YAN-PEI CAO

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A SHORT BIO

I am currently a Co-founder and the Head of Research at VAST, a leading startup in the field of Generative AI for 3D research and applications.

Prior to co-founding VAST, I was a Principal Researcher at Tencent ARC Lab and Tencent AI Lab, where I led an effort on 3D digitization, 3D generation, and immersive content creation. This role followed my tenure as a Senior Research Engineer at Y-tech, Kuaishou Technology. Earlier in my career, I was the CTO of Owlii, a company later acquired by Kuaishou. Concurrently, from 2018 to 2020, I expanded my academic experience as a Postdoctoral Researcher at Tsinghua University.

I did my PhD at Graphics and Geometric Computing Group, Tsinghua University, where I was advised by Prof. Shi-Min Hu. During my PhD, I spent time as a visiting PhD student at Computer Graphics Group, RWTH Aachen University, advised by Prof. Leif Kobbelt. Earlier, I obtained my bachelor's degree in Computer Science from Tsinghua University.

With a career spanning both academic and industrial landscapes, I have developed extensive expertise in Computer Graphics and 3D Computer Vision. My efforts are focused on developing and optimizing 3D solutions and applications, bridging academic research with tangible, industry-relevant outcomes.

EDUCATION

Tsinghua University *August 2013 - July 2018*
Ph.D. in Computer Science & Technology
Advisor: Prof. Shi-Min Hu

RWTH Aachen University *September 2015 - April 2016*
Visiting Ph.D. Student in Computer Science
Advisor: Prof. Leif Kobbelt

Tsinghua University *August 2009 - July 2013*
B.Eng in Computer Science & Technology
Overall GPA: 91/100 (Top 10%)

PROFESSIONAL EXPERIENCE

VAST October 2023 - Present
Co-founder and Head of Research *Beijing, China*

- Lead and oversee research.
- Technical strategy and product development.

Tencent November 2021 - October 2023
Principal Researcher *Beijing, China*

- 3D digitization (reconstruction, novel view synthesis).
- 3D generative AI.
- Virtual human creation.

Kuaishou Technology September 2020 - November 2021
Senior Algorithm Engineer, R&D Lead *Beijing, China*

- 3D human pose estimation and reconstruction on mobile devices.
- Consumer-level motion capture systems.

· High-accuracy and high-fidelity full-body performance capture and animation systems.
· 3D animation & virtual production (confidential projects).

Tsinghua University September 2018 - September 2020
Postdoctoral Researcher *Beijing, China*

· Research interests: computer graphics, geometric modeling and processing, 3D reconstruction, realistic rendering, 3D computer vision, SLAM techniques.

Owlii (Acquired by Kuaishou Technology) January 2017 - September 2019
CTO *Beijing, China*

· Technology strategies; R&D (4D reconstruction systems, telepresence, 3D avatar creation, motion capture, CG & CV algorithms on mobile platforms, mobile app backends); development & production operations; mentoring.
· Algorithms and systems for 3D surface tracking, hand modeling and tracking, spatiotemporal mesh parameterization, mesh processing, point cloud registration, fast stereo matching, etc.

Netease Games July 2017 - September 2017
R&D Intern *Hangzhou, China*

· Algorithms and demo systems for real-time 6-DoF object detection and tracking in monocular videos

Tencent AI Lab June 2016 - August 2016
Research Intern *Shenzhen, China*

· Real-time object detection system based on SSD.
· Implemented the Normalization Propagation algorithm (ICML 2016), improved the accuracy of SSD on PASCAL VOC, MS COCO and ILSVRC.

Tsinghua University 2013, 2014
Teaching Assistant *Beijing, China*

· Fundamentals of Programming (Fall 2013).
· Object-Oriented Programming (Spring 2014).

MISCELLANEOUS

Reviewer of: ACM TOG, IEEE TVCG, Computer Graphics Forum, Computational Visual Media, IEEE TPAMI, IEEE TIP, CVPR, ICCV, NeurIPS, ICLR, AAAI, ICRA, IEEE VR, CAD, and CAG-D, etc.
Award: Best Student Paper Award (Pacific Graphics 2014).

