

CVM 2020 Programme

Conference venue: Online Conference by Tencent/VooV + Bilibili

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Day One

Thursday, 3 September 2020

9:00 - 9:20

Opening session

Keynote 1

9:20-10:05

Gordon Wetzstein (Stanford University)

[Towards Neural Imaging and Display](#)

Session 1

Cognitive Media

10:05 - 10:25

Qiang Fu, Hongbo Fu, Hai Yan, Bin Zhou, Xiaowu Chen, Xueming Li

[Human-Centric Metrics for Indoor Scene Assessment and Synthesis](#)

10:25 - 10:45

Rui-Song Zhang, Wei-Ze Quan, Lu-Bin Fan, Li-Ming Hu, Dong-Ming Yan

[Distinguishing Computer-Generated Images from Natural Images Using Channel and Pixel Correlation](#)

10:45 - 11:05

Song-Hai Zhang, Zheng-Ping Zhou, Bin Liu, Xi Dong, Peter Hall

[What and Where: A Context-based Recommendation System for Object Insertion](#)

Session 2

Neural Rendering

11:05 - 11:25

Zheng Zeng, Lu Wang, Beibei Wang, Chunmeng Kang, Yanning Xu

[Denoising Stochastic Progressive Photon Mapping Renderings Using a Multi-Residual Network](#)

11:25 - 11:45

Weiheng Lin, Beibei Wang, Lu Wang, Nicolas Holzschuch

[A Detail Preserving Neural Network Model for Monte Carlo Denoising](#)

Session 3

Detection, Classification and Recognition

14:00-14:20

Ruo Chen Fan, Xuanrun Wang, Qibin Hou, Hanchao Liu, Tai-jiang Mu

[SpinNet: Spinning convolutional network for lane boundary detection](#)

14:20-14:40

Jin-Gong Jia, Yuan-Feng Zhou, Xing-Wei Hao, Feng Li, Christian Desrosiers, Cai-Ming Zhang

[Two-Stream Temporal Convolutional Networks for Skeleton-Based Human Action Recognition](#)

14:40-15:00

Xinxin Liu, Yunfeng Zhang, Fangxun Bao, Kai Shao, Ziyi Sun, Caiming Zhang

[Kernel-blending connection approximated by a neural network for image classification](#)

15:00-15:20

Chuan-Kang Li, Hong-Xin Zhang, Jia-Xin Liu, Yuan-Qing Zhang, Shan-Chen Zou, Yu-Tong Fang

[Window Detection in Facades using Heatmap Fusion](#)

Session 4	Image Resizing and Super-resolution
15:20-15:40	Huan-Jing Yue, Sheng Shen, Jing-Yu Yang, Hao-Feng Hu, Yan-Fang Chen <u>Reference Image Guided Super-Resolution via Progressive Channel Attention Networks</u>
15:40-16:00	Chuang-Ye Zhang, Yan Niu, Tie-Ru Wu, Xi-Ming Li <u>Color Image Super-Resolution and Enhancement with Inter-Channel Details at Trivial Cost</u>
16:00-16:20	Shuai Liu, Ruipeng Gang, Chenghua Li, Ruixia Song <u>Adaptive Deep Residual Network for Single Image Super-Resolution</u>
Session 5	Mathematics and Algorithms
16:20-16:40	Dejun Zhang, Linchao He, Mengting Luo, Zhanya Xu, Fazhi He <u>Weight Asynchronous Update: Improves the Diversity of Filters in Deep Convolutional Network</u>
16:40-17:00	Chao Zhang, Xuequan Lu, Katsuya Hotta, Xi Yang <u>G2MF-WA: Geometric Multi-Model Fitting with Weakly Annotated Data</u>
17:00-17:20	Xiaohan Liu, Lei Ma, Jianwei Guo, Dong-Ming Yan <u>Parallel Computation of 3D Clipped Voronoi Diagrams</u>

