniel Schneider, Tim Menzner, Travis Gesslein, Philipp Gagel, and Jens Grubert.

B49 Wearable RemoteFusion: A Mixed Reality Remote Collaboration System with Local Eye Gaze and Remote Hand Gesture Sharing. Prasanth Sasikumar, Lei Gao, Huidong Bai, and Mark Billinghurst.

B50 Estimation of Rotation Gain Thresholds Considering FOV, Gender, and Distractors. Niall L Williams, and Tabitha C. Peck.

B51 Prediction of Discomfort due to Egomotion in Immersive Videos for Virtual Reality. Suprith Balasubramanian, and Rajiv Soundararajan.

B52 Projection Distortion-based Object Tracking in Shader Lamp Scenarios. Niklas Gard, Anna Hilsmann, and Peter Eisert.

B53 FVA: Modeling Perceived Friendliness of Virtual Agents Using Movement Characteristics. Tanmay Randhavane, Aniket Bera, Kyra Kapsaskis, Kurt Gray, and Dinesh Manocha.

B54 Sick Moves! Motion Parameters as Indicators of Simulator Sickness. Tobias Feigl, Daniel Roth, Stefan Gradl, Markus Gerhard Wirth, Michael Philippsen, Marc Erich Latoschik, Bjoern M Eskofier, and Christopher Mutschler.

Demonstrations

(Oct 16th/17th, 10:00 - 17:30, Meeting Room 3)

Number	All authors
1	Dennis Wolf, Michael Rietzler,Leo Hnatek, and Enrico Rukzio
2	Zhiyu Huo, Lingyu Wang, Yi Han, Yigang Fang, and Cheng Lu
3	Wallace S. Lages, Yuan Li, Lee Lisle, Tobias HÖllerer, and Doug A. Bowman
4	Yu RiJi, Ye Shishu, Shi Yuhan, Liu Shun, Jiang Shuai, and Guo Xiaofang
5	Stephen Thompson, Andrew Chalmers, Daniel Medeiros, and Taehyun Rhee
6	Guillaume Quiniou, Frederic Rayar, and Diego Thomas
7	Yu Riji, Liu Shun, and Wang Mengjie
8	João Paulo Lima, João Otávio de Lucena, Diego Thomas, and Veronica Teichrieb'
9	Yongzhi Su, Jason Rambach, Nareg Minaskan, Paul Lesur, Alain Pagani, and Didier Stricker
10	Zhixiong Lu, Yongtao Hu, and Jingwen Dai
11	Margaret Cook, Amber Ackley, Karla Chang Gonzalez, Austin Payne Caleb Kicklighter, Michelle Pine, Timothy McLaughlin, and Jinsil Hwaryoung Seo
12	Ted Romanus, Sam Frish, Mykola Maksymenko, William Frier, Loïc Corenthy, and Orestis Georgiou
13	Shun Odajima, and Takashi Komuro
14	Oleh Gavrilyuk, and Mykola Ursaty
15	Kieran W. May, Ian Hanan, Andrew Cunningham, and Bruce H. Thomas
16	Ken Moteki, and Takashi Komuro
17	Yasuhira Chiba, JongMoon Choi, Takeo Hamada, and Noboru Koshizuka
18	Kan Chen, and Eugene Lee
19	Valentin Vasiliu, Gábor Sörös
20	Shirin Sadri, Shalva A. Kohen, Carmine Elvezio, Shawn H. Sun, Alon Grinshpoon, Gabrielle Loeb, Naomi Basu, and Steven Feiner
21	Shingo Kagami, and Koichi Hashimoto
22	Alexander Otte, Daniel Schneider, Tim Menzner, Travis Gesslein, Philipp Gagel, and Jens Grubert.
23	Felix Bork, Alexander Lehner, Daniela Kugelmann, ULrich Eck, Jens Waschke, and Nassir Navab"

Workshops

W3. Mixed Reality and Accessibility

(Oct 14th, 09:00 - 17:00, Meeting Room3)

