

IEEE VR 2023

SHANGHAI

THE 30TH IEEE CONFERENCE
ON VIRTUAL REALITY
AND 3D USER INTERFACES



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Welcome to IEEE VR 2023!

It is our great pleasure to welcome you to the 30th IEEE Conference on Virtual Reality and 3D User Interfaces (IEEE VR), the premier international conference focused on research in the continuous spectrum of extended reality, including virtual reality, augmented reality, mixed reality, and 3D user interfaces. IEEE VR 2023 will be held in a hybrid mode, both physically in Shanghai, China, and virtually online, from March 25th through 29th.

This year, we have a unified paper track and received a record number of paper submissions. With a total of 612 paper submissions, the international program committee accepted 61 papers for publication in IEEE Transactions on Visualization and Computer Graphics (TVCG) and 69 conference papers, with a global acceptance rate of 21.2%. With additional 10 journal papers from TVCG that have been published over the past year, we will have a total of 140 papers to be presented in 28 sessions. Moreover, the conference will feature thought-provoking presentations, demonstrations, and technical content. A total of 4 keynotes, 187 posters, 18 workshops, 5 tutorials, 19 doctoral thesis proposals, 14 research demonstrations, 12 finalists of 3DUI contests, 7 videos, and 5 panels will be presented at the conference.

IEEE VR 2023 will feature four keynotes given by Professor Wen Gao (Director of Pengcheng Lab), Dr. Harry Shum (Chairman of Xiaobing.ai), Dr. Baining Guo (Distinguished Scientist of Microsoft Research), and Professor Ming C. Lin (Distinguished Professor of the University of Maryland). The distinguished keynote speakers will share their achievements and innovative ideas in the fields of VR/AR/MR, especially about 3D computer graphics and computer vision, digital humans, neural rendering, virtual AI Beings, and thoughts about the virtual content generation revolution brought by large GPT models.

As a landmark event for its 30th anniversary, the IEEE VR conference will feature the Plenary Panel “Revisiting ‘What’s Real about Virtual Real?’” to discuss the inspiring questions raised in a highly-cited influential paper published in 1999, written by Professor Fredrick P. Brooks, a pioneer leader in virtual reality and a Turing Award winner for his contribution to computer science, who passed away in November 2022. After 24 years of the article was published, we would like to have a retrospect of the thought-provoking questions for Virtual Reality and the decades of development of VR technologies and applications, from the perspective of active researchers and practitioners in our VR community, to show how we get to the status of today, and the implications for the future of VR.

We wish you enjoy the conference. Thank you, and welcome to Shanghai!

General Chairs

Xubo Yang, Shanghai Jiao Tong University, China

Kun Zhou, Zhejiang University, China

Stephan Lukosch, HIT Lab NZ, University of Canterbury, New Zealand

Tobias Langlotz, University of Otago, New Zealand

Committee members

Honorary Chair

Qinping Zhao – *Beihang University, China*

General Chairs

Xubo Yang – *Shanghai Jiao Tong University, China*

Kun Zhou – *Zhejiang University, China*

Stephan Lukosch – *HIT Lab NZ, University of Canterbury, New Zealand*

Tobias Langlotz – *University of Otago, New Zealand*

Program Chairs

Bobby Bodenheimer – *Vanderbilt University, USA*

Voicu Popescu – *Purdue University, USA*

John Quarles – *The University of Texas at San Antonio, USA*

Lili Wang – *Beihang University, China*

Awards Chairs

Mark Billingham – *University of South Australia, Australia*

Shi-Min Hu – *Tsinghua University, China*

Kiyoshi Kiyokawa – *Nara Institute of Science and Technology, Japan*

Amela Sadagic – *Naval Postgraduate School, USA*

Anthony Steed – *University College London, UK*

3DUI Contest Chairs

Elham Ebrahimi – *University of North Carolina Wilmington, USA*

BoYu Gao – *Jinan University, China*

Chao Mei – *Meta Reality Labs, USA*

Thammathip Piumsomboon – *University of Canterbury, New Zealand*

Diversity, Accessibility, and Inclusion Chairs

Tonja Machulla – *LMU München, Germany*

Alesha Hayes – *University of North Texas, USA*

Sean K. Banerjee – *Clarkson University, USA*

Yongning Zhu – *Tongji University, China*

Doctoral Consortium Chairs

Jens Grubert – *Coburg University of Applied Sciences and Arts, Germany*

Hai-Ning Liang – *Xi'an Jiaotong-Liverpool University, China*

Jonathan Ventura – *California Polytechnic State University, USA*

Weiwei Xu – *Zhejiang University, China*

Exhibits and Sponsors Chairs

Jingwen Dai – *Ximmerse, China*

Lu Chen – *Shanghai Jiao Tong University, China*

Online Experience Chairs

Kyle Johnson – *University Of Georgia, USA*

Yue Li – *Xi'an Jiaotong-Liverpool University, China*

Zhihan Lv – *Uppsala University, Sweden*

Finance Chairs

Shuangjiu Xiao – *Shanghai Jiao Tong University, China*

Local Arrangement Chairs

Zhigeng Pan – *Nanjing University of Information Science and Technology, China*

Fei Liu – *Shanghai Jiao Tong University, China*

Panel Chairs

Jian Chen – *The Ohio State University, USA*

Henry B.L. Duh – *The Hong Kong Polytechnic University, China*

Xin Tong – *Microsoft Research Asia, China*

Posters Chairs

Isaac Cho – *Utah State University, USA*

Frank Guan – *Singapore Institute of Technology, Singapore*

Yue Liu – *Beijing Institute of Technology, China*

Daniel Zielasko – *University of Trier, Germany*

Publications Chairs

Christos Mousas – *Purdue University, USA*

Mohammed Safayet Arefin – *DEVCOM US Army Research Laboratory, USA*

Matias Volonte – *Northeastern University, USA*

Yan Zhang – *Shanghai Jiao Tong University, China*

Publicity Chairs

Benni Weyers – *University of Trier, Germany*

Maki Sugimoto – *Keio University, Japan*

Qi Sun – *New York University, USA*

Xin Yang – *Dalian University of Technology, China*

Zhenyi He – *Huawei HMI Lab, China*

Research Demos Chairs

Alexandre Gomes de Siqueira – *University of Florida, USA*

Sylvia Xueni Pan – *Goldsmiths University of London, UK*

Yigang Wang – *Hangzhou Dianzi University, China*

Yi Xu – *Oppo, USA*

Student Volunteers Chairs

Wei Hong Lo – *University of Otago, New Zealand*

Xiaoxu Meng – *Tencent, USA*

Prasanth Sasikuma – *University of Auckland, New Zealand*

Xuanhui Yang – *Shanghai Jiao Tong University,*

China

Tutorials Chairs

Heide Lukosch – *University of Canterbury, New Zealand*

Beatriz Santos – *University of Aveiro, Portugal*

Bin Zhou – *Beihang University, China*

Rongkai Guo – *Nvidia, China*

Video Chairs

Ye Pan – *Shanghai Jiao Tong University, China*

Mauricio Sousa – *University of Toronto, Canada*

Jerald Thomas – *Virginia Tech, USA*

Web Chairs

Giannan Ye – *Shanghai Jiao Tong University, China*

Haotian Mao – *Shanghai Jiao Tong University, China*

Jacob Young – *Victoria University of Wellington, New Zealand*

Workshops Chairs

Daisuke Iwai – *Osaka University, Japan*

Bhuvaneswari Sarupuri – *Topdesk, Hungary*

Gabriel Zachmann – *Bremen University, Germany*

Xinyu Zhang – *East China Normal University, China*

Industry Forum Chairs

Haiying Duanmu – *Shanghai Multimedia Industry Association, China*

Lin Gao – *Institute of Computing Technology Chinese Academy of Sciences, China*

Xin Yang – *Dalian University of Technology, China*

Program at a glance

Saturday, March 25						Shanghai, China, UTC+8	
Room ID	Online					B	C
Room Name	Online					BEIJING	SHANGHAI
08:00 - 08:15							
08:15 - 08:30							
08:30 - 09:00							
09:00 - 10:00							
10:00 - 11:00							
11:00 - 11:30	Workshop [online]: Multi-modal Affective and Social Behavior Analysis and Synthesis in Extended Reality (MASSXR)	Workshop [online]: First Workshop on VR for Exergaming (VR4Exergame)	Workshop [online]: KELVAR Workshop: K-12+ Embodied Learning through Virtual and Augmented Reality	Workshop [online]: 4th Annual Workshop on 3D Content Creation for Simulated Training in eXtended Reality (TrainingXR)	Workshop [online]: Workshop on Emerging Novel Prototyping Techniques for XR (ENPT XR)	Workshop [online]: 2nd International Workshop on eXtended Reality for Industrial and Occupational Support (XRIOS)	Tutorial [online]: Demystifying Academic Paper Reviews: How to Construct Quality Reviews for Peer-Reviewed Publications
11:30 - 12:00							
12:00 - 13:00							
13:00 - 13:30							
13:30 - 14:00							
14:00 - 15:00							
15:00 - 16:00							
16:00 - 16:30		Workshop [online]: 2nd XR Health workshop - XR Technologies for Healthcare and Wellbeing (XR Health)					
16:30 - 17:00							
17:00 - 17:30							
17:30 - 18:00							
18:00 - 18:30							