Day Two

Friday, 4 September 2020

Session 6	Reconstruction and Segmentation
9:00-9:20	Jianda Zhang, Chunpeng Li, Qiang Song, Lin Gao, Yu-kun Lai <u>Automatic 3D tooth segmentation using convolutional neural networks in harmonic parameter space</u>
9:20-9:40	Lili Cheng, Zhuo Wei, Mingchao Sun, Shiqing Xin, Andrei Sharf, Yangyan Li, Baoquan Chen, Changhe Tu <u>DeepPipes: Learning 3D PipeLines Reconstruction from Point Clouds</u>
9:40-10:00	Jiahui Huang, Zheng-Fei Kuang, Fang-Lue Zhang, Tai-Jiang Mu <u>WallNet: Reconstructing General Room Layouts from RGB Images</u>
Session 7	Simulation and Materials
10:00-10:20	Jianwei Jiang, Bin Sheng, Ping Li, Lizhuang Ma, Xin Tong, Enhua Wu <u>Real-Time Hair Simulation with Heptadiagonal Decomposition on Mass Spring System</u>
10:20-10:40	Xiaorui Chen, min Tang, cheng li, Dinesh Manocha, RuoFeng Tong <u>BADF: BVH-Centric Adaptive Distance Field Computation for Deformable Objects on GPUs</u>
10:40-11:00	Hong Deng, Beibei Wang, Rui Wang, Nicolas Holzschuch <u>A Practical Path Guiding Method for Participating Media</u>
Session 8	Shape and Curves
11:00-11:20	Zhiyang Dou, Shiqing Xin, Rui Xu, Jian Xu, Yuanfeng Zhou, Shuang-min Chen,

Wenping Wang, Xiuyang Zhao, Changhe Tu

[Top-Down Shape Abstraction Based on Greedy Pole Selection](#)

11:20-11:40

Aizeng Wang, Chuan He, Fei Hou, Zhanchuan Cai, Gang Zhao

[Designing planar cubic B-spline curves with monotonic curvature for curve interpolation](#)

11:40-12:00

Fan Zhang, Jinjiang Li, Peiqiang Liu, Hui Fan

[Computing Knots by Quadratic and Cubic Polynomial Curves](#)

Session 9

Image Processing and Sythesis

14:00-14:20

Xian Wu, Xiao-Nan Fang, Tao Chen, Fang-Lue Zhang

[JMNet: A Joint Matting Network for Automatic Human Matting](#)

14:20-14:40

Yuting Wang, Shiqing Xin, Shanshan Gao, Yuanfeng Zhou

[Skeletal Saliency Map Computation Based on Projection Symmetry Analysis](#)

14:40-15:00

Xiaoce Wu, Bingyin Zhou, Qingyun Ren, Wei Guo

[Multispectral Image Denoising using Sparse and Graph Laplacian Tucker Decomposition](#)

15:00-15:20

Fei Fang, Fei Luo, Hong-pan Zhang, Hua-jian Zhou, Alix L.H. Chow, Chun-xia Xiao

[A Comprehensive Pipeline for Complex Text-to-Image Synthesis](#)

Session 10

SLAM and Motion Capture

15:20-15:40

Zheng-Jun Du, Shi-Sheng Huang, Tai-Jiang Mu, Qunhe Zhao, Ralph R. Martin, Kun Xu

[Accurate RGB-D SLAM in Dynamic Environments using Observationally Consistent Conditional Random Fields](#)

15:40-16:00

Kun Li, Yali Mao, Yunke Liu, Ruizhi Shao, Yebin Liu

[Full-body Motion Capture for Multiple Closely Interacting Persons](#)

16:00-16:20

Miaopeng Li, Zimeng Zhou, Xinguo Liu

[3D Hypothesis Clustering for Cross-view Matching in Multi-person Motion Capture](#)

Keynote 2

16:20-17:05

Christian Theobalt (MPI Informatik)

