

# ZENGHAO CHAI

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## 🎓 EDUCATION

**Tsinghua University**, Beijing, CN

Sept. 2020 – Jul. 2023 (Expected)

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

GPA: 3.74/4.00

- Research Topics: Digital Humans, Long-tail Learning, Image Retrieval, Predictive Learning, Image Colorization.
- 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%**)

- Courses: Linear Algebra (100), Digital Image Processing (100), Probability & Mathematical Statistics (99), Object-Oriented Programming (C++) (98), Software Architecture & Design Patterns (98), Discrete Mathematics (97).

## 💻 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<sup>++</sup> 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<sup>++</sup>, 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.

Anonymous Submitted, 2023, **Under Review**.

Project Page: 🌐 [project-hiface.github.io](https://project-hiface.github.io)

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

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

European Conference on Computer Vision (ECCV), 2022, **Published**.

Project Page: 🌐 [realy3dface.com](https://realy3dface.com)

- **Learning Imbalanced Data with Vision Transformers**

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

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

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

Zhengzhuo 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**

Zhengzhuo Xu\*, Zenghao Chai\*, Chun Yuan.

Neural Information Processing Systems (NeurIPS), 2021, **Published**.

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

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

IEEE Transactions on Multimedia (TMM), 2022, **Published**.

- **HyP<sup>2</sup> Loss: Beyond Hypersphere Metric Space for Multi-label Image Retrieval**

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

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

- **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, **Published**.
- **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, **Published**.
- **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, **Published**.

## 🔑 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

- 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
- Beijing Outstanding Graduate (**Top 5%**) 2020
- Outstanding Graduate of *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<sup>A</sup>T<sub>E</sub>X, 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:** NeurIPS 2023, ICCV 2023, CVPR 2023, ECCV 2022.