Sunday, March 26

Shanghai, China, UTC+8

Room ID	Online				B	C	F
Room Name	Online				BEIJING	SHANGHAI	DALIAN
08:00 - 08:15	Workshop [online]: Workshop on Immersive Visualization Laboratories - Past Present and Future 8:00 - 13:40	Workshop [online]: First Workshop on Security and Privacy for Immersive Virtual Worlds (Secure Immersive Worlds)	Workshop [online]: Enhancing User Comfort Health and Safety in VR and AR	Workshop [online]: Workshop on Immersive Sickness Prevention (WISP)	Workshop [hybrid]: Data4XR: Datasets for Developing Intelligent XR Applications	Workshop [hybrid]: Mixing Realities: Cross-reality Visualization Interaction and Collaboration	Tutorial [hybrid]: Introduction to Building Digital human with 3D and 4D Face Capture
08:15 - 09:00							
09:00 - 10:00							
10:00 - 10:30							
10:30 - 11:00							
11:00 - 12:00		Tutorial [online]: Towards Building Automated Non-Rigid Spatially Augmented Reality					
12:00 - 12:30							
12:30 - 13:00							
13:00 - 14:00							
14:00 - 15:00			Workshop [online]: ARES - Augmented Reality Enabling Superhuman Sports + Serious Games (2nd Annual Workshop)	Workshop [online]: Open Access Tools and libraries for virtual reality (OAT)	Workshop [hybrid]: 6th IEEE VR Internal Workshop on Animation in Virtual and Augmented Environments (ANIVAE-2023)	Workshop [hybrid]: Industrial Metaverse (I-Meta)	Tutorial [hybrid]: Introduction of building XR environments using Omniverse
15:00 - 16:00							
16:00 - 16:30							
16:30 - 17:00							
17:00 - 17:30							
17:30 - 18:00							
18:00 - 19:00							
19:00 - 20:30	Paper fast forward				Youth Scholars Exchange Event	Excellent Students Forum	Paper fast forward
20:30 - 21:00							

Monday, March 27				Shanghai, China, UTC+8		
Room ID	A	B	C	D		E
Room Name	LUOYANG	BEIJING	SHANGHAI	CHANGAN		KAIFENG
08:30 - 09:00	Opening					
09:00 - 10:00	Keynote1					
10:00 - 10:15	Break			Exhibition		Industry Forum
10:15 - 11:15	Paper Session1 Tracking	Paper Session2 Collaboration	Paper Session3 Agents			
11:15 - 12:00	Posters & Demos & 3DUI Contest fast forward: session 1					
12:00 - 13:30	Lunch			Posters & Demos: session 1	3DUI Contest	
13:30 - 14:30	Panel 1: Advancing Interactions in XR: Exploring New Input Technologies for the Metaverse	Paper Session4 Locomotion 1	Paper Session5 Audio	Exhibition		
14:30 - 14:45	break					
14:45 - 15:45	Paper Session6 Rendering 1	Paper Session7 Cybersickness and SocialEmotional				
15:45 - 16:00	break					
16:00 - 17:00	Paper Session8 360Video, 3D Video, and Applications	Paper Session9 Locomotion 2	Paper Session10 Rendering 2			
gather at shangri-la, take bus to the dock				Posters & Demos & 3DUI Contest [online]		
18:00 - 22:00	Reception					

Tuesday, March 28

Shanghai, China, UTC+8

Room ID	A	B	C	D		E
Room Name	LUOYANG	BEIJING	SHANGHAI	CHANGAN		KAIFENG
07:00 - 08:00				Posters & Demos & 3DUI Contest [online]		
08:30 - 09:30	Paper Session11 Gaze, Haptics, and Foveated Rendering	Paper Session12 Cybersickness 1	Paper Session13 Interaction 1	Exhibition		Industry Forum 08:30 - 17:00
09:30 - 10:45	Plenary Panel: Revisiting what is real about VR					
10:45 - 11:00	break					
11:00 - 12:00	Keynote2					
12:45 - 12:45	Posters fast forward: session 2					
12:45 - 14:00	lunch			Posters & Demos: session 2	3DUI Contest	
14:00 - 15:00	Panel2: Can a visual design and game approach for VR increase engagement with health issues?	Paper Session14 Gaze	Paper Session15 Interaction 2	Exhibition		
15:00 - 15:15	break					
15:15 - 16:15	Paper Session16 Accessibility and Applications	Paper Session17 Displays				
16:15 - 16:30	break					
16:30 - 17:30		Paper Session18 Medical	Paper Session19 Haptics			
17:30 - 18:00	Set up for Banquet 17:00 - 18:00			Posters & Demos & 3DUI Contest [online]		
18:00 - 20:30	Banquet (keynote, VGTC Award Announcement)					

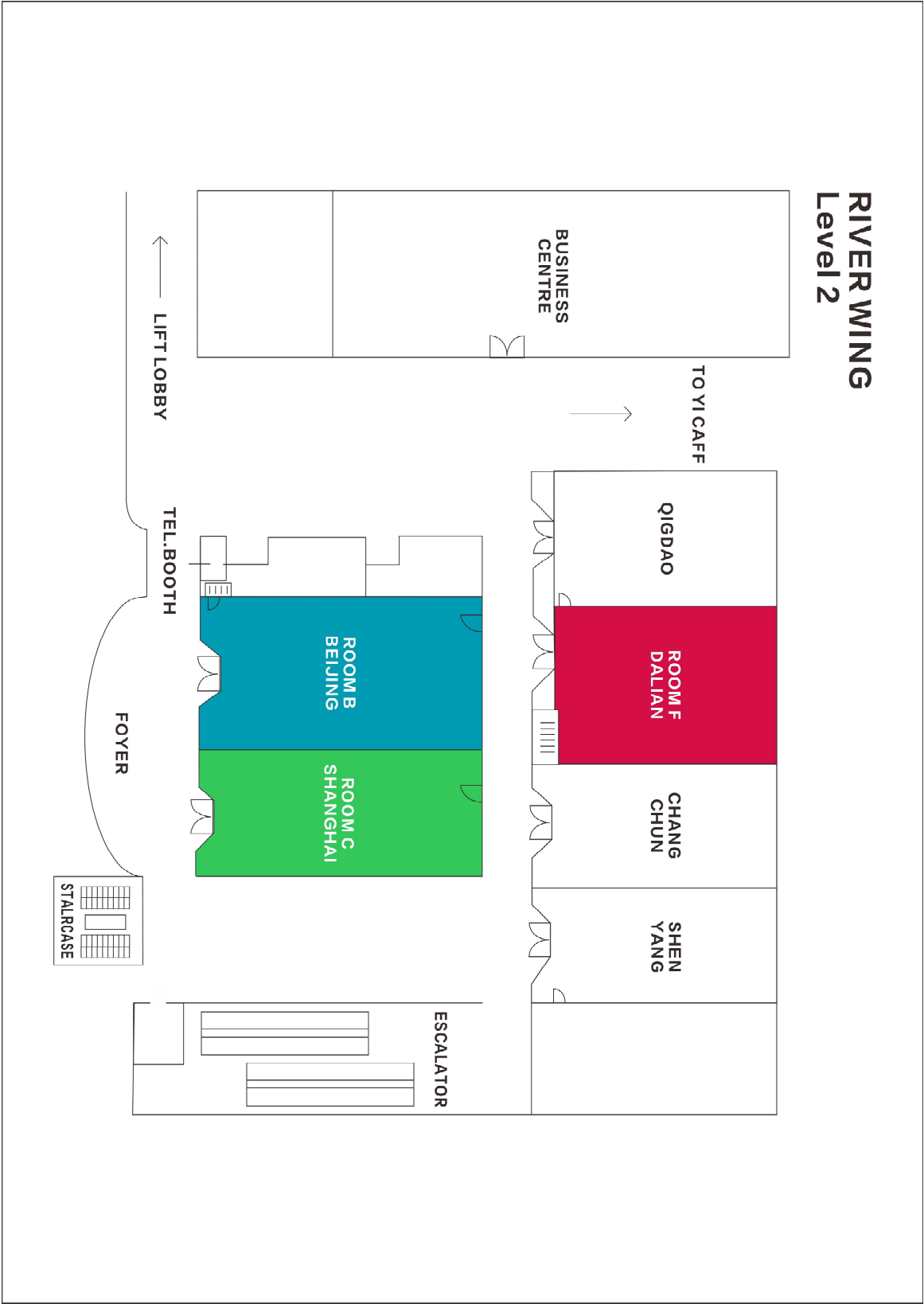
Wednesday, March 29				Shanghai, China, UTC+8	
Room ID	A	B	C	D	
Room Name	LUOYANG	BEIJING	SHANGHAI	CHANGAN	
07:00 - 08:00				Posters & Demos & 3DUI Contest [online]	
08:30 - 09:30	Paper Session20 SocialEmotional	Paper Session21 Perception 1	Panel3 [remote] Standards for Virtual Reality	Exhibition	
09:30 - 09:45	break				
09:45 - 10:45	Keynote3				
10:45 - 11:00	break				
11:00 - 12:00	Paper Session22 Multimodal and Haptics	Paper Session23 Gestures and Interaction	Paper Session24 Education and Medical		
12:00 - 12:45	Posters fast forward: session 3				
12:45 - 14:00	lunch			Posters & Demos: session 3	3DUI Contest
14:00 - 15:00	Panel4: Challenges and Opportunities of XR Applications for High-Risk Incidents	Paper Session25 Displays and Haptics	Paper Session26 Agents and Perception	Exhibition	
15:00 - 15:15	break				
15:15 - 16:15	Paper Session27 Perception 2	Paper Session28 InfoVis and TextEntry			
16:15 - 17:00	break			Posters & Demos & 3DUI Contest [online]	
17:00 - 17:30	Closing & Awards				