Mixed Reality (MR) refers to technology in which real and virtual world objects are presented together in one environment. This technology holds great potential for accessibility, for example, facilitating different daily tasks by incorporating virtual assistive information into the real environment, and creating MR environments to support training and rehabilitation for people with different needs and disabilities. Despite its potential, as a new form of technology with hardware and software limitations, MR itself could pose unique challenges to people with disabilities, involving technical, privacy, ethical, and accessibility concerns. As more and more MR products and research prototypes are designed to address accessibility issues.i

It is time to discuss opportunities and challenges for MR applications for people with disabilities, as well as to derive accessibility standards for MR technology itself.

Website: https://www.mr-accessibility.com/

Organizers:

Yuhang Zhao, Cornell Tech

Shiri Azenkot, Cornell Tech

Steven Feiner, Columbia University

Leah Findlater, University of Washington

Meredith Ringel Morris, Microsoft Research

Holger Regenbrecht, University of Otago

Martez Mott, Microsoft Research

Yuanchun Shi, Tsinghua University

Chun Yu, Tsinghua University

W4. Augmenting Cities and Architecture with Immersive Technologies

(Oct 14th, 09:00 - 12:30, Meeting Room7)

We invite interested parties from a variety of backgrounds to participate and join our workshop to discuss how Immersive Technologies can best contribute Augmenting Cities and Architecture.

Immersive technologies such as augmented reality (AR), virtual reality (VR), and mixed reality (MR) have the potential to augment experiences within cities and the process of designing architecture. Moreover, the 5G network which has low-latency and fast speed has begun. However, more work is needed to understand specific applications within these areas and how they can be designed. Therefore, the main aim of the workshop is to discuss and ideate use-cases for creating situated immersive AR, VR, and MR applications for the purpose of making cities more engaging and to help design the cities of the future over 5G network.

Website: https://augmentingcities.wordpress.com/

Organizers:

Callum Parker, The University of Sydney

Soojeong Yoo, The University of Sydney

Youngho Lee, Mokpo National University

Waldemar Jenek, Queensland University of Technology

Junseong Bang, University of Science & Technology(UST)

Workshop

W6. AR and MR Technology for Ubiquitous Educational Learning Experience

(Oct 14th, 09:00 - 17:00, Meeting Room9)

Augmented Reality and Mixed Reality technologies have been around for more than 40 years. Recent advancement in both all-in-one headset and mobile platform of the technology has open up the possibility for adoption of the technology in ways not before possible. Augmented Reality and Mixed Reality technologies can now be included ubiquitously as part of the classroom technology to enhance the learning experience. The purpose of the workshop is to bring together researchers, developers, and practitioners interested in using Augmented Reality and Mixed Reality technology to enhance educational learning experience. Many researches in the field have proven the effectiveness of immersive technologies-based instructions on students' learning outcomes in K-12 and higher education in improving learning outcome gains.

Website: https://simonmssu.github.io/ismar-workshop-edu.htms

Organizers:

Simon Su, CCDC Army Research Laboratory
DoD Supercomputing Resource Center
Xubo Yang, Shanghai Jiao Tong University
Henry B.L.Duh, La Trobe University

Workshop

W1. Mixed/Augmented Reality and Mental Health

(Oct 18th, 09:00 - 12:30, Meeting Room3)

The goal of this workshop is to provide an opportunity for VR/AR/MR researchers and Health researchers to submit their original ideas, work-in-progress contribution, demos and position papers on the design and/or evaluation of new mental health technologies aiding education, self- assessment, support to affected individuals, and intervention.

We are interested in theoretically, empirically, and/or methodologically oriented contributions focused on supporting and educating mental health delivered through novel designs and evaluations of on AR/VR/MR systems, with/without support of additional technologies such as Games, Social Media and Internet of Things. In addition to potential benefits, we would also like to receive contributions on potential dangers of using such technologies for addressing mental health issues.

