Dr. Chuanxia Zheng

Sep 07, 2025

Physical Vision Group (PVG)
College of Computing and Data Science (CCDS)
Nanyang Technological University (NTU)
✉ *chuanxia.zheng@ntu.edu.sg*
physicalvision.github.io/people/ chuanxia
lyndonzheng

Research Interests

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

- **Physical AI**: Occlusion, Interaction, Motion, Sound, 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 natural world creation

2024–25 **Marie Skłodowska-Curie Actions (MSCA) Fellow**, *University of Oxford*, UK.
Feed-Forward 3D and 4D reconstruction from sparse views

2022–24 **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 **Singapore NRF Fellowship** (SGD $3,078,720)
2024 DAAD Ainet Fellowship, *Postdoctoral Networking Tour in Artificial Intelligence*
2024 **HORIZON Marie Skłodowska-Curie (HORIZON-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- SGD$3,078,720, PI, "From Pixels to Physics: Integrating Physical Properties in Natural World Creation", Singapore National Research Foundation (NRF) Fund Fellowship.
2025- SGD$250,000, PI, "C4D: Completed 4D Reconstruction and Decomposition", White Space Fund (Start Grant of NAP).
2025- $100,000, Co-I, "Vista4D: Feed-Forward 4D Scene Reconstruction from Any Monocular Video", Sony Focused Research Award.
2024-25 €236,748, PI, "Synthesizing Photorealistic 3D Scene from Zero to One or Limited Views", HORIZON-MSCA, EP/Z001811/1
2024-25 €5,910, Co-I, "Object-Centric 3D Reconstruction and Decomposition", Bavarian Funding.

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**) 2020-2025, 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**, *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 Leaning for Generative AI**, *Harbin Institute of Technology*, China.
2023 **Codebook Leaning for Generative AI**, *NTU*, Singapore.
2023 **Codebook Leaning 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

PhD

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

[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. URL: https://donydchen.github.io/matchnerf/.

[38] Zeren Jiang, **Chuanxia Zheng**, Iro Laina, Diane Larlus, and Andrea Vedaldi. Geo4d: Leveraging video generators for geometric 4d scene reconstruction. In ***ICCV***, 2025. URL: https://geo4d.github.io/.

[37] Tianhao Wu, **Chuanxia Zheng**, Frank Guan, Andrea Vedaldi, and Tat-Jen Cham. Amodal3r: Amodal 3d reconstruction from occluded 2d images. In ***ICCV***, 2025. URL: https://sm0kywu.github.io/Amodal3R/.

[36] Ruining Li, **Chuanxia Zheng**, Christian Rupprecht, and Andrea Vedaldi. Dso: Aligning 3d generators with simulation feedback for physical soundness. In ***ICCV***, 2025. URL: https://ruiningli.com/dso.

[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. URL: https://vgg-puppetmaster.github.io/.

[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. URL: https://huiang-he.github.io/semantix/.

[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. URL: https://www.robots.ox.ac.uk/.

[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. URL: https://donydchen.github.io/mvsplat360/.

[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.

[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. URL: https://donydchen.github.io/mvsplat/.

[28] Ruining Li, **Chuanxia Zheng**, Christian Rupprecht, and Andrea Vedaldi. Dragapart: Learning a part-level motion prior for articulated objects. In ***ECCV***, 2024. URL: https://dragapart.github.io/.

[27] Tianhao Wu, **Chuanxia Zheng**, Tat-Jen Cham, and Qianyi Wu. Clusteringsdf: Self-organized neural implicit surfaces for 3d decomposition. In ***ECCV***, 2024. URL: https://sm0kywu.github.io/ClusteringSDF/.

[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. URL: https://chuanxiaz.com/picformer/.

[25] **Chuanxia Zheng** and Andrea Vedaldi. Free3d: Consistent novel view synthesis without 3d representation. In ***CVPR***, 2024. URL: https://chuanxiaz.com/free3d/.

[24] Guanqi Zhan, **Chuanxia Zheng**, Weidi Xie, and Andrew Zisserman. Amodal ground truth and completion in the wild. In ***CVPR***, 2024. URL: https://www.robots.ox.ac.uk/ vgg/research/.

[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. URL: https://jabir-zheng.github.io/OneMoreStep/.

[22] Tianhao Wu, **Chuanxia Zheng**, and Tat-Jen Cham. Panodiffusion: 360-degree panorama outpainting via diffusion. In ***ICLR***, 2024. URL: https://sm0kywu.github.io/panodiffusion/.

[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. URL: https://mhh0318.github.io/cocktail/.

[20] **Chuanxia Zheng** and Andrea Vedaldi. Online clustered codebook. In ***ICCV***, 2023. URL: https://chuanxiaz.com/cvq/.

[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. URL: https://mhh0318.github.io/unid3/.

[17] **Chuanxia Zheng**, Tung Vuong, Jianfei Cai, and Dinh Phung. Movq: Modulating quantized vectors for high-fidelity image generation. In ***NeurIPS***, 2022. URL: https://chuanxiaz.com.

[16] Jyothsna 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. URL: https://wuqianyi.top/objectsdf/.

[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. URL: https://donydchen.github.io/sem2nerf/.

[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. URL: https://chuanxiaz.com/tfill/.

[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. URL: https://chuanxiaz.com/vinv/.

[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. URL: https://chuanxiaz.com/pic/.

[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. URL: https://guoxiansong.github.io.

[8] **Chuanxia Zheng**, Tat-Jen Cham, and Jianfei Cai. The spatially-correlative loss for various image translation tasks. In ***CVPR***, 2021. URL:https://chuanxiaz.com/flsesim/.

[7] **Chuanxia Zheng**, Tat-Jen Cham, and Jianfei Cai. Pluralistic image completion. In ***CVPR***, pages 1438–1447, 2019. URL: https://chuanxiaz.com/pic/.

[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. URL: https://chuanxiaz.com/synthetic2real/.

[4] **Chuanxia Zheng**, Jianhua Wang, Weihai Chen, and Xingming Wu. Multi-class indoor semantic segmentation with deep structured model. ***TVCJ***, 34(5):735–747, 2018.

[3] Jianhua Wang, **Chuanxia Zheng**, Weihai Chen, and Xingming Wu. Learning aggregated features and optimizing model for semantic labeling. ***TVCJ***, 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.