Zhaoxun Liu

Lorenz **O**ften **R**epresents the **E**nglish **N**ame for **Z**haoxun

Department of Computer Science, University of Toronto, St. George Campus

Zhaoxun (Lorenz) Liu lorenz@cs.toronto.edu lorenz.fun lorenz-liu

EDUCATION

University of Toronto — **St. George Campus, Toronto, ON**
Department of Computer Science — GPA: 4.0
Master of Science in Applied Computing (MScAC) — *Sep. 2023 – Jan. 2025*

Beihang University — **Beijing, CN**
School of Computer Science and Engineering — GPA: 87/100 *with an* Upper Division GPA: 91/100
Bachelor of Engineering in Computer Science and Technology — *Sep. 2019 – Jun. 2023*

SKILLSET

Programming Languages: Python, C++, C#, JavaScript & TypeScript, Scala, Java, SQL
Frameworks & Tools: PyTorch, Scikit-Learn, NumPy, SciPy, Matplotlib, Unity3D, React Native & React, Apache Spark, Apache Kafka, Google Firebase, AWS Services, Linux/Unix, Git, Docker, Kubernetes, Flask, PostgreSQL

EXPERTISE

Human-AI Interaction: I apply my expertise in HCI and AI to build interactive data systems, study their impact on users, and search for methods to control AI behaviors and align them with human values and goals.

PUBLICATIONS

CrossKeys: Text Entry for Virtual Reality Using a Single Controller via Wrist Rotation
Zhaoxun Liu*, Xiaolong Liu, Lili Wang
International Journal of Human–Computer Interaction (IJHCI), 2024

Hands-Free Is Fine: Gaze-Dominant Object Manipulation in Virtual Reality
Zhaoxun Liu*, Xiaolong Liu, Lili Wang
Journal of Beihang University, 2023 (Undergraduate Thesis)

Temporal Transformer Networks with Self-Supervision for Action Recognition
Yongkang Zhang, Jun Li, Na Jiang, Guoming Wu, Han Zhang, Zhiping Shi, Zhaoxun Liu*, Zizhang Wu
IEEE Internet of Things Journal (IoT), 2023

INDUSTRIAL

University Health Network (UHN) — Starting **Feb. 2025**
Team Lead, Machine Learning — *Toronto, ON*

- I lead the Machine Learning Research Team at the SARA Lab, UHN, overseeing research in computer vision, graphics, and reinforcement learning. I also supervise healthcare-tailored game development and web application projects.
- Our mission is to pioneer AI-driven solutions for surgical and clinical applications.

University Health Network (UHN) — **May. 2024 – Dec. 2024**
Machine Learning Researcher — *Toronto, ON*

- Introduced *MasTER*, a data-intensive triage dashboard with a user-friendly human interface to enable fast patient dispatch in mass-casualty incidents by leveraging PPO-based deep reinforcement learning and large language models.

Ubisoft — **Sep. 2022 – Mar. 2023**
Intern Gameplay Programmer — *Chengdu, CN*

- Researched reinforcement learning (DQN, DDPG) on non-player character actions, behaviours, and interactions.
- *Assassin's Creed Mirage* downloadable contents (DLCs), excelling in C# and Unity3D and performance optimization.
- Achieved notable improvements in DLC performance and functionality, streamlined project workflows with Perforce and Confluence, and successfully delivered high-quality content.

ACADEMIC

Dynamic Graphics Project Graduate Student
Jan. 2024 – Apr. 2024 *University of Toronto*
Supervised by **Prof. Tovi Grossman**

- Proposed *DocHub*, a LLM-based interactive system that identifies and visualizes crucial data and their interconnections within documents as node-link diagrams.
- Offered an interactive interface allowing users to modify these visualizations for tailored insights and to pose detailed, context-specific queries for deeper understanding.
- Featured a non-linear abstraction framework to adeptly handle and streamline the complexity of information presented.

Computational Social Science Lab Graduate Student
Sep. 2023 – Dec. 2023 *University of Toronto*
Supervised by **Prof. Ashton Anderson**

- Presented a pretrained language model-based framework to detect and reason about entities targeted by hateful memes.
- Provided insight into why certain groups are more susceptible to becoming targets of hateful memes.
- Proposed a specific preventive measure to curb the spread of hateful memes.

