

Dr. Chuanxia Zheng

Physical Vision Group (PVG)
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Research Interests

My research interests focus on computer vision and machine learning, aiming to develop systems that perceive, reconstruct, and interact with the physical world. I have done a wide range of work on 2D, 3D, and 4D scene synthesis, with the goal of *creating a physical natural world* via generative AI. In particular, on topics:

- **Physical AI:** Occlusion, Interaction, Motion, and other physics perception and generation.
- **Spatial AI:** 3D and 4D Reconstruction, Decomposition, and Spatial Reasoning.
- **Generative AI:** Physics-aware generative models for images, videos, 3D, and 4D content.

Professional experience

- 2025– **Nanyang Assistant Professor**, *Nanyang Technological University*, Singapore.
Physical AI and Spatial AI
- 2023–25 **Marie Skłodowska-Curie Actions (MSCA) Fellow**, *University of Oxford*, UK.
Feed-Forward 3D and 4D reconstruction from sparse views
- 2022–23 **Postdoctoral Research Fellow**, *University of Oxford*, UK.
2D and 3D scene synthesis
- 2021–22 **Postdoctoral Research Fellow**, *Monash University*, Australia.
Codebook learning for 2D and 3D synthesis

Education

- 2017–21 **Doctor of Philosophy (PhD)**.
Nanyang Technological University
School of Computer Science and Engineering, Singapore
Thesis: *Synthesizing Photorealistic Images with Deep Generative Learning*
Outstanding PhD Thesis Award, Advisors: Tat-Jen Cham and Jianfei Cai
- 2014–17 **Master of Science (MSc) in computer science**.
Beihang University, Beijing, China
Thesis: *Context-based Indoor Scene Understanding for Mobile Robot*
Advisors: Jianhua Wang and Weihai Chen
- 2010–14 **Bachelor of Science in information engineering**.
Beijing Jiaotong University, Beijing, China
Thesis: *Image Retrieval based on Visual Saliency*
Highest Honours (Outstanding Graduate of Beijing), Advisor: Ze Liu

Research Experience

- 2022-25 **Research Fellow**, *University of Oxford*, UK, **Prof. Andrea Vedaldi**.
Research interests: 3D and 4D reconstruction from limited images or videos
- 2021-22 **Research Fellow**, *Monash University*, Australia, **Prof. Jianfei cai**.
Research interests: nature scene generation and completion
- 2017-21 **PhD**, *Nanyang Technological University*, Singapore, **Prof. Nadia Thalmann**.
Research interests: photorealistic image generation

Awards and other recognitions

- 2025 Outstanding Reviewer Award, *International Conference on Computer Vision (ICCV)*
- 2025 **Singapore NRF Fellowship** (SGD \$3,078,720)
- 2024 **Germany DAAD Ainet Fellowship**, *Postdoctoral Networking Tour in Artificial Intelligence*
- 2024 **HORIZON Marie Skłodowska-Curie (MSCA) Fellowship** (€236,748)
- 2023 Outstanding Reviewer Award, *Conference on Computer Vision and Pattern Recognition (CVPR)*
- 2022 Scholar/Travel Award, *Conference on Neural Information Processing Systems (NeurIPS)*
- 2022 **Outstanding PhD Thesis Award**, NTU, Singapore
- 2021 Outstanding Reviewer Award, *IEEE Transactions on Multimedia (TMM)*
- 2017 NTU Research Scholarship
- 2014 Outstanding Graduate of Beijing
- 2012 Hanergy Scholarship Award (**Top 1%**)
- 2011 Siemens Scholarship Award (**Top 1%**)

Grants

- 2025- **National Research Foundation (NRF) Fund Fellowship**, “From Pixels to Physics: Integrating Physical Properties in 3D World Creation”, PI, SGD\$3,078,720, NRFF17-2025-0148.
- 2025- NTU White Space Fund (Start Grant of NAP), “C4D: Completed 4D Reconstruction and Decomposition”, PI, SGD\$250,000.
- 2025- Sony Focused Research Award, “Vista4D: Feed-Forward 4D Scene Reconstruction from Any Monocular Video”, Co-I, \$100,000.
- 2024-25 **HORIZON Marie Skłodowska-Curie (MSCA) Fellowship**, “SYN3D: Synthesizing Photo-realistic 3D Scene from Zero to One or Limited Views”, PI, €236,748, EP/Z001811/1
- 2024-25 Bavarian Funding, “Object-Centric 3D Reconstruction and Decomposition”, Co-I, €5,910.