New methods for Reconstruction and Neural Rendering of Real World Scenes

Day Three

Saturday, 5 September 2020

Keynote 3

9:00-09:45

Ruizhen Hu (Shenzhen University)

Shape analysis via functionality and mobility inference

Session 11

9:45-10:05

Video Understanding

Yaohua Pan, Zhibin Niu, Jing Wu, Jiawan Zhang

10:05-10:25	<p><u>InSocialNet: Interactive Visual Analytics for Role-Event Videos</u></p> <p>Hui-si Wu, Meng-shu Liu, Lu-lu Yin, Ping Li, Zhen-kun Wen, Hon-Cheng Wong</p> <p><u>Automatic Video Segmentation Based on Information Centroid and Optimized SaliencyCut</u></p>
10:25-10:45	<p>Yongqing Liang, Navid Jafari, Xing Luo, Qin Chen, Yanpeng Cao, Xin Li</p> <p><u>WaterNet: An adaptive matching pipeline for segmenting water with volatile appearance</u></p>
Session 12	Visualization and Visual Analysis
10:45-11:05	<p>Naoki Kita, Gregoire Cliquet, Kazunori Miyata</p> <p><u>Mapping Two-Dimensional Plots to a Spherical Surface using Elliptical Grid Mapping</u></p>
11:05-11:25	<p>Songye Han, Shaojie Ye, Hongxin Zhang</p> <p><u>Visual exploration of Internet news via sentiment score and topic models</u></p>
11:25-11:45	<p>Cui-Xia Ma, Jian-Cheng Song, Qian Zhu, Kevin Maher, Ze-Yuan Huang, Hong-An Wang</p> <p><u>EmotionMap: Visual Analysis of Video Emotional Content on a Map</u></p>
11:45-12:00	Closing Session

Keynote Speakers



Gordon Wetzstein, Stanford University

Title:

Towards Neural Imaging and Display

Abstract:

Computational imaging leverages the co-design of hardware and software to re-define next-generation camera and display systems. In this talk, we discuss recent advances in computational single-photon imaging to enable non-line-of-sight vision and 3D imaging through highly scattering media. We also discuss how the emerging paradigm of end-to-end optimization of optics and imaging processing algorithms unlocks unprecedented capabilities in HDR and depth imaging as well as hybrid optical-electronic computing. Finally, similar end-to-end design strategies also allow us to define next-generation displays, such as holographic near-eye systems for virtual and augmented reality applications, which we will discuss in this talk.

Speaker's Biography:

Gordon Wetzstein is an Assistant Professor of Electrical Engineering and, by courtesy, of Computer Science at Stanford University. He is the leader of the Stanford Computational Imaging Lab and a faculty co-director of the Stanford Center for Image Systems Engineering. At the intersection of computer graphics and vision, computational optics, and applied vision science, Prof. Wetzstein's research has a wide range of applications in next-generation imaging, display, wearable computing, and microscopy systems. Prior to joining Stanford in 2014, Prof. Wetzstein was a Research Scientist in the Camera Culture Group at MIT. He received a Ph.D. in Computer Science from the University of British Columbia in 2011 and graduated with Honors from the Bauhaus in Weimar, Germany before that. He is the recipient of an NSF CAREER Award, an Alfred P. Sloan Fellowship, an ACM SIGGRAPH Significant New Researcher Award, a Presidential Early Career Award for Scientists and Engineers (PECASE), an SPIE Early Career Achievement Award, a Terman Fellowship, an Okawa Research Grant, the Electronic Imaging Scientist of the Year 2017 Award, an Alain Fournier Ph.D. Dissertation Award, and a Laval Virtual Award as well as Best Paper and Demo Awards at ICCP 2011, 2014, and 2016 and at ICIP 2016.