Poster & Exhibition & Research demo & 3DUI Contest

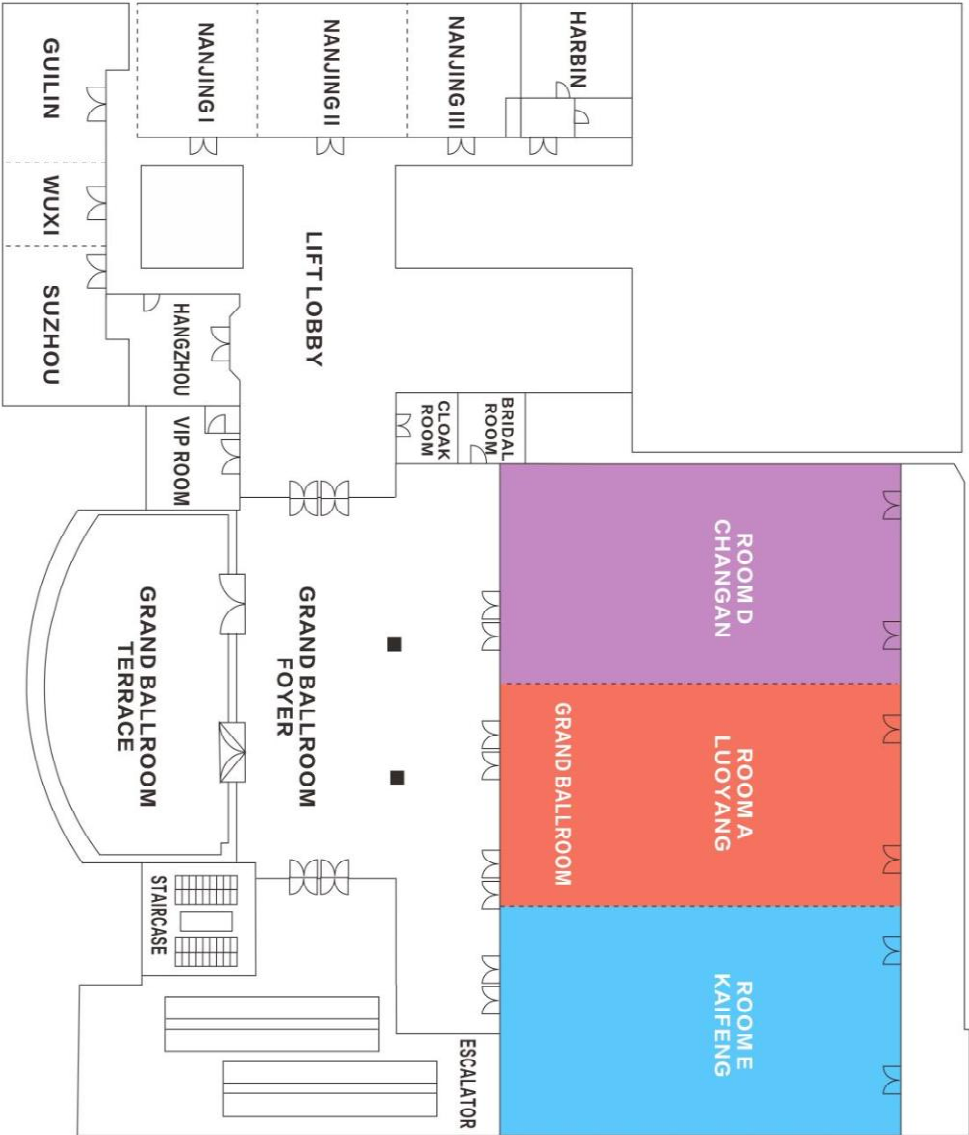
map



Venue map



RIVER WING
Level 3



Program details

Saturday, March 25

WORKSHOPS

8:30 - 13:10 @[Online]

[Workshop] Multi-modal Affective and Social Behavior Analysis and Synthesis in Extended Reality (MASSXR)

Principal Organizer: Zerrin Yumak

8:15 - 13:30 @[Online]

[Workshop] First Workshop on VR for Exergaming (VR4Exergame)

Principal Organizer: Bhawna Shiwani

9:00 – 12:00 @[Online]

[Workshop] KELVAR Workshop: K-12+ Embodied Learning through Virtual and Augmented Reality (KELVAR)

Principal Organizer: Steven Cutchin

8:30 – 11:30 @[Online]

[Workshop] 4th Annual Workshop on 3D Content Creation for Simulated Training in eXtended Reality (TrainingXR)

Principal Organizer: Lap Fai (Craig) Yu

9:00 – 12:00 @[Online]

[Workshop] Workshop on Emerging Novel Prototyping Techniques for XR (ENPT XR)

Principal Organizer: Assem Kroma

8:30 – 18:30 @[Online]

[Workshop] 2nd International Workshop on eXtended Reality for Industrial and Occupational Support (XRIOS)

Principal Organizer: Kangsoo Kim

14:00 – 17:00 @[Online]

[Workshop] 2nd XR Health workshop - XR Technologies for Healthcare and Wellbeing

Principal Organizer: Matias Volonte

14:00 – 17:00 @[Hybrid]: Room BEIJING

[Workshop] 3D Reconstruction | Digital Twinning | and Simulation for Virtual Experiences (ReDigiTS)

Principal Organizer: Alberto Cannavò

TUTORIALS

8:00 - 11:30 @[Online]

[T5] Demystifying Academic Paper Reviews: How to Construct Quality Reviews for Peer-Reviewed Publications

Organizers: Jerald Thomas (Virginia Tech), Evan Suma Rosenberg (University of Minnesota), Tabitha Peck (Davidson College)

17:00 - 18:30 @[Online]

[T2] Introduction to Building Social Virtual Reality with Ubiq

Organizers: Anthony Steed (University College London), Sebastian Friston (University College London), Ben Congdon (University College London)

DOCTORAL CONSORTIUM

8:45 - 12:30 @Room SHANGHAI

Presentations 1-5

Shane Burrell Jr – Dr. Victoria Interrante

Radhika Jain – Dr. Steven Cutchin

Damaruka Priya Rajasagi – Dr. Andrea Stevenson Won

Xingyao Yu – Dr. Steven Feiner

Xiaoyan Zhou – Dr. Doug Bowman

10:00 – 10:30 Breakout with mentors

Presentations 6-10

Klara Brandstätter – Dr. Andrew Robb

Ziwen Lu – Dr. Stefanie Zollmann

Mathieu Lutfallah – Dr. Tabitha Peck

Nels Numan – Dr. Rajiv Khadka

Antony Prakash – Dr. Joe Gabbard

12:00 -12:30 Breakout with mentors

14:00 - 17:30 @ Room SHANGHAI

Presentations 11-15

Amira Mahmoud Shaban Ahmed – Dr. Richard Skarbez

Adil Khokhar – Dr. Jason Orlosky

Dooyoung Kim – Dr. Evan Suma Rosenberg

Nadine Wagener – Dr. Nilufar Baghaei

Yue Wang – Dr. Lili Wang

15:00 – 15:30 Breakout with mentors

Presentations 16-19

Zhuang Chang – Dr. Anthony Steed

Isla Xi Han – Dr. Yiyu Cai

Piaopiao Yu – Dr. Lik-Hang Lee

Yidan Zhang – Dr. Mark Billinghurst

17:00 – 17:30 Breakout with mentors

Sunday, March 26

WORKSHOPS

9:00 – 12:00 @[Hybrid]: Room BEIJING

[Workshop] Data4XR: Datasets for Developing Intelligent XR Applications

Principal Organizer: Yuyang Wang

9:00 – 12:00 @[Hybrid]: Room SHANGHAI

[Workshop] Mixing Realities: Cross-reality Visualization, Interaction, and Collaboration

Principal Organizer: Bhawna Shiwani

8:00 – 13:40 @[Online]

[Workshop] Workshop on Immersive Visualization Laboratories - Past, Present and Future.

Principal Organizer: William Sherman

8:15 – 14:00 @[Online]

[Workshop] First Workshop on Security and Privacy for Immersive Virtual Worlds (Secure Immersive Worlds)

Principal Organizer: Sean Banerjee

9:00 – 12:00 @[Online]

[Workshop] Enhancing User Comfort, Health and Safety in VR and AR

Principal Organizer: Arash Mahnan

9:00 – 12:00 @[Online]

[Workshop] Workshop on Immersive Sickness Prevention (WISP)

Principal Organizer: Isayas Berhe Adhanom

14:00 – 16:30 @[Hybrid]: Room BEIJING

[Workshop] 6th IEEE VR Internal Workshop on Animation in Virtual and Augmented Environments (ANIVAE-2023)

Principal Organizer: Thomas Moser

14:00 – 16:00 @[Hybrid]: Room SHANGHAI

[Workshop] Industrial Metaverse (I-Meta)

Principal Organizer: Hongming Cai, Shuangjiu Xiao, Bingqing Shen

14:00 – 17:00 @[Online]

[Workshop] ARES - Augmented Reality Enabling Superhuman Sports + Serious Games (2nd Annual Workshop)

Principal Organizer: Christian Eichhorn

14:00 – 17:00 @[Online]

[Workshop] Open Access Tools and libraries for virtual reality (OAT)

Principal Organizer: Matias Volonte

TUTORIALS

9:00 - 10:30 @[Hybrid]: Room DALIAN

[T4] Introduction to Building Digital human with 3D and 4D Face Capture

Organizers: Dongdong Weng (Beijing Institute of Technology)

