

Bio

Xiaoyu Liu is a current Ph.D. student advised by Dr. Zhicheng Liu from Human-Data Interaction Group at University of Maryland. His research interests include human-computer interaction, information visualization, human-AI collaboration and computer graphics.

Education

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|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <b>Ph.D., Computer Science</b><br><i>Department of Computer Science, University of Maryland, College Park, Maryland</i>                            | Sep. 2024 – present<br>GPA: 4.00 / 4.00   |
| <b>B.S.E., Computer Science</b><br><i>College of Engineering, University of Michigan, Ann Arbor, Michigan</i>                                      | Aug. 2021 – Apr. 2023<br>GPA: 3.89 / 4.00 |
| <b>B.S., Electrical &amp; Computer Engineering (Dual Degree)</b><br><i>UM-SJTU Joint Institute, Shanghai Jiao Tong University, Shanghai, China</i> | Sep. 2019 – Aug. 2023<br>GPA: 3.79 / 4.00 |

Publications

**MIWA: Mixed-Initiative Web Automation for Better User Control and Confidence**  
Weihao Chen, Xiaoyu Liu, Jiacheng Zhang, Ian Iong Lam, Zhicheng Huang, Rui Dong, Xinyu Wang, Tianyi Zhang. *2023 ACM Symposium on User Interface Software and Technology*. October 2023. DOI: [10.1145/3586183.3606720](https://doi.org/10.1145/3586183.3606720).  
We introduce the Mixed-Initiative Web Automation system, which allows non-technical users to automate repetitive web scraping tasks through programming-by-demonstration with greater efficiency and confidence.

**Dr. Box: Packaging Design Platform – Analysis Visualization and Web Development**  
Xiaoyu Liu, Zixiang Meng, Yanmei Wang, Yunqian Yao, Zongkai Zhang, Shane Johnson, Peisen Huang. *Shanghai Jiao Tong University Bachelor’s degree dissertation*. August 2023.  
We implemented parameterized mesh generator and WebGL-based visualization modules to support finite element analysis of corrugated paper boxes on *Dr. Box*, an industrial computing platform for customizable box strength analysis.

Research Projects

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| <b>Conceptualizing Infographics’ Definition and Design Characteristics</b><br><i>University of Maryland, College Park, Maryland</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Jan. 2025 – present<br>Advisor: Dr. Zhicheng Liu   |
| <ul style="list-style-type: none"><li>Conducted literature review (<math>N = 184</math>) and expert survey (<math>N = 44</math>) to investigate inconsistencies and patterns in infographics understanding of visualization / HCI researchers and practitioners</li><li>Developing comprehensive design space for visual and data components of infographics; to conduct systematic annotation of infographic corpora against our design space for validation and fine-grained pattern mining</li><li>First-author paper “Infographics: What Do We Mean and What Do They Show?” submitted to <i>2026 ACM CHI conference on Human Factors in Computing Systems</i> (Sep. 2025); currently under review</li></ul> |                                                    |
| <b>Semantics Extraction of Visualization Corpora for Diversity Analysis</b><br><i>University of Maryland, College Park, Maryland</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Sep. 2024 – Sep. 2025<br>Advisor: Dr. Zhicheng Liu |
| <ul style="list-style-type: none"><li>Programmatically extracted semantic labels (mark types, data encodings, layout features) from low-level Vega-Lite specifications (<math>N = 1981</math>) to support quantitative evaluation of corpus-wide chart diversity</li><li>Co-authored paper “Towards Measuring Data Visualization Design Diversity” submitted to <i>2026 ACM CHI conference on Human Factors in Computing Systems</i> (Sep. 2025); currently under review</li></ul>                                                                                                                                                                                                                              |                                                    |