Christian Theobalt, MPII Saarbrücken, Germany

Title:

New methods for Reconstruction and Neural Rendering of Real World Scenes

Abstract:

In this presentation, I will talk about some of the recent work we did on new methods for reconstructing computer graphics models of specific classes of dynamic real world scenes from sparse or even monocular video data. I will also talk about how neural rendering approaches that combine model-based and neural network based concepts for image formation in new ways enable new ways synthesize highly realistic imagery and videos of real world scenes under user control. My talk will exemplify these concepts using work we did on human faces and face video, but will also briefly illustrate how we began to extend these concepts to a broader range of scenes.

Speaker's Biography:

Christian Theobalt is a Professor of Computer Science and the head of the research group "Graphics, Vision, & Video" at the Max-Planck-Institute (MPI) for Informatics, Saarbrücken, Germany. He is also a Professor of Computer Science at Saarland University, Germany. From 2007 until 2009 he was a Visiting Assistant Professor in the Department of Computer Science at Stanford University. He received his MSc degree in Artificial Intelligence from the University of Edinburgh, his Diplom (MS) degree in Computer Science from Saarland University, and his PhD (Dr.-Ing.) from the Max-Planck-Institute for Informatics. In his research he looks at algorithmic problems that lie at the intersection of Computer Graphics, Computer Vision and machine learning, such as: static and dynamic 3D scene reconstruction, marker-less motion and performance capture, virtual and augmented reality, computer animation, appearance and reflectance modelling, intrinsic video and inverse rendering, machine learning for graphics and vision, new sensors for 3D acquisition, advanced video processing, as well as image- and physically-based rendering. He is also interested in using reconstruction techniques for human computer interaction. For his work, he received several awards, including the Otto Hahn Medal of the Max-Planck Society in 2007, the EUROGRAPHICS

Young Researcher Award in 2009, the German Pattern Recognition Award 2012, and the Karl Heinz Beckurts Award in 2017. He received two ERC grants, an ERC Starting Grant in 2013 and an ERC Consolidator Grant in 2017. In 2015, he was elected as one of the top 40 innovation leaders under 40 in Germany by the business magazine Capital. Christian Theobalt is also a co-founder of an award-winning spin-off company from his group - www.thecaptury.com - that is commercializing one of the most advanced solutions for marker-less motion capture.



Ruizhen Hu, Shenzhen University

Title:

Shape analysis via functionality and mobility inference

Abstract:

The computational power, especially neural network processing power of mobile devices will be advanced significantly in the near future. Combined with better camera sensors and new camera module designs, it provides an exciting opportunity to revamp the traditional mobile imaging technologies, and brings new and exciting photography experiences to virtually everyone around the world. It is a brand new chapter in the history of photography, and it has never been a better time to work in this area. In this talk, I will introduce a series of new mobile photography technologies and applications that we are developing in-house, many will soon be released to tens of millions of end users worldwide. I will also shed some light on where the industry is going moving forward.

One of the goals of computer graphics is to provide tools for designing and simulating real or imagined artifacts, such as man-made objects. Such artifacts are usually functional, and thus an understanding of functionality is paramount for simulating and validating different designs of artifacts. Moreover, in recent years, computer graphics and related fields, such as computer vision and robotics, have also devoted much attention to the inference of possible motions of 3D objects and their parts, since this problem is closely related to an understanding of object and functionality. In this talk, I will introduce a series of works on analysis and understanding of shape functionality and part mobility with interaction as the key component, and discuss its potential

applications in modeling, fabrication and robotics.

Speaker's Biography:

Ruizhen Hu is an Assistant Professor at Shenzhen University, China. She received her Ph.D. from the Department of Mathematics, Zhejiang University. Before that, she spent two years visiting Simon Fraser University, Canada. Her research interests are in computer graphics, with a recent focus on applying machine learning to advance the understanding and generative modeling of visual data including 3D shapes and indoor scenes. She has received several research awards including the Asia Graphics "Young Researcher Award" in 2019, among others.