11:00 - 12:30 @[Online]

[T1] Towards Building Automated Non-Rigid Spatially Augmented Reality

Organizers: Aditi Majumder (Department of Computer Science, University of California, Irvine),

Muhammad Twaha Ibrahim (Department of Computer Science, University of California, Irvine)

14:00 - 17:30 @[Hybrid]: Room DALIAN

[T3] Introduction of building XR environments using Omniverse

Organizers: Shen Song (Senior Solution Architecture, Nvidia)

FORUMS

19:00 – 21:00

Youth Scholars Exchange Event @ Room BEIJING

Organizers: Xin Yang

Excellent Students Forum @ Room SHANGHAI

Organizers: Lin Gao

Monday, March 27

8:30 – 9:00

Opening @Room LUOYANG

9:00 – 10:00

Keynote1: Digital Humans in Virtual Environment @Room LUOYANG

Speaker: Baining Guo, Microsoft Research



10:15 – 11:15

Paper Session1: Tracking @Room LUOYANG

Session Chair: Guofeng Zhang

[Conference] Simultaneous Scene-independent Camera Localization and Category-level Object Pose Estimation via Multi-level Feature Fusion

Junyi Wang, Yue Qi

[Conference] SCP-SLAM: Accelerating DynaSLAM with Static Confidence Propagation

Mingfei Yu, Lei Zhang, Wufan Wang, Jiahui Wang

[Conference] AR-MoCap: Using Augmented Reality to Support Motion Capture Acting

Alberto Cannavò, Filippo Gabriele Praticò, Alberto Bruno, Fabrizio Lamberti

[Conference] Cross-View Visual Geo-Localization for Outdoor Augmented Reality

Niluthpol Chowdhury Mithun, Kshitij Minhas, Han-Pang Chiu, Taragay Oskiper, Mikhail Sizintsev, Supun Samarasekera, Rakesh Kumar

[Journal] LiDAR-aid Inertial Poser: Large-scale Human Motion Capture by Sparse Inertial and LiDAR Sensors

Yiming Ren, Chengfeng Zhao, Yannan He, Peishan Cong,

Han Liang, Jingyi Yu, Lan XU, Yuexin Ma

Paper Session2: Collaboration @Room BEIJING

Session Chair: Hai-Ning Liang

[Conference] Comparing Visual Attention with Leading and Following Virtual Agents in a Collaborative Perception-Action Task in VR

Sai-Keung Wong, Matias Volonte, Kuan-yu Liu, Elham Ebrahimi, Sabarish V. Babu

[Conference] Towards an Understanding of Asymmetric Collaborative Visualization on Problem-solving

Wai Tong, Meng Xia, Kam Kwai Wong, Doug Bowman, Ting-Chuen Pong, Huamin Qu, Yalong Yang

[Conference] MAGIC: Manipulating Avatars and Gestures to Improve Remote Collaboration

Catarina Gonçalves Fidalgo, Mauricio Sousa, Daniel Mendes, Rafael Kuffner dos Anjos, Daniel Medeiros, Karan Singh, Joaquim Jorge

[Journal] Effects of Collaborative Training Using Virtual Co-embodiment on Motor Skill Learning

Daiki Kodama, Takato Mizuho, Yuji Hatada, Takuji Narumi, Michitaka Hirose

[Journal] Using Virtual Replicas to Improve Mixed Reality

Remote Collaboration

Huayuan Tian, Gun A. Lee, Huidong Bai, Mark Billingham

Paper Session3: Agents @Room SHANGHAI

Session Chair: Chong Cao

[Conference] Exploring the Social Influence of Virtual Humans Unintentionally Conveying Conflicting Emotions
Zubin Choudhary, Nahal Norouzi, Austin Erickson, Ryan Schubert, Gerd Bruder, Greg Welch

[Conference] Studying Avatar Transitions in Augmented Reality: Effect of Visual Transformation and Physical Action

Riku Otono, Adélaïde Genay, Monica Perusquia-Hernandez, Naoya Isoyama, Hideaki Uchiyama, Martin Hachet, Anatole Lécuyer, Kiyoshi Kiyokawa

[Conference] Animation Fidelity in Self-Avatars: Impact on User Performance and Sense of Agency
Haoran Yun, Jose Luis Ponton, Carlos Andujar, Nuria Pelechano

[Conference] Fully Automatic Blendshapes Generation for Stylized Characters
Jingying Wang, Yilin Qiu, Keyu Chen, Yu Ding, Ye Pan

[Journal] PACE: Data-Driven Virtual Agent Interaction in Dense and Cluttered Environments

James F Mullen Jr, Dinesh Manocha

11:15 – 12:00

Posters fast forward: session 1 @Room LUOYANG, BEIJING, and SHANGHAI (broadcasting)

12:00 – 13:30

Posters & Demos & 3DUI Contest @Room CHANGAN

13:30 – 14:30

Panel 1: Advancing Interactions in XR: Exploring New Input Technologies for the Metaverse @Room LUOYANG

Moderator: Salar Shahna: Sensoryx, Switzerland

Panelists: Rolf Adelsberger (Sensoryx, Switzerland), Wen Shen (Lenovo, China)

Paper Session4: Lomotion 1 @Room BEIJING

Session Chair: Songhai Zhang

[Conference] Designing Viewpoint Transition Techniques in Multiscale Virtual Environments

Jong-In Lee, Paul Asente, Wolfgang Stuerzlinger

[Journal] Assisted walking-in-place: Introducing assisted

motion to walking-by-cycling in embodied Virtual Reality
Yann Moullec, Justine Saint-Aubert, Mélanie Cogne,
Anatole Lécuyer

[Journal] Monte-Carlo Redirected Walking: Gain
Selection Through Simulated Walks
Ben J. Congdon, Anthony Steed

[Invited Journal] A Systematic Literature Review of
Virtual Reality Locomotion Taxonomies
Lisa Marie Prinz, Tintu Mathew, Benjamin Weyers

[Invited Journal] Revisiting Walking-in-Place by
Introducing Step-Height Control, Elastic Input, and
Pseudo-Haptic Feedback
Yutaro Hirao, Takuji Narumi, Ferran Argelaguet, Anatole
Lécuyer

Paper Session5: Audio @Room SHANGHAI

Session Chair: Yue Li

[Conference] Lightweight Scene-aware Rain Sound
Simulation for Interactive Virtual Environments
Haonan Cheng, Shiguang Liu, Jiawan Zhang

[Journal] ConeSpeech: Exploring Directional Speech
Interaction for Multi-Person Remote Communication in
Virtual Reality

Yukang Yan, Haohua Liu, Yingtian Shi, Jingying Wang, Ruici Guo, Zisu Li, Xuhai Xu, Chun Yu, Yuntao Wang, Yuanchun Shi

[Journal] The Design Space of the Auditory Representation of Objects and their Behaviours in Virtual Reality for Blind People

João Guerreiro, Yujin Kim, Rodrigo Nogueira, SeungA Chung, André Rodrigues, Uran Oh

[Journal] Emotional Voice Puppetry

Ye Pan, Ruisi Zhang, Shengran Cheng, Shuai Tan, Yu Ding, Kenny Mitchell, Xubo Yang

[Conference] Persuasive vibrations : Effects of Speech-Based Vibrations on Persuasion, Leadership, and Co-Presence During Verbal Communication in VR

Justine Saint-Aubert, Ferran Argelaguet Sanz, Claudio Pacchierotti, Marc J-M Macé, Amir Amedi, Anatole Lécuyer

14:45 – 15:45

Paper Session6: Rendering 1 @Room LUOYANG

Session Chair: Jie Guo

[Journal] ShadowMover: Automatically Projecting Real Shadows onto Virtual Object

Piaopiao Yu, Jie Guo, Fan Huang, Zhenyu Chen, Chen

Wang, Yan Zhang, Yanwen Guo

[Journal] Add-on Occlusion: Turning Off-the-Shelf Optical See-through Head-mounted Displays Occlusion-capable
Yan Zhang, Xiaodan Hu, Kiyoshi Kiyokawa, Xubo Yang

[Journal] NeRFPlayer: A Streamable Dynamic Scene Representation with Decomposed Neural Radiance Fields

Liangchen Song, Anpei Chen, Zhong Li, Zhang Chen, Lele Chen, Junsong Yuan, Yi Xu, Andreas Geiger

[Journal] Integrating Both Parallax and Latency Compensation into Video See-Through Head-Mounted Display

Xue Teng, Robert Allison, Laurie M Wilcox

[Journal] GeoSynth: A Photorealistic Synthetic Indoor Dataset for Scene Understanding

Brian Pugh, Davin Chernak, Salma Jiddi

Paper Session7: Cybersickness and Social Emotional @Room BEIJING

Session Chair: Yue Liu

[Journal] Cybersickness, Cognition, & Motor Skills: The Effects of Music, Gender, and Gaming Experience

Panagiotis Kourtesis, Rayaam Amir, Josie Linnell, Ferran

Argelaguet, Sarah MacPherson

[Journal] Effect of Frame Rate on User Experience, Performance, and Simulator Sickness in Virtual Reality
Jialin Wang, Rongkai Shi, Wenxuan Zheng, Weijie Xie, Dominic Kao, Hai-Ning Liang

[Invited Journal] Intentional Head-Motion Assisted Locomotion for Reducing Cybersickness
Zehui Lin, Xiang Gu, Sheng Li, Zhiming Hu, Guoping Wang