FULL PEER-REVIEWED PUBLICATION LIST

CVPR/ICCV/ECCV/NeuIPS: 14

SIGGRAPH/SIGGRAPH Asia/ACM TOG: 9

[34] Zheng Chen, **Yan-Pei Cao**, Yuan-Chen Guo, Chen Wang, Ying Shan, and Song-Hai Zhang. "PanoGRF: Generalizable Spherical Radiance Fields for Wide-baseline Panoramas." *NeurIPS 2023.*

[33] Xiuzhe Wu, Peng Dai, Deng Weipeng, Handi Chen, Yang Wu, **Yan-Pei Cao**, Ying Shan, and Xiaojuan Qi. "CL-NeRF: Continual Learning of Neural Radiance Fields for Evolving Scene Representation." *NeurIPS 2023.*

[32] Yuan-Chen Guo, **Yan-Pei Cao**, Chen Wang, Yu He, Ying Shan, and Song-Hai Zhang. "VMesh: Hybrid Volume-Mesh Representation for Efficient View Synthesis." *SIGGRAPH Asia 2023.*

[31] Cong Wang, Di Kang, **Yan-Pei Cao**, Linchao Bao, Ying Shan, and Song-Hai Zhang. "Neural Point-based Volumetric Avatar: Surface-guided Neural Points for Efficient and Photorealistic Volumetric Head Avatar." *SIGGRAPH Asia 2023.*

[30] Hao-Bin Duan, Miao Wang, Jin-Chuan Shi, Xu-Chuan Chen, and **Yan-Pei Cao**. "BakedAvatar: Baking Neural Fields for Real-Time Head Avatar Synthesis." *SIGGRAPH Asia 2023.*

[29] Yiyu Zhuang, Qi Zhang, Ying Feng, Hao Zhu, Yao Yao, Xiaoyu Li, **Yan-Pei Cao**, Ying Shan, and Xun Cao. "Anti-Aliased Neural Implicit Surfaces with Encoding Level of Detail." *SIGGRAPH Asia 2023.*

[28] Jia-Wei Liu, **Yan-Pei Cao**, Tianyuan Yang, Eric Zhongcong Xu, Jussi Keppo, Ying Shan, Xiaohu Qie, and Mike Zheng Shou. "HOSNeRF: Dynamic Human-Object-Scene Neural Radiance Fields from a Single Video." *ICCV 2023.*

[27] Zidong Cao, Hao Ai, **Yan-Pei Cao**, Ying Shan, Xiaohu Qie, and Lin Wang. "OmniZoomer: Learning to Move and Zoom in on Sphere at High-Resolution." *ICCV 2023.*

[26] Xiuzhe Wu, Pengfei Hu, Yang Wu, Xiaoyang Lyu, **Yan-Pei Cao**, Ying Shan, Wenming Yang, Zhongqian Sun, and Xiaojuan Qi. "Speech2Lip: High-fidelity Speech to Lip Generation by Learning from a Short Video." *ICCV 2023.*

[25] Yi-Hua Huang, **Yan-Pei Cao**, Yukun Lai, Ying Shan, and Gao Lin. "NeRF-Texture: Texture Synthesis with Neural Radiance Fields." *SIGGRAPH 2023.*

[24] Wangbo Yu, Yanbo Fan, Yong Zhang, Xuan Wang, Fei Yin, Yunpeng Bai, **Yan-Pei Cao**, Ying Shan, Yang Wu, Zhongqian Sun, and Baoyuan Wu. "NOFA: NeRF-based One-shot Facial Avatar Reconstruction." *SIGGRAPH 2023.*

[23] Xinhai Liu, Zhizhong Han, Lee Sanghuk, **Yan-Pei Cao**, and Yu-Shen Liu. "D-Net: Learning for Distinctive Point Clouds by Self-Attentive Point Searching and Learnable Feature Fusion." *Computer Aided Geometric Design 2023.*

[22] Yiming Gao, **Yan-Pei Cao**, and Ying Shan. "SurfelNeRF: Neural Surfel Radiance Fields for Online Photorealistic Reconstruction of Indoor Scenes." *CVPR 2023.*

[21] Hao Ai, Zidong Cao, **Yan-Pei Cao**, Ying Shan, and Lin Wang. "HRDFuse: Monocular 360○ Depth Estimation by Collaboratively Learning Holistic-With-Regional Depth Distributions." *CVPR 2023.*

[20] Jiale Xu, Xintao Wang, Weihao Cheng, **Yan-Pei Cao**, Ying Shan, Xiaohu Qie, and Shenghua Gao. "Dream3D: Zero-shot Text-to-3D Synthesis using 3D Shape Prior and Text-to-Image Diffusion Models." *CVPR 2023.*

[19] Peng Xiang, Xin Wen, Yu-Shen Liu, **Yan-Pei Cao**, Pengfei Wan, Wen Zheng, and Zhizhong Han. "Snowflake Point Deconvolution for Point Cloud Completion and Generation with Skip-Transformer." *IEEE TPAMI 2022.*

[18] Jia-Wei Liu, **Yan-Pei Cao**, Weijia Mao, Wenqiao Zhang, David Junhao Zhang, Jussi Keppo, Ying Shan, Xiaohu Qie, and Mike Zheng Shou. "DeVRF: Fast Deformable Voxel Radiance Fields for Dynamic Scenes." *NeurIPS 2022.*

