

ZENGHAO CHAI

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🎓 EDUCATION

National University of Singapore, SG

Apr. 2023 – Jul. 2027 (expected)

Ph.D. Student in Computer Science.

- Research Topics: Digital Humans, Text-guided Generation, Generative Visual Retrieval.

Tsinghua University, Beijing, CN

Sept. 2020 – Jun. 2023

Master of Computer Technology, Supervisor: Prof. Chun Yuan.

GPA: 3.74/4.00

- Master Thesis: High-Fidelity 3D Face Reconstruction and Its Evaluation.

Beijing Institute of Technology, Beijing, CN

Sept. 2016 – Jul. 2020

Bachelor of Software Engineering.

GPA: 90.97/100, Rank: 2/185 (**Top 1%**)

💻 WORK EXPERIENCE

Microsoft Research Asia, Beijing, CN

May. 2022 – Mar. 2023

Research Intern in Machine Learning Group.

Topics: 3D Face Reconstruction & Animation.

- Extend the dense landmark optimization framework into learning-based models for detailed 3D face reconstruction.
- Exploit perceptual signals of face attributes to learn high-level representations for expressive coefficient regression.
- Design SD-DeTail Module to decouple static and dynamic factors for synthesizing realistic and animatable details.
- Propose HiFace and loss functions to jointly learn the coarse shape and details from synthetic and real-world data.

Tencent AI Lab, Shenzhen, CN

Mar. 2021 – May. 2022

Research Intern in Digital Human Team.

Topics: 3D Face Reconstruction, 3D Face Modeling & Evaluation.

- Unify topology for 2,000+ 3D scans and construct an expressive 3DMM named HIFI3D⁺⁺ with 500+ dimensions.
- Construct a region-aware benchmark named REALY and propose a region-aware pipeline for quantitative evaluation.
- Reproduce and evaluate 10+ state-of-the-art reconstruction models on the benchmark and update the leaderboard.
- Release HIFI3D⁺⁺, REALY, and evaluation codes for research purposes and contribute to the 3D face community.

📄 PUBLICATION & PREPRINT (“*” indicates equal contribution)

- **HiFace: High-Fidelity 3D Face Reconstruction by Learning Static and Dynamic Details**

Zenghao Chai, Tianke Zhang, Tianyu He, Xu Tan, Tadas Baltrušaitis, HsiangTao Wu, Runnan Li, Sheng Zhao, Chun Yuan, Jiang Bian.

IEEE/CVF International Conference on Computer Vision (ICCV), 2023.

Project Page: 🌐 project-hiface.github.io

- **REALY: Rethinking the Evaluation of 3D Face Reconstruction**

Zenghao Chai*, Haoxian Zhang*, Jing Ren, Di Kang, Zhengzhao Xu, Xuefei Zhe, Chun Yuan, Linchao Bao.

European Conference on Computer Vision (ECCV), 2022.

Project Page: 🌐 realy3dface.com

- **Learning Imbalanced Data with Vision Transformers**

Zhengzhao Xu, Ruikang Liu, Shuo Yang, Zenghao Chai, Chun Yuan.

IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2023.

- **Towards Effective Collaborative Learning in Long-Tailed Recognition**

Zhengzhao Xu*, Zenghao Chai*, Chengyin Xu, Chun Yuan, Haiqin Yang.

IEEE Transactions on Multimedia (TMM), 2023, Under Review.

- **Towards Calibrated Model for Long-Tailed Visual Recognition from Prior Perspective**

Zhengzhao Xu*, Zenghao Chai*, Chun Yuan.

Neural Information Processing Systems (NeurIPS), 2021.

- **HHF: Hashing-guided Hinge Function for Deep Hashing Retrieval**

Chengyin Xu*, Zenghao Chai*, Zhengzhao Xu*, Hongjia Li, Qiruyi Zuo, Lingyu Yang, Chun Yuan.

IEEE Transactions on Multimedia (TMM), 2022.

- **HyP² Loss: Beyond Hypersphere Metric Space for Multi-label Image Retrieval**

Chengyin Xu*, Zenghao Chai*, Zhengzhao Xu, Chun Yuan, Yanbo Fan, Jue Wang.

ACM International Conference on Multimedia (ACM MM), 2022.