[Invited Journal] Mitigation of VR Sickness during Locomotion with a Motion-Based Dynamic Vision Modulator
Guanghan Zhao, Jason Orlosky, Steven Feiner, Photchara Ratsamee, Yuki Uranishi

[Invited Journal] The Effects of Spatial Complexity on Narrative Experience in Space-Adaptive AR Storytelling
Jae-eun Shin, Boram Yoon, Dooyoung Kim, Woontack Woo

16:00 – 17:00

**Paper Session8: 360Video,3D Video and applications
@Room LUOYANG**

Session Chair: Fei Hou

[Journal] Introducing 3D Thumbnails to Access

360-Degree Videos in Virtual Reality

ir. Alissa Vermast, Wolfgang Hürst

[Journal] Masked360: Enabling Robust 360-degree Video Streaming with Ultra Low Bandwidth Consumption

Zhenxiao Luo, Baili Chai, Zelong Wang, Miao Hu, Di Wu

[Journal] Wavelet-Based Fast Decoding of 360 Videos

Colin Groth, Sascha Fricke, Ing. Susana Castillo, Marcus Magnor

[Conference] CaV3: Cache-assisted Viewport Adaptive Volumetric Video Streaming

Junhua Liu, Boxiang Zhu, Fangxin Wang, Yili Jin, Wenyi Zhang, zihan xu, Shuguang Cui

[Conference] Scaling VR Video Conferencing

Mallesham Dasari, Edward Lu, Michael W Farb, Nuno Pereira, Ivan Liang, Anthony Rowe

Paper Session9: Locomotion 2 @Room BEIJING

Session Chair: Miao Wang

[Conference] Tell Me Where To Go: Voice Controlled Hands-Free Locomotion for Virtual Reality Systems

Jan Niklas Hombeck, Henrik Voigt, Timo Heggemann, Rabi R. Datta, Kai Lawonn

[Conference] Investigating Guardian Awareness Techniques to Promote Safety in Virtual Reality

Sixuan Wu, Jiannan Li, Mauricio Sousa, Tovi Grossman

[Conference] Redirected Walking Based on Historical User Walking Data

Cheng-Wei Fan, Sen-Zhe Xu, Peng Yu, Fang-Lue Zhang, Song-Hai Zhang

[Journal] Gaining the High Ground: Teleportation to Mid-Air Targets in Immersive Virtual Environments

Tim Weissker, Pauline Bimberg, Aalok Shashidhar Gokhale, Torsten Wolfgang Kuhlen, Bernd Froehlich

[Journal] FREE-RDW: A Multiuser Redirected Walking Method for Supporting Nonforward Steps

Tianyang Dong, Tieqi Gao, Yinyan Dong, Liming Wang, Kefan Hu, Jing Fan

Paper Session10: Rendering 2 @Room SHANGHAI

Session Chair: Xin Yang

[Conference] Level-of-Detail AR: Dynamically Adjusting Augmented Reality Level of Detail Based on Visual Angle

Abby Wysopal, Vivian Ross, Joyce E Passananti, Kangyou Yu, Brandon Huynh, Tobias Höllerer

[Conference] Where to Render: Studying Renderability

for IBR of Large-Scale Scenes

Zimu Yi, Ke Xie, Jiahui Lyu, Minglun Gong, Hui Huang

[Conference] Delta Path Tracing for Real-Time Global Illumination in Mixed Reality

Yang Xu, Yuanfa Jiang, Shibo Wang, Kang Li, Guohua Geng

[Conference] Style-aware Augmented Virtuality Embeddings (SAVE)

Atsushi Ishihara, Hiroyuki Aga, Yasuko Ishihara, Hirotake Ichikawa, Hidetaka Kaji, Koichi Kawasaki, Johannes Hoster, Dennis Ritter, Kristian Hildebrand

[Journal] LFACon: Introducing Anglewise Attentions to Light Field Space in No-reference Quality Assessment

Qiang Qu, Xiaoming Chen, Yuk Ying Chung, Weidong Cai

17:30 – 21:30

Conference Reception on The Huangpu River

Tuesday, March 28

8:30 – 9:30

**Paper Session11: Gaze, Haptics and Foveated Rendering
@Room LUOYANG**

Session Chair: Sheng Li

[Conference] Locomotion-aware Foveated Rendering

Xuehuai Shi, Lili Wang, Jian Wu, Wei Ke, Chan-Tong Lam

[Conference] Power, Performance, and Image Quality Tradeoffs in Foveated Rendering

Rahul Singh, Muhammad Huzaifa, Jeffrey Liu, Anjul Patney, Hashim Sharif, Yifan Zhao, Sarita Adve

[Journal] Privacy-preserving datasets of eye-tracking samples with applications in XR

Brendan David-John, Kevin Butler, Eakta Jain

[Invited Journal] Analyzing the Effect of Diverse Gaze and Head Direction on Facial Expression Recognition with Photo-Reflective Sensors Embedded in a Head-Mounted Display

Fumihiko Nakamura, Masaaki Murakami, Katsuhiro Suzuki, Masaaki Fukuoka, Katsutoshi Masai, Maki Sugimoto

[Journal] When Tangibles become Deformable: Studying Pseudo-Stiffness Perceptual Thresholds in a VR Grasping Task

Elodie Bouzbib, Claudio Pacchierotti, Anatole Lécuyer

Paper Session12: Cybersickness 1 @Room BEIJING

Session Chair: Rob Lindeman

[Conference] You Make Me Sick! The Effect of Stairs on

Presence, Cybersickness, and Perception of Embodied Conversational Agents

Samuel Ang, Amanda Fernandez, Michael Rushforth, John Quarles

[Conference] LiteVR: Interpretable and Lightweight Cybersickness Detection using Explainable AI

Ripan Kumar Kundu, Rifatul Islam, John Quarles, Khaza Anuarul Hoque

[Conference] An EEG-based Experiment on VR Sickness and Postural Instability While Walking in Virtual Environments

Carlos Alfredo Tirado Cortes, Chin-Teng Lin, Tien-Thong Nguyen Do, Hsiang-Ting Chen

[Conference] Like a Rolling Stone: Effects of Space Deformation During Linear Acceleration on Slope Perception and Cybersickness

Tongyu Nie, Isayas Berhe Adhanom, Evan Suma Rosenberg

[Conference] Enhanced Theta Activity in the Left Parietal Cortex May Defend Against VR Motion Sickness Attacks: A Pilot Study of EEG

Gang Li, Katharina Margareta Theresa Pöhlmann, Mark McGill, Chao Ping Chen, Stephen Anthony Brewster, Frank Pollick

Paper Session13: Interaction 1 @Room SHANGHAI

Session Chair: Huidong Bai

[Conference] Toward Intuitive Acquisition of Fully Occluded VR Objects Through Direct Grab From a Disocclusion Mini-map

Mykola Maslych, Yahya Hmaiti, Ryan Ghamandi, Paige Leber, Ravi Kiran Kattoju University of Central Florida, Jacob Belga, Joseph LaViola

[Conference] Measuring the Effect of Stereo Deficiencies on Peripersonal Space Pointing

Anil Ufuk Batmaz, Moaaz Hudhud Mughrabi, Mine Sarac, Mayra Donaji Barrera Machuca, Wolfgang Stuerzlinger

[Conference] AR Interfaces for Disocclusion--A Comparative Study

Shuqi Liao, Yuqi Zhou, Voicu Popescu

[Conference] Warpy: Contextual and Multi-view Indirect 3D Curve Sketching in Augmented Reality

Rawan Alghofaili, Cuong Nguyen, Vojtěch Krs, Nathan Carr, Radomir Mech, Lap-Fai Yu

[Conference] How Do I Get There? Overcoming Reachability Limitations of Constrained Industrial Environments in Augmented Reality Applications

Daniel Bambusek, Zdenek Materna, Michal Kapinus,
Vitezslav Beran, Pavel Smrž

9:30 – 10:45

Plenary Panel: Revisiting "What's Real about Virtual Reality?" (remote | hybrid @Room LUOYANG)

Moderator: Evan Suma Rosenberg: University of Minnesota, USA

Panelists: Elizabeth Baron (Immersionary Enterprises LLC, USA), Jingwen Dai (Ximmerse, China), Henry Fuchs (University of North Carolina, USA), Sharif Razzaque (Medtronic, USA), Mary C. Whitton (University of North Carolina, USA)

11:00 – 12:00

Keynote2: Immersive Video Reality -- Technology, Standard and Application @Room LUOYANG

Speaker: Wen Gao, Pengcheng Laboratory, Shenzhen, China



12:00 – 12:30

Posters fast forward: session 2 @Room LUOYANG, BEIJING, and SHANGHAI (broadcasting)

12:45 – 14:00

Posters & Demos & 3DUI Contest @Room CHANGAN

14:00 – 15:00

Panel 2: Can a visual design and game approach for VR increase engagement with health issues? (hybrid @Room LUOYANG)

Moderator: Hannes Rall, Nanyang Technological University, Singapore

Panelists: Hannes Rall (Nanyang Technological University, Singapore), Gray Hodgkinson (Nanyang Technological University, Singapore), Sabrina Wong (National Healthcare Group, Singapore)

Paper Session14: Gaze @Room BEIJING

Session Chair: Kaan Akşit

[Conference] Exploring 3D Interaction with Gaze Guidance in Augmented Reality

Yiwei Bao, Jiaxi Wang, Zhimin Wang, Feng Lu

[Conference] A Large-Scale Study of Proxemics and Gaze in Groups

Mark Roman Miller, Cyan DeVeaux, Eugy Han, Nilam Ram, Jeremy N. Bailenson

[Conference] Exploring Enhancements towards Gaze Oriented Parallel Views in Immersive Tasks