Website: https://auckland.op.ac.nz/ismar-2019-workshop-proposal

Organizers:

Nilufar Baghaei, Otago Polytechnic Auckland Campus (OPAIC)
Sylvia Hach, Unitec Institute of Technology
Hai-Ning Liang, Xi'an Jiaotong-Liverpool University
John Naslund, Harvard Medical School

Workshop

W2. Extended Reality for Good (XR4Good)

(Oct 18th, 09:00 - 17:00, Meeting Room5)

Extended Reality (XR) is becoming mainstream, with major corporations releasing consumer products, and non-experts using the systems to solve real-world problems outside the traditional XR laboratory. With the research and technological advances, it is now possible to use these technologies in almost all domains and places. This provides a bigger opportunity to create applications that intend to impact society in greater ways than beyond just entertainment. Today the world is facing different challenges including, but not limited to, healthcare, environment, and education. Now is the time to explore how XR might be used to solve widespread societal challenges. After three successful gatherings, the 4th Extended Reality for Good (XR4Good) workshop will keep bringing together researchers, developers, and industry partners in presenting and promoting research that intends to solve real-world problems using augmented and virtual realities.

The 4th XR4Good will keep providing a platform to grow a research community that discusses challenges and opportunities to create Extended Reality for Good: XR that helps humankind and society in more impactful ways.

Website:http://forgoodxr.org/

Organizers:

Arindam Dey, University of Queensland
Mark Billinghurst, University of Auckland
Greg Welch, University of Central Florida
Gun Lee, University of South Australia
Stephan Lukosch, TU Delft

W5. XR-aided Design (XRAD): next generation of CAD tools

(Oct 18th, 13:30 - 17:00, Meeting Room7)

This workshop aims to overcome these challenges by inciting research into next generation of CAD interfaces combined with virtual, augmented, mixed, and cross reality interactive environments. The main focus of this special issue is on the theoretical and practical dissection of these technologies, their relationship to one another, and their unique abilities to realize theoretical XR capabilities and design principles in multimodal immersive environments.

We appreciate contributions from both commercial and academic sources; from researchers as well as practitioners.

Website: http://web.engr.oregonstate.edu/~deamicir/ISMAR2019/index.html

Organizers:

Michele Fiorentino, Polytechnic University of Bari
Raffaele de Amicis, Oregon State University

Tutorial

T1. OpenARK — Tackling Augmented Reality Challenges via an Open-Source Software Development Kit

(Oct 14th, 13:30 - 17:00, Meeting Room7)

The aim of this tutorial is to present an open-source augmented reality development kit, called OpenARK. OpenARK was founded by Dr. Allen Yang at UC Berkeley in 2015. Since then, the project has received high-impact awards and visibility. Currently, OpenARK is being used by several industrial alliances including HTC Vive, Siemens, Ford, and State Grid. In 2018, OpenARK won the only Mixed Reality Award at the Microsoft Imagine Cup Global Finals. In the same year in China, OpenARK also won a Gold Medal at the Internet+ Innovation and Entrepreneurship Competition, the largest such competition in China. OpenARK currently also receives funding support from a research grant by Intel RealSense project and the NSF.

Website: https://vivecenter.berkeley.edu/courses openark-ismar-2019-tutorial/

Presenters:

Allen Y. Yang, UC Berkeley

Joseph Menke, UC Berkeley

Luisa Caldas, UC Berkeley

Tutorial

T2. Interaction Paradigms in MR – Lessons from Art

(Oct 18th, 13:30 - 17:00, Meeting Room7)

This tutorial aims to share our best practices in teaching artists to best express themselves via interactive technology, but also in turn, what we have learnt from being part of their creative journey. Examples include navigation in VR with LeapMotion, narrative change based on user's head orientation, interaction with mathematical equation visualisation using hand gestures, audio-visual interface where participants use their voice to control lighting in the scene, or controlling the flow of particles through breathing as part of a meditation experience. The tutorial will also include a review of the state of the art in brain-computer interface and neurophysiological interfaces with XR.