Service to the academic community

- **Area Chair.** ACM Multimedia 2024, BMVC 2024, 2025, ICLR 2026.
- **Reviewer for international journals.** IEEE Transactions on Pattern Analysis and Machine Intelligence (**TPAMI**), International Journal on Computer Vision (**IJCV**), IEEE Transactions on Image Processing (**TIP**), IEEE Transactions on Multimedia(**TMM**), Computer Vision and Image Understanding (**CVIU**), The Visual Computer (**TVC**).
- **Reviewer for international conferences.** IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**) 2020-2026, European Conference on Computer Vision (**ECCV**) 2020, 2022, 2024, International Conference on Computer Vision (**ICCV**) 2019, 2021, 2023, 2025 International Conference on Neural Information Processing Systems (**NeurIPS**) 2022-2025, International Conference on Learning Representations (**ICLR**) 2021-2025, International Conference on Machine Learning (**ICML**) 2023, International Conference on Computer Graphics (**SIGGRAPH**) 2021,2022, International Conference on Robotics and Automation (**ICRA**) 2023.

International workshops

- 2024 “Second Workshop for Learning 3D with Multi-View Supervision” at the IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**) with Abdullah Hamdi, Silvio Giancola, Guocheng Qian, Jinjie Mai, Sara Rojas Martinez, Bernard S. Ghanem, and Yash Bhalgat.

Press Coverage

- 2024 [Hacker News](#): Zero-Shot Gaussian Splatting from Uncalibrated Image Pairs
- 2024 [Hacker News](#): MVSpLat: Efficient 3D Gaussian Splatting from Sparse Multi-View Images
- 2023 [Sber.ru](#): MoVQ — 0.1 means a lot for text-image generation [Kandinsky 2.1](#) (Github: 2.8K)
- 2022 [Phys.org](#): Researchers unravel cell biology through artificial intelligence
- 2022 [NTU News](#): NTU SCSE Outstanding PhD Thesis Award 2022
- 2022 [Zhuanzhi](#): How to create photorealistic images? Ph.D. Thesis by Dr. Zheng
- 2021 [kknews](#), [Sohu](#), [NetEase](#): AgileGAN — a tool for creating stylized portraits (Demo: 10K/week)

Invited talks

- 2025 **Beyond Visual Geometry: Toward Physical 3D Reconstruction**, *University of Queensland*.
- 2025 **Beyond Visual Geometry: Toward Physical 3D Reconstruction**, *Zhejiang University*.
- 2025 **Beyond Visual Geometry: Toward Physical 3D Reconstruction**, *Westlake University*.
- 2025 **Beyond Visual Geometry: Toward Physical 3D Reconstruction**, *University of Cambridge, UK*, [Link](#).
- 2024 **Physical Natural World Creation: Feed-forward, generalisable 3D and 4D reconstruction**, *University of Oxford, UK*, [Link](#).
- 2024 **Physi4D: Physically interactive 4D natural world creation**, *NTU, Singapore, NTU*.
- 2024 **Natural World Creation based on Generative AI**, *Shanghai Jiaotong University, China*.
- 2023 **Visiting the Invisible via Generative AI**, *University of Science and Technology, China*.
- 2023 **Codebook Learning for Generative AI**, *Harbin Institute of Technology, China*.
- 2023 **Codebook Learning for Generative AI**, *NTU, Singapore*.
- 2023 **Codebook Learning for Generative AI**, *University of Oxford, UK*.
- 2022 **Synthesizing Photorealistic Scenes**, *NTU, Singapore*, [Link](#).
- 2022 **Synthesizing Photorealistic Scenes**, *University of Oxford, UK*.
- 2022 **Synthesizing Photorealistic Scenes**, *ETH, Zürich*.
- 2022 **Synthesizing Photorealistic Scenes**, *University of Science and Technology, China*.
- 2019 **Pluralistic Image Completion**, *NTU, Singapore*.
- 2018 **Depth Estimation from Single 2D Image**, *Nanyang Technological University, Singapore*.