Theophilus Teo, Kuniharu Sakurada, Maki Sugimoto

[Conference] MoPeDT: A Modular Head-Mounted

Display Toolkit to Conduct Peripheral Vision Research
Matthias Albrecht, Lorenz Assländer, Harald Reiterer,
Stephan Streuber

[Journal] Leveling the Playing Field: A Comparative
Reevaluation of Unmodified Eye-Tracking as an Input and
Interaction Modality for VR

Ajoy Savio Fernandes, T. Scott Murdison, Michael J
Proulx

Paper Session15: Interaction 2 @Room SHANGHAI

Session Chair: Akihiro Matsuura

[Conference] Examining the Fine Motor Control Ability of
Linear Hand Movement in Virtual Reality

Xin Yi, Xueyang Wang, Jiaqi Li, Hewu Li Tsinghua
University

[Conference] Exploring the Effects of Augmented Reality
Notification Type and Placement in AR HMD while
Walking

Hyunjin Lee, Woontack Woo

[Journal] Evaluating Augmented Reality Landmark Cues
and Frame of Reference Displays with Virtual Reality

Yu Zhao, Jeanine Stefanucci, Sarah Creem-Regehr, Bobby
Bodenheimer

[Journal] A Lack of Restraint: Comparing Virtual Reality Interaction Techniques for Constrained Transport Seating
Graham Wilson, Mark McGill, Daniel Medeiros, Stephen Anthony Brewster

[Journal] Improving the Effectiveness of Near-field Augmented Reality Interactions By Avatarizing Users' End Effectors

Roshan Venkatakrishnan, Rohith Venkatakrishnan, Balagopal Raveendranath, Christopher Pagano, Andrew Robb, Wen-Chieh Lin, Sabarish V. Babu

15:15 – 16:15

Paper Session16: Accessibility and Applications @Room LUOYANG

Session Chair: Debbie Ding

[Conference] Using Smartphones as Assistive Displays to AR HMDs to Enhance the AR Reading Experience
Sunyoung Bang, Woontack Woo

[Conference] Evoking empathy with visually impaired people through an augmented reality embodiment experience

Renan Guarese, Emma Pretty, Haytham Fayek, Fabio Zambetta, Ron van Schyndel

[Conference] Optimizing Product Placement for Virtual

Stores

Wei Liang, Luhui Wang, Xinzhe Yu, Changyang Li, Rawan Alghofaili, Yining Lang, Lap-Fai Yu

[Journal] A survey on remote assistance and training in Mixed Reality environments

Catarina Gonçalves Fidalgo, Yukang Yan, Hyunsung Cho, Mauricio Sousa, David Lindlbauer, Joaquim Jorge

[Journal] Evaluating the Effects of Virtual Reality Environment Learning on Subsequent Robot Teleoperation in an Unfamiliar Building

Karl Eisenträger, Judith Haubner, Jennifer Brade, Wolfgang Einhäuser, Alexandra Bendixen, Sven Winkler Chemnitz, Philipp Klimant Chemnitz, Georg Jahn

Paper Session17: Display @Room BEIJING

Session Chair: Frank Guan

[Conference] HoloBeam: Paper-Thin Near-Eye Displays

Kaan Akşit, Yuta Itoh

[Conference] Extended Depth-of-Field Projector using Learned Diffractive Optics

Yuqi Li, Qiang Fu, Wolfgang Heidrich

[Conference] Proposal for an aerial display using dynamic projection mapping on a distant flying screen

Masatoshi Iuchi, Yuito Hirohashi, Hiromasa Oku

[Conference] CompenHR: Efficient Full Compensation for High-resolution Projector

Yuxi Wang, Haibin Ling, Bingyao Huang

[Conference] A compact photochromic occlusion capable see-through display with holographic lenses.

Chun Wei Ooi, Yuichi Hiroi, Yuta Itoh

16:30 – 17:30

Paper Session18: Medical @Room BEIJING

Session Chair: Bruce Gu

[Conference] Remapping Control in VR for Patients with AMD

Michael Nitsche, Blaire Bosley, Susan A. Primo, Jisu Park, Daniel Carr

[Conference] Design and Development of a Mixed Reality Acupuncture Training System

Qilei Sun, Mr Jiayou Huang, Haodong Zhang, Paul Craig, Lingyun Yu, Eng Gee LIM

[Journal] Evaluation of AR visualization approaches for catheter insertion into the ventricle cavity

Mohamed Benmahdjoub, Abdullah Thabit, Marie-Lise C. van Veelen, Wiro J. Niessen, Eppo B. Wolvius, Theo van

Walsum

[Journal] A Video-Based Augmented Reality System for Human-in-the-Loop Muscle Strength Assessment of Juvenile Dermatomyositis

Kanglei Zhou, Ruizhi Cai, Yue Ma, Qingqing Tan, Xinning Wang, Jianguo Li, Hubert P. H. Shum, Frederick W. B. Li, Song Jin, Xiaohui Liang

[Journal] CardioGenesis4D: Interactive Morphological Transitions of Embryonic Heart Development in a Virtual Learning Environment

Danny Schott, Matthias Kunz, Tom Wunderling, Florian Heinrich, Rüdiger Braun-Dullaeus, Christian Hansen

Paper Session19: Haptics @Room SHANGHAI

Session Chair: Yaoping Hu

[Conference] Providing 3D Guidance and Improving the Music-Listening Experience in Virtual Reality Shooting Games Using Musical Vibrotactile Feedback

Yusuke Yamazaki, Shoichi Hasegawa

[Conference] Investigating Noticeable Hand Redirection in Virtual Reality using Physiological and Interaction Data
Martin Feick, Kora Persephone Regitz, Anthony Tang, Tobias Jungbluth, Maurice Rekrut, Antonio Krüger

[Conference] A Haptic Stimulation-Based Training Method to Improve the Quality of Motor Imagery EEG Signal in VR

Shiwei Cheng, Jieming Tian

[Conference] RemoteTouch: Enhancing Immersive 3D Video Communication with Hand Touch

Yizhong Zhang, Zhiqi Li, Sicheng Xu, Chong Li, Jiaolong Yang, Xin Tong, Baining Guo

[Conference] CoboDeck: A Large-Scale Haptic VR System Using a Collaborative Mobile Robot

Soroosh Mortezaipoor, Khrystyna Vasylevska, Emanuel Vonach, Hannes Kaufmann

18:00 – 20:30

Banquet in Shangri-La Hotel, VGTC Award Announcement and Keynote

Banquet Keynote: Reconstructing Reality: From Physical World to Virtual Environments

Speaker: Ming C. Lin, University of Maryland at College Park



Wednesday, March 29

8:30 – 9:30

Paper Session20: Social Emotional @Room LUOYANG

Session Chair: Zeyu Wang

[Conference] Virtual reality in supporting charitable giving: The role of vicarious experience, existential guilt, and need for stimulation

Ou Li, Han Qiu

[Conference] Continuous VR Weight Illusion by Combining Adaptive Trigger Resistance and Control-Display Ratio Manipulation

Carolin Stellmacher, André Zenner, Oscar Javier Ariza Nunez

[Journal] Measuring Interpersonal Trust towards Virtual Humans with a Virtual Maze Paradigm

Jinghuai Lin, Johrine Cronjé, Ivo Käthner, Paul Pauli, Marc Erich Latoschik

[Journal] The Dating Metaverse: Why We Need to Design Consent in Social VR

Douglas Zytke, Jonathan Chan

[Invited Journal] Role-Exchange Playing: An Exploration of Role-Playing Effects for Anti-Bullying in Immersive Virtual Environments

Xiang Gu, Sheng Li, Kangrui Yi, Xiaojuan Yang, Huiling Liu, Guoping Wang

Paper Session21: Perception 1 @Room BEIJING

Session Chair: Yong Hu

[Conference] Empirically Evaluating the Effects of Eye Height and Self-Avatars on Dynamic Passability Affordances in Virtual Reality

Ayush Bhargava, Roshan Venkatakrishnan, Rohith Venkatakrishnan, Hannah Solini, Kathryn Lucaites, Andrew Robb, Christopher Pagano, Sabarish V. Babu

[Conference] Manipulation of Motion Parallax Gain Distorts Perceived Distance and Object Depth in Virtual Reality

Xue Teng, Robert Allison, Laurie M Wilcox

[Journal] How End-effector Representations Affect the Perceptions of Dynamic Affordances in Virtual Reality

Roshan Venkatakrishnan, Rohith Venkatakrishnan, Balagopal Raveendranath, Christopher Pagano, Andrew Robb, Wen-Chieh Lin, Sabarish V. Babu

[Journal] Inward VR: Toward a Qualitative Method for Investigating Interoceptive Awareness in VR

Alexander Haley, Don Thorpe, Alex Pelletier, Svetlana Yarosh, Daniel F. Keefe

[Invited Journal] Analysis of the Saliency of Color-Based

Dichoptic Cues in Optical See-Through Augmented Reality

Austin Erickson, Gerd Bruder, Gregory F. Welch

Panel 3: Standards for Virtual Reality (remote) @ Room SHANGHAI

Moderator: Simon Su: National Institute of Standards and Technology, USA

Panelists: William Sherman (National Institute of Standards and Technology, USA), Ryan Pavlik (Collabora Inc, UK), Sakthi Priya Balaji Ranganathan (JIX, NZ)

9:45 – 10:45

Keynote3: Reconstructing Reality: From Physical World to Virtual Environments @Room LUOYANG