Website: https://home.doc.gold.ac.uk/~xpan001/humancentric-ARVR/

Presenters:

Xueni Pan, University of London

William Latham, University of London

Doron Friedman, Sammy Ofer School of Communications

Tutorial

T3.Bridging the gap between research and practice in AR

(Oct 18th, 09:00 - 12:30, Meeting Room7)

AR has involved plenty of domains and this interdiscipline boosts the AR researches and applications. However, plenty of research efforts can not be applied in practice readily since some researches lacked of user feedbacks thus only tackled the academic issues. This tutorial addresses this gap between research and practice and shares our experiences to bridge it.

The first topic is about the engineering gap in traditional 6DOF tracking. We will introduce the NetEase AR oriented VIO dataset and new metrics accounting for user experiences rather than the normally used ATE or RPE. The differences from the previous datasets and metrics will be illustrated. We hope our dataset can help researchers develop more user-friendly VIOs for AR.

The second topic is about gaps in AI based virtual content generation for AR, and we will take our melody driven choreography (MDC) research and embodied conversational agent (ECA) as examples. Both MDC and ECA have already successfully powered multiple video games from NetEase.

The third topic is about a data-driven approach to natural head animation generation for human-like virtual characters who are talking. The synthesized head movements can reflect speech prosody simultaneously

Website: https://ar.163.com/ismar2019_tutorial

Presenters:

Cheng Wang, Hangzhou EasyXR co., ltd.

Xiang Wen, Fuxi AI Lab, NetEase

Zhimeng Zhang, Fuxi AI Lab, NetEase

Doctoral Consortium

(Oct 14th, 09:00 - 12:30, Meeting Room5)

Time	TItle	Speakers
09:00 - 09:10	Welcome + Ice breaker	
09:10 - 10:45	Talks 1-6	
09:15 - 09:25	Exploring Perceptual and Cognitive Effects of Extreme Augmented Reality Experiences	Daniel Eckhoff
09:25 - 09:40	Interaction techniques for Immersive Remote Collaboration by mixing 360 Panoramas and 3D Reconstruction	Theophilus Teo
09:40 - 09:55	A Virtual On-board System of an Autonomous Vehicle for Smooth Trading of Driving Authority	Yuki Sakamura
09:55 - 10:10	Deformable Objects for Virtual Environments	Catherine Taylor
10:10 - 10:25	Social Perception of Pedestrians and Virtual Agentsusing Movement Features	Tanmay Randhavane
10:25 - 10:40	Mediation of Multispectral Vision and its Impacts on User Perception	Austin Erickson
10:40 - 10:55	Coffee Break	
10:55 - 12:40	Talks 7-13	
10:55 - 11:10	Mixed Reality for Knowledge Work of the Future	Daniel Schneider
11:10 - 11:25	Designing Hybrid Spaces:The Importance of Mixed Reality Visualization to Urban Projects	Marina Lima Medeiros
11:25 - 11:40	Volumetric and Varifocal-Occlusion Augmented Reality Displays	Kishore Rathinavel
11:40 - 11:55	AR/MR Remote Collaboration on Physical Tasks for Assembly/Training in Industry	Peng Wang
11:55 - 12:10	Interactive Visualizations for Watching Boxing Matches in VR	Tao Tao
12:10 - 12:25	Accurate outdoor perception based on multi-modal data	Ruyu Liu
12:25 - 12:40	Design and Prototyping of Wide Field of View Optical See-through Head-Mounted Displays with Per-pixel Occlusion Capability	Yan Zhang

SLAM-for-AR Challenge

(Oct 14th , 13:30 - 17:00, Meeting Room5)

As one of the most important techniques for AR applications, SLAM has achieved the level of maturity, and entered the stage of product landing. At this stage, more and more efforts are being made to improve the overall performance of a SLAM system rather than some individual technical indicators. In addition, compared to other applications like robotics, landing on AR products poses higher requirement to handle a variety of challenging situations since a home user may not carefully move the AR device, and the real environment may be quite complex. In this context, this year we launch a SLAM competition specifically designed for AR applications, emphasizing on the overall performance of SLAM systems. All teams in the finals will give presentations about the techniques used in their systems.