Mentoring

Postdoctoral researchers

- 2026- Bingchen Yang, NTU

PhD

- 2026- Yitong Xia, NTU
- 2026- [Ruijie Zhu](#), NTU
- 2026- [Ismail El Yamany](#), NTU
- 2025- [Chongtian Huang](#), NTU
- 2025- [Weirong Chen](#), TUM, co-supervised with [Prof. Daniel Cremers](#) and [Prof. Andrea Vedaldi](#)
- 2024- [Zeren Jiang](#), Oxford, co-supervised with [Prof. Andrea Vedaldi](#) and Dr. Iro Laina
- 2023- Brandon Smart, Oxford, co-supervised with [Prof. Victor Prisacariu](#) and Dr. Iro Laina

- 2023- Ruining Li, Oxford, co-supervised with Prof. Andrea Vedaldi and Christian Rupprecht
- 2023-25 Tianhao Wu, NTU, co-supervised with Prof. Tat-Jen Cham
- 2022-23 Minghui Hu, NTU, three terms with Prof. Tat-Jen Cham
- 2021-24 Yuedong Chen, Monash University, co-supervised with Prof. Jianfei Cai

Master

- 2024-24 Wenbo Ji, TUM, co-supervised with Dr. Yan Xia and Prof. Daniel Cremers
- 2024-24 Filip Skubacz, TUM, co-supervised with Dr. Yan Xia and Prof. Daniel Cremers
- 2024-24 Nina Kirakosyan, TUM, co-supervised with Dr. Yan Xia and Prof. Daniel Cremers
- 2024-24 Michael Neumayr, TUM, co-supervised with Dr. Yan Xia and Prof. Daniel Cremers

Teaching

- 2023-24 **Teaching Assistant**, *B16: Software Engineering*, Undergraduate, University of Oxford.
- 2023-23 **Teaching**, *Generative AI*, Graduate, University of Oxford.
- 2018–20 **Teaching Assistant**, *Advanced Digital Image Processing*, Graduate, NTU.
- 2018–20 **Teaching Assistant**, *Human-Computer Interaction*, Undergraduate, NTU.
- 2018–19 **Teaching Assistant**, *Engineering Mathematics*, Undergraduate, NTU.

Publications

- [44] Ruijie Zhu, Jiahao Lu, Wenbo Hu, Xiaoguang Han, Jianfei Cai, Ying Shan, and **Chuanxia Zheng**. Motioncrafter: Dense geometry and motion reconstruction with a 4d vae. In *CVPR*, 2026. [Link](#).
- [43] Zeren Jiang, **Chuanxia Zheng**, Iro Laina, Diane Larlus, and Andrea Vedaldi. Mesh4d: 4d mesh reconstruction and tracking from monocular video. In *CVPR*, 2026. [Link](#).
- [42] Ruining Li, Yuxin Yao, **Chuanxia Zheng**, Christian Rupprecht, Joan Lasenby, Shangzhe Wu, and Andrea Vedaldi. Particulate: Feed-forward 3d object articulation. In *CVPR*, 2026. [Link](#).
- [41] Weirong Chen, **Chuanxia Zheng**, Ganlin Zhang, Andrea Vedaldi, and Daniel Cremers. Nova3r: Non-pixel-aligned visual transformer for amodal 3d reconstruction. In *ICLR*, 2026. [Link](#).
- [40] Brandon Smart, **Chuanxia Zheng**, Iro Laina, and Victor Adrian Prisacariu. Learning compact 3d gaussians via feed-forward point fusion. In *3DV*, 2026.
- [39] Yuedong Chen, Haofei Xu, Qianyi Wu, **Chuanxia Zheng**, Tat-Jen Cham, and Jianfei Cai. Explicit correspondence matching for generalizable neural radiance fields. *TPAMI*, 2025. [Link](#).
- [38] Zeren Jiang, **Chuanxia Zheng**, Iro Laina, Diane Larlus, and Andrea Vedaldi. Geo4d: Leveraging video generators for geometric 4d scene reconstruction. In *ICCV*, 2025. [Link](#).
- [37] Tianhao Wu, **Chuanxia Zheng**, Frank Guan, Andrea Vedaldi, and Tat-Jen Cham. Amodal3r: Amodal 3d reconstruction from occluded 2d images. In *ICCV*, 2025. [Link](#).
- [36] Ruining Li, **Chuanxia Zheng**, Christian Rupprecht, and Andrea Vedaldi. Dso: Aligning 3d generators with simulation feedback for physical soundness. In *ICCV*, 2025. [Link](#).
- [35] Ruining Li, **Chuanxia Zheng**, Christian Rupprecht, and Andrea Vedaldi. Puppet-master: Scaling interactive video generation as a motion prior for part-level dynamics. In *ICCV*, 2025. [Link](#).
- [34] Huiang He, Minghui Hu, **Chuanxia Zheng**, Chaoyue Wang, and Tat-Jen Cham. Semantix: An energy-guided sampler for semantic style transfer. In *ICLR*, 2025. [Link](#).