Speaker: Harry Shum, Xiaobing.ai



11:00 – 12:00

Paper Session22: Multimodal and Haptics @Room LUOYANG

Session Chair: Haonan Cheng

[Journal] GroundFlow: Liquid-based Haptics for Simulating Fluid on the Ground in Virtual Reality

Ping-Hsuan Han, Tzu-Hua Wang, Chien-Hsing Chou

[Conference] Wind comfort and emotion can change by the cross-modal presentation of audio-visual stimuli of indoor and outdoor environments

Kenichi Ito, Juro Hosoi, Yuki Ban, Takayuki Kikuchi, Kyosuke Nakagawa, Hanako Kitagawa, Chizuru Murakami, Yosuke Imai, Shinichi Warisawa

[Journal] Eat, Smell, See: Investigating Cross-Modal Correspondence when Eating in VR

Florian Weidner, Frau Jana Elena Maier janamaier, Wolfgang Broll

[Journal] Modified Egocentric Viewpoint for Softer Seated Experience in Virtual Reality

Miki Matsumuro, Shohei Mori, Yuta Kataoka Reality Media Lab., Ritsumeikan University, Fumiaki Igarashi, Fumihisa Shibata, Asako Kimura

[Journal] Upper Body Thermal Referral and Tactile Masking for Localized Feedback

Hyunki Son, Haokun Wang, Yatharth Singhal, Jin Ryong Kim

Paper Session23: Gestures and Interaction @Room BEIJING

Session Chair: Boyu Gao

[Conference] Real-Time Recognition of In-Place Body Actions and Head Gestures using Only a Head-Mounted Display

Jingbo Zhao, Mingjun Shao, Yaojun Wang, Ruolin Xu

[Journal] Skeleton-based Human Action Recognition via Large-kernel Attention Graph Convolutional Network

Yanan Liu, Hao Zhang, Yanqiu Li, Kangjian He, Dan Xu

[Journal] GestureSurface: VR sketching through assembling scaffold surface with non dominant hand

Xinchi Xu, Yang Zhou, Bingchan Shao, Guihuan Feng, Chun Yu

[Journal] Comparing Different Grasping Visualizations for Object Manipulation in VR using Controllers

Giorgos Ganas, Christos Lougiakis, Akrivi Katifori, Maria Roussou, Yannis Ioannidis, Ioannis Panagiotis

[Invited Journal] Kine-Appendage: Enhancing Freehand VR Interaction Through Transformations of Virtual Appendages

Yang Tian, Hualong Bai, Shengdong Zhao, Chi-Wing Fu, Chun Yu, Haozhao Qin, Qiong Wang, Pheng-Ann Heng

Paper Session24: Education and Medical @Room SHANGHAI

Session Chair: Ali Adjorlu

[Conference] Investigating Spatial Representation of Learning Content in Virtual Reality Learning Environments

Manshul Belani, Mr. Harsh Vardhan Singh, Aman Parnami, Pushpendra Singh

[Conference] Virtual Optical Bench: Teaching Spherical Lens Layout in VR with Real-Time Ray Tracing

Martin Bellgardt, Sebastian Pape, David Gilbert, Ing. Marcel Prochnau, Dipl.-Ing. Georg König, Torsten Wolfgang Kuhlen

[Journal] How to maximise Spatial Presence: Design Guidelines for a Virtual Learning Environment for school use

Marc Bastian Rieger, Björn Risch

[Journal] ImTooth: Neural Implicit Tooth for Dental Augmented Reality

Hai Li, Hongjia Zhai, Xingrui Yang, Zhirong Wu, Yihao Zheng, Haofan Wang, Jianchao Wu, Hujun Bao, Guofeng Zhang

[Invited Journal] MD-Cave: An Immersive Visualization Workbench for Radiologists

Shreeraj Jadhav, Arie E. Kaufman

12:00 – 12:30

Posters fast forward: session 3 @Room LUOYANG, BEIJING, and SHANGHAI (broadcasting)

12:45 – 14:00

Posters & Demos & 3DUI Contest @Room CHANGAN

14:00 – 15:00

Panel 4: Challenges and Opportunities of XR Applications for High-Risk Incidents (remote) @ Room LUOYANG

Moderator: Brad Waid: New Horizons Global, USA

Panelists: Jason Jerald (NextGen Interactions, USA), Scott Ledgerwood (National Institute of Standards and Technology, Public Safety Communications Research, USA), Regis Kopper (University of North Carolina Greensboro, USA/Portugal), Jeremy Keniski (XAlter, USA), Joseph Van Harken: MindSpring, USA

Paper Session25: Display and Haptics @Room BEIJING

Session Chair: Dangxiao Wang

[Conference] Realistic Defocus Blur for Multiplane Computer-Generated Holography

Koray Kavaklı, Yuta Itoh, Hakan Urey, Kaan Akşit

[Journal] Shadowless Projection Mapping using Retrotransmissive Optics

Kosuke Hiratani, Daisuke Iwai, Yuta Kageyama, Parinya Punpongsanon, Takefumi Hiraki, Kosuke Sato

[Journal] Off-Axis Layered Displays: Hybrid Direct-View/Near-Eye Mixed Reality with Focus Cues
Christoph Ebner, Peter Mohr, Tobias Langlotz, Yifan (Evan) Peng, Dieter Schmalstieg, Gordon Wetzstein, Denis Kalkofen Graz

[Journal] Perceptually-guided dual-mode virtual reality system for motion-adaptive display
Hui Zeng, Rong Zhao

[Journal] Dynamic Redirection for VR Haptics with a Handheld Stick
Yuqi Zhou, Voicu Popescu

Paper Session26: Agents and Perception @Room SHANGHAI

Session Chair: Ye Pan

[Conference] A study of the influence of AR on the perception, comprehension and projection levels of situation awareness

Ms Camille Truong-Allié, Martin Herbeth, Alexis Paljic

[Journal] The Impact of Avatar and Environment Congruence on Plausibility, Embodiment, Presence, and

the Proteus Effect in Virtual Reality

David Mal, Erik Wolf, Nina Döllinger, Carolin Wienrich,
Marc Erich Latoschik

[Journal] A Systematic Review on the Visualization of
Avatars and Agents in AR & VR

Florian Weidner, Gerd Boettcher, Chenyao Dao, Luljeta
Sinani, Stephanie Arevalo Arboleda, Christian Kunert,
Christoph Gerhardt, Wolfgang Broll, Alexander Raake

[Conference] Volumetric Avatar Reconstruction with
Spatio-Temporally Offset RGBD Cameras

Gareth Rendle, Adrian Kreskowski, Bernd Froehlich

[Journal] Effects of the Visual Fidelity of Virtual
Environments on Presence, Context-dependent
Forgetting, and Source-monitoring Error

Takato Mizuho, Takuji Narumi, Hideaki Kuzuoka

15:15 – 16:15

Paper Session27: Perception 2 @Room LUOYANG

Session Chair: Shuo Yan

[Journal] Body and Time: Virtual Embodiment and its
effect on Time Perception

Fabian Unruh, David H.V. Vogel, Maximilian Landeck,
Jean-Luc Lugin, Marc Erich Latoschik

[Journal] Comparing the Effects of Visual Realism on Size Perception in VR versus Real World Viewing through Physical and Verbal Judgments

Ignatius Alex Wijayanto, Sabarish V. Babu, Christopher Pagano, Jung-Hong Chuang

[Journal] Can I Squeeze Through? Effects of Self-Avatars and Calibration in a Person-Plus-Virtual-Object System on Perceived Lateral Passability in VR

Ayush Bhargava, Rohith Venkatakrishnan, Roshan Venkatakrishnan, Kathryn Lucaites, Hannah Solini, Andrew Robb, Christopher Pagano, Sabarish V. Babu

[Journal] A Study of Change Blindness in Immersive Environments

Daniel Martin, Xin Sun, Diego Gutierrez, Belen Masia

[Journal] Exploring Plausibility and Presence in Mixed Reality Experiences

Franziska Westermeier, Larissa Brübach, Marc Erich Latoschik, Carolin Wienrich

Paper Session28: InfoVis and TextEntry @Room BEIJING

Session Chair: Chunyi Chen

[Conference] iARVis: Mobile AR Based Declarative Information Visualization Authoring, Exploring and Sharing

Junjie Chen, Chenhui Li, Sicheng Song, Changbo Wang

[Conference] Comparing Scatterplot Variants for Temporal Trends Visualization in Immersive Virtual Environments

Carlos Quijano-Chavez, Carla M. Dal Sasso Freitas, Luciana Nedel

[Journal] Text Input for Non-Stationary XR Workspaces: Investigating Tap and Word-Gesture Keyboards in Virtual and Augmented Reality

Florian Kern, Florian Niebling, Marc Erich Latoschik

[Journal] CrowbarLimbs: A Fatigue-Reducing Virtual Reality Text Entry Metaphor

Muhammad Abu Bakar, Yu-Ting Tsai, Hao-Han Hsueh, Elena Carolina Li

[Journal] I Can't See That! Considering the Readability of Small Objects in Virtual Environments

Jacob Young, Nadia Pantidi, Matthew Wood

17:00 -17:30

Closing & Awards

Social events

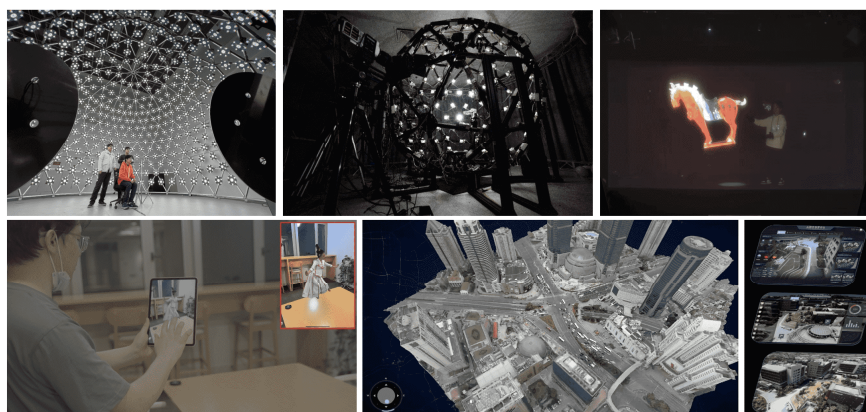
Hello and welcome to Shanghai!