Website: http://www.ismar19.org/newenweb/news/254.html

Organizers:

Guofeng Zhang, Zhejiang University, China

Jing Chen, Beijing Institute of Technology, China

Guoquan Huang, University of Delaware, USA

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Industry Session

(Oct 16th, 11:00 - 12:30, Juying Ballroom)

商汤 sensetime	SenseAR: Augment the beauty of Reality	Dr. Nina Luan
ArcSoft 虹软	The practice of AR on smartphone	Ph.D Guofeng Wang
DELL intel	Augmented Reality Powered by Dell Technologies	Ms. Haifang Luo
LUSTER 凌云	Real time 3D reconstruction of digital human for new media	GM. Xiong Wei
Lenovo 联想 研究院	AR/CV Empowering Smart Industry	Dr. Jiangwei Zhong
oppo	3D Human Body Modeling from a Single Image	Dr. Shuxue Quan
AD 耐德佳 NED-AR	Designs and Evaluation of AR Near Eye Display with Freeform Optics	Prof. Dewen Cheng

Olympic Village Night

The dinner will be held at the Bird's Nest Seafood Buffet Restaurant from 7pm to 9pm on Wednesday, October 16. The restaurant is located on the 3rd floor of the Bird's Nest Cultural Center, 1 National Stadium South Road. The restaurant has a panoramic view of the interior of the Bird's Nest and a light show at night. The restaurant has a wide variety of ingredients, and the chef will cook the food on the interactive food court, and guests can also enjoy the sight and taste.During the meal, you can also see Chinese traditional art - Sichuan opera face change.

About Bird's Nest (National Stadium)

The Bird's Nest is officially called National Stadium. It is located on the northern part of Beijing. In 2008 it hosted the Beijing Olympics. Due to its magnificent architecture and the international competitions that are regularly hosted there, it has become a famous landmark in recent years. The exterior of the Bird's Nest is made up of intersecting steel sections that look like branches forming a huge nest. The unique shape of the stadium is truly stunning. The Olympic cauldron, shaped like a torch and originally mounted on top of the Bird's Nest, has been moved to the Torch Square northeast of the stadium. It is still visible from the outside of the stadium. Nearly 100,000 spectator seats fill the interior of the Bird's Nest. Their bright red color is magnificent.

Transportation to Bird's Nest(National Stadium)

Return transportation from the conference venue will be provided. Details of the transportation will be posted during ISMAR 2019.

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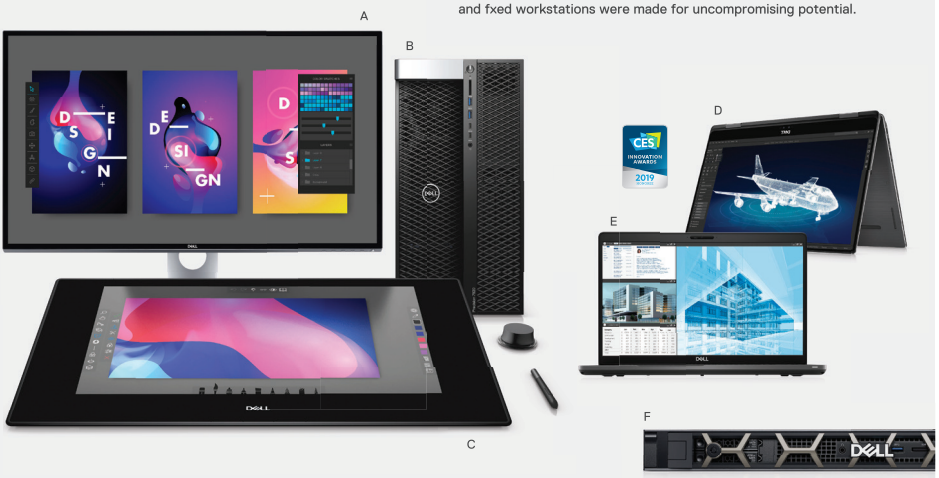

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