JIACHENG(JASON) LIU

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EDUCATION

Tsinghua University, Beijing, China   *Sep 2021 – Jun 2025*
Bachelor of Creative Design and Intelligent Engineering (CDIE), Xinya College
An interdisciplinary undergraduate program that combines Electrical Engineering and Computer Science (EECS, main part), Mechanical Engineering (ME), and Industrial Design (ID).
GPA: 3.96/4.00, Rank 2.
Selected Courses:

- EECS: Signals and System Analysis(A), Fundamentals of Analog Electronics(A), Principles of Artificial Intelligence(A-), Data Structures(A-), Digital Electronics(A), Principle of Circuits(A+), Computer Languages and Programming(A).

- ME: Fundamentals of Mechanical Design(A), Engineering Mechanics A(A), Fundamentals of Engineering Drawing(A), Manufacturing Process Practice B(A-).

- ID: User Experience Design(A-), Interaction Design(A), Design Thinking(A+).

RESEARCH EXPERIENCE

Exploring Efficient and Reliable Photoplethysmography (PPG)
Authentication in Daily Scenarios   *Oct 2023 - Sep 2024*
Project leader / Advisor: Prof. Yuntao Wang   *Tsinghua University, China*

Led the design of RAPID-MTL, a reliable and efficient authentication model using PPG signals that can fit different daily scenarios with diverse security requirements.
- Designed modules for efficient PPG feature extraction based on the optical principles of PPG signal.
- Designed a multitask learning model for simultaneous PPG signal quality assessment and feature extraction.
- Carried out a scheme that only needs motion labels of PPG signals to train PPG quality assessment models.
- Conducted validation and evaluation of the proposed methods across different time spans, sensors, and subjects.

NeckVoice: Voice Synthesis for Laryngectomees with On-body Sound Actuation   *July 2024 - Oct 2024*
Research intern / Advisor: Prof. Cheng Zhang   *Cornell University, United States*

Designed a smart neckband capable of generating high-quality human voice for patients who have undergone throat-removal therapy.
- Proposed a training scheme that made generating high-quality speech with only unaligned audio pairs possible.
- Improved the performance of the Variational Auto-Encoder (VAE) significantly by adding
Dynamic Temporal Warping (DTW) on data representations.
- Designed an e-throat holder and ear clips for user study, facilitating the difficulty of data collection.
- Conducted data collection and cross-subject voice synthesis experiments.

OdorAgent: Generate Odor Sequences for Movies Based on Large Language Model   *Mar 2023 - Sep 2023*
Research fellow / Advisor: Prof. Yingqing Xu   *Tsinghua University, China*

Designed an automated odor generator that creates synchronized scent sequences with movie content through prompt engineering with a Large Language Model (LLM).
- Developed a real-time video content recognition method utilizing the CLIP model.
- Implemented a device using ultrasonic atomizers to dispense perfume based on predefined commands for user study.
- Developed and polished graphs and figures for the conference paper.
- Coordinated user studies and contributed to data analysis.

Camera-Based Remote Physiology Sensing for Hundreds of Subjects Across Skin Tones *Jan 2024 - Feb 2024*
Research fellow / Advisor: Prof. Yuntao Wang *Tsinghua University, China*

Examined the impact of skin tone diversity in dataset composition on the performance of remote photoplethysmography (rPPG) models.
- Conducted batch experiments and identified the optimal number of subjects for training the rPPG model.
- Concluded that skin tone diversity in the training set has a significant impact on rPPG model performance through data analysis.

PUBLICATION

Exploring Efficient and Reliable PPG Authentication in Daily Scenarios *IMWUT. 2025*
*Jiankai Tang, **Jiacheng Liu***, RENLING TONG, Kai Zhu, Zhe Li, Junliang Xing, Yuanchun Shi, Yuntao Wang*
- Submitted

NeckVoice: Voice Synthesis for Laryngectomees with On-body Sound Actuation *IMWUT. 2025*
*Ruidong Zhang, **Jiacheng Liu**, Justin Xiang, Ke Li, Babak Sadoughi, Sam Tilsen, François Guimbretière, and Cheng Zhang*
- Submitted

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. 2024*
*Yu Zhang, Peizhong Gao, Fangzhou Kang, Jiaxiang Li, **Jiacheng Liu**, Qi Lu, and YINGQING XU*

HONOR AND GRANTS

Tsinghua University Scholarship
- Passion for Reading Scholarship (awarded to **only 2** students at the college level) *Oct.2022*
- Tsinghua Friendship - Toyota Scholarship (awarded to **only 1** student at the college level) *Oct.2023*
- Tsinghua Friendship - Luo Yuehua Scholarship (awarded to **only 3** students at the college level) *Nov.2024*

Research assistance fund
- Tsinghua University Academic Advancement Plan project *Oct.2024*
- Beijing Natural Science Foundation *Oct.2023*

SOCIETY MEMBERSHIPS

- Minister of the Publicity Department, Student Union, Xinya College, Tsinghua University *Jul.2022 - Jul.2023*
- Member of the Publicity Department, Student Union, Xinya College, Tsinghua University *Jul.2021 - Jul.2022*
- Class Representative, Creative Design and Intelligent Engineering Program *Jul.2023 - Present*

SKILLS

Programming Languages:	Python, C, C++, MATLAB, shell
Hardware Programming:	Verilog, Micropython, Arduino, Quartus II, Multisim
Modeling & UI Design:	Photoshop, AutoCAD, Solidworks, Indesign, Figma, Fusion 360
Skill Set:	Machine Learning, User Interface Design, 3D printing, Laser Cutting