Social Events	Time Schedule
Industry / Lab Tour	Sunday, March 26, 2023
Student Recruitment	Sunday, March 26, 2023
Industry Forum	Monday, March 27, 2023 – Tuesday, March 28, 2023
Reception: Cruise on The Huangpu River	Monday, March 27, 2023
Banquet at Shangri-La	Tuesday, March 28, 2023
Online Activities	Monday, March 27, 2023 – Tuesday, March 28, 2023
One-day tour in Shanghai	Thursday, March 30, 2023

Industry/lab tour

School of Information Science and Technology, ShanghaiTech University

At the SIST of ShanghaiTech University participants can visit the MARS Lab (Multidisciplinary Artificial Reality Studio), and experience a series of VR/AR research facilities. MARS Lab will highlight leading-edge VR and visualization research through various top-tier light-field stages and captured domes for physically-based 4D asset reproduction. It will also demonstrate a series of fascinating applications, i.e., the digital twins for smart cities, hyper-real human generation, VR/AR experiences of dynamic neural radiance fields, immersive holographic interactions, etc.



Student recruitment

This event aims to facilitate student employment and enterprise recruitment through various options, such as communication and integration across enterprises and on-site

networking, which provides an excellent platform for students and high-quality employees for companies.

Industry forum

This two-day industry forum aims to explore and discuss the latest advancements regarding the metaverse in industries such as production, education, intelligent manufacturing, and cultural tourism. During the event, presenters and panelists will provide and exchange information on key technologies and business innovations related to the development of the metaverse, such as its ecology, supporting technologies, end-use applications, economic systems, development, and evolution. At the same time, we will showcase metaverse-related technologies, products, and applications and present the results of cooperation in metaverse industry ecology to promote the initial transition of the metaverse industry jointly.

Reception: Cruise on The Huangpu River

The welcome reception of the IEEE VR Conference will be arranged on a Chinese-style cruise ship on the Huangpu River, with a virtual scene of the Bund on the 3D online platform, and a live broadcast of the entire tour to experience the stunning night view of both sides of the river in a simultaneous virtual and real space. At the reception, attendees can meet academic experts and research partners with similar interests, discuss cutting-edge technology topics, and find opportunities for cooperation.



Banquet at Shangri-La

We will host a banquet for all in-person attendees at the Shangri-La Hotel. The banquet will offer a unique experience of traditional Chinese cuisine. During the banquet, we will have a VGTC award announcement and a banquet keynote, where

attendees can share in honor of academic achievement and discuss the past, present, and future of VR technology.

Online Activities

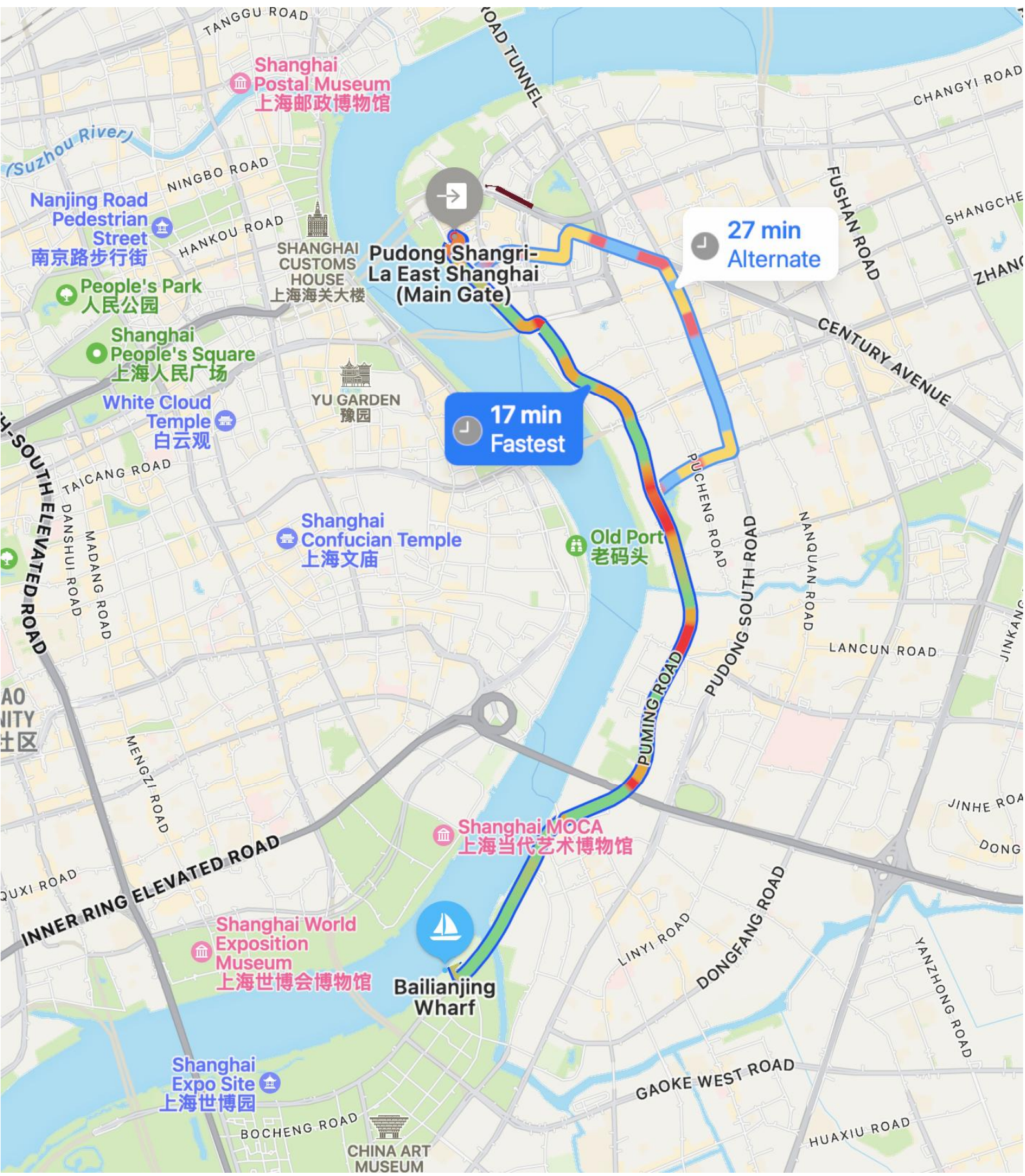
The conference will adopt a hybrid mode, combining online and on-site participation. Those who cannot attend the events in person will be able to interact via a dedicated Slack channel and a Zoom broadcasting of a virtual travel to Shanghai Jiao Tong University to celebrate the anniversary of the IEEE VR Conference. We will provide further details about online participation in advance of the conference.

One-day tour in Shanghai

Participants can join in a one-day exploration of Shanghai, which will take them to some of the city's most iconic sights, including Yuyuan Garden, the Oriental Pearl Radio and Television Tower, and the Shanghai Municipal History Museum.



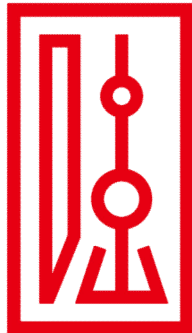
Cruise ship & Restaurant guide





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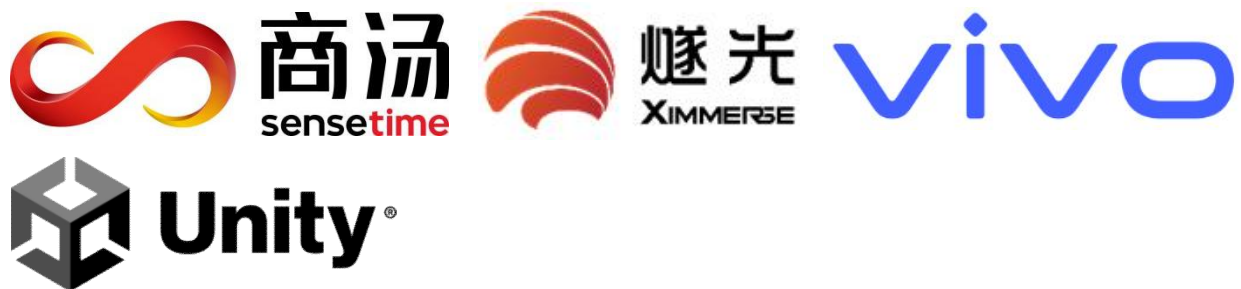


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Gold

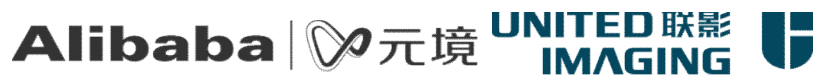


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