- **CMS-LSTM: Context Embedding and Multi-Scale Spatiotemporal Expression LSTM for Predictive Learning**
Zenghao Chai, Zhengzhuo Xu, Yunpeng Bai, Zhihui Lin, Chun Yuan.
IEEE International Conference on Multimedia and Expo (ICME), 2022.
- **MoDeRNN: Towards Fine-grained Motion Details for Spatiotemporal Predictive Learning**
Zenghao Chai, Zhengzhuo Xu, Chun Yuan.
IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2022.
- **Semantic-Sparse Colorization Network for Deep Exemplar-based Colorization**
Yunpeng Bai, Chao Dong, Zenghao Chai, Andong Wang, Zhengzhuo Xu, Chun Yuan.
European Conference on Computer Vision (ECCV), 2022.

🔑 INVENTION PATENT

- **A 3D Model Error Estimation Method and Apparatus, Device, and Storage Medium**
Haoxian Zhang, Zenghao Chai, Linchao Bao, Di Kang.
Invention patent, Submitted, 2022.
- **A Retrieval Method and Apparatus, Device, and Storage Medium**
Chengyin Xu, Zenghao Chai, Zhengzhuo Xu, Yanbo Fan.
Invention patent, Published Application Number: CN115146143A, 2022.
- **A Lightweight Fine-grained Spatiotemporal Predictive Method and System**
Chun Yuan, Zenghao Chai, Zhengzhuo Xu.
Invention patent, Published Application Number: CN114445463A, 2022.
- **A Move Generation Method for Game of the Amazons Based on Deep Convolutional Neural Network**
Chongyang Shi, Zhaohe Liao, Zenghao Chai.
Invention patent, Authorization Announcement Number: CN111330255B, 2020.

🏆 COMPETITION

- **Gold Medal** of ICGA Computer Olympiad, *International Computer Games Association* 2019
- **Meritorious Winner** of MCM/ICM Contest in Modeling, *Consortium for Mathematics and Its Applications* 2019
- **Gold Medal** of International Genetically Engineered Machine Competition, *Massachusetts Institute of Technology* 2018
- **Second Prize** of Computer Games Championship, *Chinese Association for Artificial Intelligence* 2018
- **Second Prize** of National Computer Games Tournament, *Chinese Association for Artificial Intelligence* 2018
- **Third Prize** of Beijing Physics Competition, *Beijing Physical Society* 2017
- **First Prize** of China Mathematics Competition, *Chinese Mathematical Society* 2017
- **First Prize** of Beijing Mathematics Competition, *Beijing Mathematical Society* 2017

🏅 AWARD & HONOR

- President's Graduate Fellowship of *National University of Singapore* 2023
- First Prize in Internship Award of *Tsinghua University (Top 1%)* 2023
- Award of Excellence in "Stars of Tomorrow" Internship Program of *Microsoft Research Asia (Top 5%)* 2023
- National Scholarship of *Ministry of Education (Top 0.2%, 3 times)* 2018/2019/2022
- Ping An AI BANK Fellowship (**Top 5%**) 2021
- Outstanding Graduate of *Beijing and Beijing Institute of Technology (Top 5%)* 2020
- Teli Xu Fellowship (**Top 0.1%**) 2020
- Beijing Merit Student (**Top 1%**) 2020
- Competition Scholarship of *Beijing Institute of Technology (Top 5%, 2 times)* 2019/2020
- Innovation Scholarship of *Ministry of Industry and Information Technology (Top 1%)* 2019
- JJWorld Fellowship (**Top 5%**) 2017
- First Prize Scholarship of *Beijing Institute of Technology (Top 5%, 6 times)* 2017/2018/2019/2020

🔧 SKILL & ACTIVITY

- **Programming:** Python, PyTorch, PyTorch3D, TensorFlow, L^AT_EX, WRAP, C/C++, SQL.
- **Language:** Mandarin (Native), English (Fluent, IELTS: 7.0).
- **Talk:** "REALY: Rethinking the Evaluation of 3D Face Reconstruction", MPI-IS, Online, Aug. 2022.
- **Reviewer Service:** TNNLS, PG 2023, NeurIPS 2023, ICCV 2023, CVPR 2023, ECCV 2022.