State Key Laboratory of Virtual Reality Technology and Systems Researcher (Undergraduate Thesis)
Feb. 2023 – Jun. 2023 *Beihang University*
Supervised by **Prof. Lili Wang** & Collaborated with **Ph.D. Xiaolong Liu**

- We proposed a hands-free object manipulation method based on gaze-dominant interaction, which significantly outperforms the current state-of-the-art gaze-based hands-free object manipulation method.
- We designed a novel user study, facilitating a quantitative evaluation of the efficiency of the proposed method.

XDiscovery Lab (Dartmouth HCI Lab) Intern Researcher
May. 2022 – Sep. 2022 *Dartmouth College*
Supervised by **Prof. Xing-Dong Yang** & Collaborated with **Ph.D. Zheer Xu**

- Devised a novel text entry method that composes scattered keywords into a natural and clear sentence.
- Designed and developed a keyword extractor using BERT from Hugging Face.
- Retrained the model based on the prompt-based approach to give three different semantic candidate sentences.
- Developed a web application to enable more people to participate in our user study.

State Key Laboratory of Virtual Reality Technology and Systems Researcher
Sep. 2021 – Feb. 2022 *Beihang University*
Supervised by **Prof. Lili Wang**

- Led the team to devise *CrossKeys*, a novel and efficient text entry technique for virtual reality (VR) using a single controller via wrist rotation, which unprecedentedly employs the three-dimensional space a virtual environment can provide and outperforms the state-of-the-art method.
- Implemented responsive components, auto-completing prediction algorithm, user interface design, ergonomics-mathematical deduction, and 3D modeling.

State Key Laboratory of Software Development Environment Intern Researcher
Mar. 2021 – Dec. 2021 *Beihang University*
Supervised by **Prof. Xianglong Liu** & Collaborated with **Ph.D. Jun Li**

- Developed Cross-Attention ReID, a state-of-the-art approach to realizing pedestrians' re-identification based on training with large-scale datasets generated by single-channeled IR cameras and three-channeled RGB cameras.
- Surveyed literature and applied existing theories to code with high performance and robustness.
- Conducted quantitative analysis and results assessment with datasets like SYSU-MM01 and RegDB.

BNRist and School of Software Intern Researcher
Oct. 2020 – Jan. 2021 *Tsinghua University*
Supervised by **Prof. Feng Xu**

- Refined a CVPR accepted project "Monocular Real-time Full Body Capture with Inter-part Correlations".
- Implemented unsupervised training via differentiable renderers.
- Conducted quantitative analysis and cross-datasets tests with datasets like Basel Face Model and 3DMM Face Model.

SERVICES

Teaching Assistant **Sep. 2024 – Dec. 2024**
Department of Computer Science, University of Toronto
"CSC207: Software Design"

Teaching Assistant **Jan. 2024 – May. 2024**
Department of Computer Science, University of Toronto
"CSC404: Video Game Design"

Teaching Assistant **Jan. 2024 – May. 2024**
Department of Computer Science, University of Toronto
"CSC165: Mathematical Expression and Reasoning for Computer Science"

Teaching Assistant **Feb. 2021 – Jul. 2021**
School of Computer Science and Engineering, Beihang University
"Data Structure"

AWARDS & CERTIFICATES

2024	Scholarship	The Mitacs Accelerate Fellowship
2023	Award	"Outstanding Undergraduate Thesis" of Beihang University
2021	Scholarship	"Excellent Student Cadres" of Beihang University
2020	The First Prize	The 9th National University Students Arts Performance Competition
2019	Silver Medal	BUAA Basketball Association

SELECTED COURSES

- MAT1510H - Deep Learning: Theory & Data Science
- CSC2552H - Topics in Computational Social Science
- CSC2524H - Topics in Interactive Computing
- CSC2547H - Topics in Machine Learning: AI Alignment

EXTRACURRICULAR

Chief Cellist
BUAA Symphony Orchestra *Sep.2019 – Jul.2023*

Point Guard
BUAA Basketball Team *Sep.2019 – Jul.2023*