- [33] Stanislaw Szymanowicz*, Eldar Insafutdinov*, **Chuanxia Zheng***, Dylan Campbell, Joao Henriques, Christian Rupprecht, and Andrea Vedaldi. Flash3d: Feed-forward generalisable scene reconstruction from a single image. In *3DV*, 2025. [Link](#).
- [32] Yuzhu Ji, **Chuanxia Zheng**, and Tat-Jen Cham. One-shot human motion transfer via occlusion-robust flow prediction and neural texturing. *TMM*, 2025.
- [31] Yuedong Chen, **Chuanxia Zheng**, Haofei Xu, Bohan Zhuang, Andrea Vedaldi, Tat-Jen Cham, and Jianfei Cai. Mvsplat360: Benchmarking 360-degree generalizable 3d novel view synthesis from sparse views. In *NeurIPS*, 2024. [Link](#).
- [30] Guanqi Zhan, **Chuanxia Zheng**, Weidi Xie, and Andrew Zisserman. A general protocol to probe large vision models for 3d physical understanding. In *NeurIPS*, 2024. [Link](#).
- [29] Yuedong Chen, Haofei Xu, **Chuanxia Zheng**, Bohan Zhuang, Marc Pollefeys, Andreas Geiger, Tat-Jen Cham, and Jianfei Cai. Mvsplat: Efficient 3d gaussian splatting from sparse multi-view images. In *ECCV*, 2024. [Link](#).
- [28] Ruining Li, **Chuanxia Zheng**, Christian Rupprecht, and Andrea Vedaldi. Dragapart: Learning a part-level motion prior for articulated objects. In *ECCV*, 2024. [Link](#).
- [27] Tianhao Wu, **Chuanxia Zheng**, Tat-Jen Cham, and Qianyi Wu. Clusteringsdf: Self-organized neural implicit surfaces for 3d decomposition. In *ECCV*, 2024. [Link](#).
- [26] **Chuanxia Zheng**, Guoxian Song, Tat-Jen Cham, Jianfei Cai, Linjie Luo, and Dinh Phung. Bridging global context interactions for high-fidelity pluralistic image completion. *TPAMI*, 2024. [Link](#).
- [25] **Chuanxia Zheng** and Andrea Vedaldi. Free3d: Consistent novel view synthesis without 3d representation. In *CVPR*, 2024. [Link](#).
- [24] Guanqi Zhan, **Chuanxia Zheng**, Weidi Xie, and Andrew Zisserman. Amodal ground truth and completion in the wild. In *CVPR*, 2024. [Link](#).
- [23] Minghui Hu, Jianbin Zheng, **Chuanxia Zheng**, Chaoyue Wang, and Tat-Jen Cham. One more step: A versatile plug-and-play module for rectifying diffusion schedule flaws and enhancing low-frequency controls. In *CVPR*, 2024. [Link](#).
- [22] Tianhao Wu, **Chuanxia Zheng**, and Tat-Jen Cham. Panodiffusion: 360-degree panorama outpainting via diffusion. In *ICLR*, 2024. [Link](#).
- [21] Minghui Hu, Jianbin Zheng, Daqing Liu, **Chuanxia Zheng**, Chaoyue Wang, and Tat-Jen Cham. Cocktail: Mixing multi-modality control for text-conditional image generation. In *NeurIPS*, 2023. [Link](#).
- [20] **Chuanxia Zheng** and Andrea Vedaldi. Online clustered codebook. In *ICCV*, 2023. [Link](#).
- [19] Long Tung Vuong, Trung Le, He Zhao, **Chuanxia Zheng**, Mehrtash Harandi, Jianfei Cai, and Dinh Phung. Vector quantized wasserstein auto-encoder. In *ICML*, 2023.
- [18] Minghui Hu, **Chuanxia Zheng**, Heliang Zheng, Tat-Jen Cham, Zuopeng Yang, Chaoyue Wang, and Ponnuthurai N. Suganthan. Unified discrete diffusion for simultaneous vision-language generation. In *ICLR*, 2023. [Link](#).
- [17] **Chuanxia Zheng**, Tung Vuong, Jianfei Cai, and Dinh Phung. Movq: Modulating quantized vectors for high-fidelity image generation. In *NeurIPS*, 2022. [Link](#).
- [16] Jyothisna Vasudevan*, **Chuanxia Zheng***, James G. Wan, Tat-Jen Cham, Lim Chwee Teck, and Javier G. Fernandez. From qualitative data to correlation using deep generative networks:

