

JIACHENG LIU(JASON)

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EDUCATION

Tsinghua University, China

Sep 2021 – Jun 2025

Bachelor of Creative Design and Intelligent Engineering (CDIE), Xinya College (GPA: 3.96/4.00)

Cornell university, United States

July 2024 - Oct 2024

Research Intern of information science

SKILLS

Programming Languages:	Python, C, C++, MATLAB, shell
Hardware Programming:	Verilog, Arduino, Quartus II, Multisim
Modeling & UI Design:	Photoshop, AutoCAD, Solidworks, Indesign, Figma
Other:	Soldering, Concept Design, 3D printing, User Study, Laser Cutting

RESEARCH EXPERIENCE

Identity authentication based on photoplethysmography (PPG)

Oct 2023 - Present

Project co-leader

Tsinghua University, China

- Verified the feasibility of identity authentication using short-duration PPG signals.
- Designed modules based on the Inception model architecture for efficient PPG feature extraction.
- Processed the signals using methods such as temporal difference, filtering, and sliding window slicing.
- Designed a multitask learning model for simultaneous PPG signal quality assessment and feature extraction.
- Conducted generalization validation across sessions, sensors, and subjects.

Silent speech recognition using low-power active acoustic sensing

July 2024 - Oct 2024

Research intern

Cornell University, United States

- Addressed the issue of insufficient training data by utilizing voiced audio and cross-modal learning.
- Reduced the disparity between different modalities in cross-modal learning by introducing Cross Contrast Loss and Supervised Temporal Contrast Loss.
- Improved output quality by using LLM through prompt engineering and LLM fine-tuning.

Silent speech synthesis using electrolaryngeal voice

July 2024 - Oct 2024

Research intern

Cornell University, United States

- Used the Montreal Force Aligner and a custom-trained ResNet Aligner to perform phoneme annotation on voiced audio and electrolaryngeal audio.
- Aligned voiced audio and electrolaryngeal audio using Dynamic Time Warping (DTW) and latent space DTW.
- Conducted data collection and cross-subject voice synthesis experiments.
- Trained a voice generation model using an improved model based on VAE and GAN.

Camera-Based Remote Physiology Sensing

Jan 2024 - Feb 2024

Research fellow

Tsinghua University, China

- Used the PPG Toolbox to conduct batch experiments and identified the optimal number of subjects for training the remote photoplethysmography (rPPG) model.
- Concluded that skin tone diversity in the training set has a significant impact on rPPG model performance through data analysis.

Odor Sequences Generation for Movies Based on Large Language Model

Mar 2023 - Sep 2023

Research fellow

Tsinghua University, China

- Developed a prototype for real-time content recognition in videos based on the CLIP model.
- Set up a demo device using an ultrasonic atomizer for experimental purposes.
- Participated in organizing user experiments to study whether providing real-time olfactory experiences in VR devices enhances the overall experience.

PUBLICATION

Exploring Efficient and Reliable PPG Authentication in Daily Scenarios

CHI. 2025

Jiankai Tang, and Jiacheng Liu, RENLING TONG, Kai Zhu, Zhe Li, Junliang Xing, Yuanchun Shi, Yuntao Wang

- Manuscript in preparation

Camera-Based Remote Physiology Sensing for Hundreds of Subjects

Across Skin Tones

CHI Workshop PhysioCHI. 2024

Jiankai Tang, Xinyi Li, Jiacheng Liu, Xiyuxing Zhang, Zeyu Wang, and Yuntao Wang

OdorAgent: Generate Odor Sequences for Movies Based on

Large Language Model

IEEE VR Papers program. 2023

Yu Zhang, Peizhong Gao, Fangzhou Kang, Jiaxiang Li, Jiacheng Liu, Qi Lu, and YINGQING XU

HONOR AND GRANTS

Tsinghua University Scholarship

- Comprehensive Merit Scholarship

Oct.2022

- Comprehensive Merit Scholarship

Oct.2023

Research assistance fund

- Tsinghua University Academic Advancement Plan project

Oct.2024

- Beijing Natural Science Foundation

Oct.2023