[17] Xin Wen, Peng Xiang, Zhizhong Han, **Yan-Pei Cao**, Pengfei Wan, Wen Zheng, and Yu-Shen Liu. "PMP-Net++: Point Cloud Completion by Transformer-Enhanced Multi-step Point Moving Paths." *IEEE TPAMI 2022.*

[16] Ruizhi Shao, Hongwen Zhang, He Zhang, **Yan-Pei Cao**, Tao Yu, and Yebin Liu. "DoubleField: Bridging the Neural Surface and Radiance Fields for High-fidelity Human Rendering." *CVPR 2022.*

[15] Jiaqi Zhang, Xiang Xu, Zhimeng Shen, Zehuan Huang, Yang Zhao, Miao Wang, **Yan-Pei Cao**, Pengfei Wan, and Shi-Min Hu. "Write-An-Animation: Text-based 3D Animation Editing with Scene Layout and Character Motion Optimization." *Pacific Graphics 2021.*

[14] Peng Xiang, Xin Wen, Zhizhong Han, **Yan-Pei Cao**, Pengfei Wan, Wen Zheng, and Yu-Shen Liu. "SnowflakeNet: Point Cloud Completion by Snowflake Point Deconvolution with Skip-Transformer". *ICCV 2021 (Oral).*

[13] Xin Wen, Zhizhong Han, **Yan-Pei Cao**, Pengfei Wan, Wen Zheng, and Yu-Shen Liu. "Unpaired Point Cloud Completion using Cycle Transformation with Missing Region Coding." *CVPR 2021.*

[12] Xin Wen, Peng Xiang, Zhizhong Han, **Yan-Pei Cao**, Pengfei Wan, Wen Zheng, and Yu-Shen Liu. "PMP-Net: Point Cloud Completion by Learning Multi-step Point Moving Paths." *CVPR 2021.*

[11] Haoxuan Song, Jiahui Huang, **Yan-Pei Cao**, and Tai-Jiang Mu. "HDR-Net-Fusion: Real-time 3D Dynamic Scene Reconstruction with a Hierarchical Reinforcement Network." *CVM 2021.*

[10] Zheng-Ning Liu, **Yan-Pei Cao**, Tai-Jiang Mu, and Shi-Min Hu. "Semi-Supervised Learning of Disentangled Representations for Cross-Modal Translation." *CVM 2021.*

[9] Sheng Yang, Beichen Li, **Yan-Pei Cao**, Hongbo Fu, Yu-Kun Lai, Leif Kobbelt, and Shi-Min Hu. "Noise-Resilient Reconstruction of Panoramas and 3D Scenes Using Robot-Mounted Unsynchronized Commodity RGB-D Cameras." *ACM TOG 2020.*

[8] **Yan-Pei Cao**, Zheng-Ning Liu, Zheng-Fei Kuang, Leif Kobbelt, and Shi-Min Hu. "High-quality Textured 3D Shape Reconstruction with Cascaded Fully Convolutional Networks." *IEEE TVCG 2019.*

[7] Sheng Yang, Zheng-Fei Kuang, **Yan-Pei Cao**, Yu-Kun Lai, and Shi-Min Hu. "Projective Association and Semantic Guided Relocalization for Dense Reconstruction." *ICRA 2019.*

[6] **Yan-Pei Cao**, Zheng-Ning Liu, Zheng-Fei Kuang, Leif Kobbelt, and Shi-Min Hu. "Learning to Reconstruct High-quality 3D Shapes with Cascaded Fully Convolutional Networks." *ECCV 2018.*

[5] **Yan-Pei Cao**, Leif Kobbelt, and Shi-Min Hu. "Real-time High-accuracy 3D Reconstruction with Consumer RGB-D Cameras." *ACM TOG 2018.*

[4] **Yan-Pei Cao**, Tao Ju, Jie Xu, and Shi-Min Hu. "Extracting Sharp Features from RGB-D Images." *Eurographics 2017.*

[3] Lin Gao, **Yan-Pei Cao**, Yu-Kun Lai, Hao-Zhi Huang, Leif Kobbelt, and Shi-Min Hu. "Active Exploration of Large 3D Model Repositories." *IEEE TVCG 2014.*

[2] **Yan-Pei Cao**, Tao Ju, Zhao Fu, and Shi-Min Hu. "Interactive Image-Guided Modeling of Extruded Shapes." *Pacific Graphics 2014.*

[1] Kun Xu, **Yan-Pei Cao**, Li-Qian Ma, Zhao Dong, Rui Wang, and Shi-Min Hu. "A Practical Algorithm for Rendering Interreflections with All-Frequency BRDFs." *ACM TOG 2014.*