

# Hongrui Cai

Updated July 17, 2023

**Email:** hrcai AT mail.ustc.edu.cn    **Homepage:** rainbowrui.github.io    **GitHub:** RainbowRui 1.7k+ star

**Research Interests**    Computer Vision & Graphics: 3D reconstruction, structure-from-motion, geometry learning, image and video generation.

**Experience**    **Ant Group**    Hangzhou, China  
Research Intern @ Interaction Intelligence Lab    May. 2023 – Present  
Mentor: Dr. Xuan Wang

**Education**    **University of Science and Technology of China**    Hefei, China  
Ph.D. in Data Science    Sep. 2019 – Present  
Mentor: Prof. Juyong Zhang. GPA: 3.85/4.3

**South China University of Technology**    Guangzhou, China  
B.S. in Mathematics and Applied Mathematics    Sep. 2015 – Jun. 2019  
Ranking: 1/46. GPA: 92.15/100

**Papers**    **Hongrui Cai**, Wanquan Feng, Xuetao Feng, Yan Wang, Juyong Zhang. Neural Surface Reconstruction of Dynamic Scenes with Monocular RGB-D Camera. *NeurIPS, 2022 (Spotlight)*. 🌟 NDR 480+ star

Wanquan Feng, Jin Li, **Hongrui Cai**, Xiaonan Luo, Juyong Zhang. Neural Points: Point Cloud Representation with Neural Fields for Arbitrary Upsampling. *CVPR, 2022*. 🌟 NeuralPoints 220+ star

Wanquan Feng, Juyong Zhang, **Hongrui Cai**, Haoifei Xu, Junhui Hou, Hujun Bao. Recurrent Multi-view Alignment Network for Unsupervised Surface Registration. *CVPR, 2021*. 🌟 RMA-Net 200+ star

Xin Huang, Dong Liang, **Hongrui Cai**, Juyong Zhang, Jinyuan Jia. Caric Painter: Sketch Guided Interactive Caricature Generation. *ACM MM, 2022*.

**Hongrui Cai**, Yudong Guo, Zhuang Peng, Juyong Zhang. Landmark Detection and 3D Face Reconstruction for Caricature using a Nonlinear Parametric Model. *Graphical Models (GMOD)*, 2021. 🌟 CaricatureFace 540+ star

Xin Huang, Dong Liang, **Hongrui Cai**, Yunfeng Bai, Juyong Zhang, Jinyuan Jia. Double References Guided Interactive 2D and 3D Caricature Generation. Under review.

Wanquan Feng, **Hongrui Cai**, Junhui Hou, Bailin Deng, Juyong Zhang. Differentiable Deformation Graph based Neural Non-rigid Registration. *Communications in Mathematics and Statistics (CIMS)*, 2023.

Yudong Guo, Juyong Zhang, Yihua Chen, **Hongrui Cai**, Zhangjin Huang, Bailin Deng. Real-time Face View Correction for Front-facing Cameras. *Computational Visual Media (CVM)*, 2021.

## Projects

### **Self-supervised Topology-aware Non-rigid Point Cloud Registration**

Research project Jun. 2022 – Apr. 2023

Developed an advanced non-rigid registration system that maximizes performance through a topology-aware feature extraction method and a self-supervised training strategy. This innovative approach significantly improves registration accuracy, particularly in dynamic topology regions.

### **Monocular RGB-D based Wound Surface Modeling**

Horizontal research project May. 2022 – Jun. 2022

Developed a highly automated algorithm using monocular RGB-D video sequences to reconstruct high-fidelity wound surfaces. This algorithm facilitates precise measurement of both wound area and depth.

### **Audio driven Talking Head Synthesis**

Horizontal research project Aug. 2020 – Nov. 2020

Developed a cutting-edge deep learning based head reconstruction system that utilizes differentiable rendering with RGB, RGB-D, or video input for precise and high-quality results.

### **Real-time Face View Correction for Front-facing Cameras**

Horizontal research project Sep. 2019 – Oct. 2020

Developed an automatic face view correction system using a single RGB(-D) camera, effectively solving video distortions like 'upward nose' and 'big face' caused by disparities between camera location and face orientation.

## Reviewers

Conferences: CVPR 2023, ICCV 2023

Journals: IEEE Transactions on Multimedia, Computers & Graphics

## Academic Talks

Spotlight presentation in NeurIPS 2022 Dec. 2022

Invited talk in Jiqizhixin Nov. 2022

Oral presentation in CVM 2021 Apr. 2021

## Selected Honors

First-class Academic Scholarships for Postgraduates, by USTC 2019 - 2022

Excellent Undergraduate Thesis Award, by SCUT 2019

Excellent Undergraduate Student, by SCUT 2019