- Demonstrating the relation of nuclear position with the arrangement of actin filaments. *PloS one*, 17(7):e0271056, 2022.
- [15] Qianyi Wu, Xian Liu, Yuedong Chen, Kejie Li, **Chuanxia Zheng**, Jianfei Cai, and Jianming Zheng. Object-compositional neural implicit surfaces. In *ECCV*, 2022. [Link](#).
 - [14] Yuedong Chen, Qianyi Wu, **Chuanxia Zheng**, Tat-Jen Cham, and Jianfei Cai. Sem2nerf: Converting single-view semantic masks to neural radiance fields. In *ECCV*, 2022. [Link](#).
 - [13] **Chuanxia Zheng**, Tat-Jen Cham, Jianfei Cai, and Dinh Phung. Bridging global context interactions for high-fidelity image completion. In *CVPR*, pages 11512–11522, June 2022. [Link](#).
 - [12] **Chuanxia Zheng**, Duy-Son Dao, Guoxian Song, Tat-Jen Cham, and Jianfei Cai. Visiting the invisible: Layer-by-layer completed scene decomposition. *IJCV*, 129(12):3195–3215, 2021. [Link](#).
 - [11] Yujun Cai, Yiwei Wang, Yiheng Zhu, Tat-Jen Cham, Jianfei Cai, Junsong Yuan, Jun Liu, **Chuanxia Zheng**, Sijie Yan, Henghui Ding, Xiaohui Shen, Ding Liu, and Nadia Magnenat Thalmann. A unified 3d human motion synthesis model via conditional variational auto-encoder. In *ICCV*, pages 11645–11655, 2021.
 - [10] **Chuanxia Zheng**, Tat-Jen Cham, and Jianfei Cai. Pluralistic free-form image completion. *IJCV*, 129(10):2786–2805, 2021. [Link](#).
 - [9] Guoxian Song, Linjie Luo, Jing Liu, Wan-Chun Ma, Chunpong Lai, **Chuanxia Zheng**, and Tat-Jen Cham. Agilegan: stylizing portraits by inversion-consistent transfer learning. *ACM Transactions on Graphics (TOG)*, 40(4):1–13, 2021. [Link](#).
 - [8] **Chuanxia Zheng**, Tat-Jen Cham, and Jianfei Cai. The spatially-correlative loss for various image translation tasks. In *CVPR*, 2021. [Link](#).
 - [7] **Chuanxia Zheng**, Tat-Jen Cham, and Jianfei Cai. Pluralistic image completion. In *CVPR*, pages 1438–1447, 2019. [Link](#).
 - [6] Tianyi Zhang, Jingyi Yang, **Chuanxia Zheng**, Guosheng Lin, Jianfei Cai, and Alex C Kot. Task-in-all domain adaptation for semantic segmentation. In *VCIP*, pages 1–4, 2019.
 - [5] **Chuanxia Zheng**, Tat-Jen Cham, and Jianfei Cai. T2net: Synthetic-to-realistic translation for solving single-image depth estimation tasks. In *ECCV*, pages 767–783, 2018. [Link](#).
 - [4] **Chuanxia Zheng**, Jianhua Wang, Weihai Chen, and Xingming Wu. Multi-class indoor semantic segmentation with deep structured model. *TVCG*, 34(5):735–747, 2018.
 - [3] Jianhua Wang, **Chuanxia Zheng**, Weihai Chen, and Xingming Wu. Learning aggregated features and optimizing model for semantic labeling. *TVCG*, 33(12):1587–1600, 2017.
 - [2] **Chuanxia Zheng**, Jianhua Wang, Weihai Chen, and Xingming Wu. Semantic segmentation based on aggregated features and contextual information. In *ROBIO*. IEEE, 2016.
 - [1] Jianhua Wang, **Chuanxia Zheng**, Weihai Chen, and Xingming Wu. Learning contextual information for indoor semantic segmentation. In *ICIEA*, pages 1639–1644. IEEE, 2016.