**Enhancing and Evaluating LLM Performance for Chat-based Science Tutoring**

Jan. 2024 – Jun. 2025

*University of Michigan, Ann Arbor, Michigan*

Advisor: Dr. Xu Wang

- Implemented chat-based video learning system based on a multi-agent LLM architecture, capable of providing pedagogically helpful follow-ups and hints through retrieval-augmented generation (RAG) from learning materials
- Conducted usability study, performance evaluation and contextual interview with high school students ( $N = 22$ ) to understand user preferences, efficacy and potential pitfalls of LLM-powered chat-based tutoring
- First-author paper “To Chat or to Quiz?: Examining the Pedagogical Benefits and Risks of AI Tutors in Facilitating High School Science Learning from Videos” submitted to *2026 ACM CHI conference on Human Factors in Computing Systems* (Sep. 2025); currently under review

**Utilizing Bio-Transformer for Flow Cytometry Feature Extraction**

Jun. 2023 – Jul. 2024

*Purdue University, West Lafayette, Indiana*

Advisor: Dr. Wenbo Guo

*Duke University, Durham, North Carolina*

Advisor: Dr. Lynn Lin

- Implemented and trained multi-layer Transformer model to predict potential effects of cancer immunotherapy based on Flow Cytometry measurements on individual cells
- Model assisted the creation of fine-tuned treatment strategies for individual patients with enhanced efficacy based on identified characteristics of their immune system
- Due to subsequent changes to project scope, my contribution was not included in the final publication. I was mentioned in paper acknowledgements for “contribut[ing] to the early stages of this project”. Paper accepted to *Patterns* (Sep. 2025); DOI: [10.1016/j.patter.2025.101297](https://doi.org/10.1016/j.patter.2025.101297)

**Teaching Experience****Teaching Assistant (CMSC 425: Game Programming)**

Sep. 2024 – May 2025

*University of Maryland, College Park, Maryland*

Supervisor: Prof. Stevens Miller

**Academic Writing Center Consultant**

Sep. 2020 – Aug. 2021

*UM-SJTU Joint Institute, Shanghai Jiao Tong University, Shanghai, China*

Supervisor: Dr. Amalia Jiva

**Work Experience****Intern Smart Control System Designer**

Jul. 2020 – Aug. 2020

*Shenzhen Sunwin Intelligent Co. Ltd., China*

Supervisor: Mr. Ping Jia, Senior System Analyst

**Data Analytics & Machine Learning Research Assistant**

Jan. 2020 – Feb. 2020

*Bixi Montreal, Canada*

Supervisor: Mr. Karim Lahrichi, Senior Data Scientist

**Technical Skills****Programming**Python, HTML/CSS, JavaScript/TypeScript,  $\LaTeX$ , C#, SQL, Java**Web Development**

Flask/Django, React, jQuery, Bootstrap

**Data Processing & Analysis**

Pandas, NumPy, Excel, Mathematica, MATLAB, Alteryx

**Data Visualization**

D3.js, Vega-Lite, Tableau, OriginLab

**Machine Learning**

PyTorch, Scikit-Learn

**Graphics Design**

Figma, Adobe Illustrator, Adobe Photoshop

**Game Design & 3D**

Unity, Blender

**Multimedia**

Adobe Premiere Pro, music production

## **Coursework**

### **University of Maryland, College Park**

Information Visualization   Computer Graphics   Human-Subject Study Design

### **University of Michigan, Ann Arbor**

|                             |                            |                                   |
|-----------------------------|----------------------------|-----------------------------------|
| Natural Language Processing | Human-Computer Interaction | Machine Learning                  |
| Cryptography                | Game Design                | Web Development                   |
| Database Management System  | Compiler Design            | Operating System                  |
| Software Engineering        | Computer Security          | Computational Theory & Complexity |
| Computer Organization       | Java Programming           | Data Structure & Algorithm        |

## **Awards**

### **Aerial Messengers: A Modularized Drone System for Supporting Wildfire Suppression**

Yanmei Wang, Xiaoyu Liu, and Dier Hou. *Honorable Mention, 2021 COMAP Mathematical Contest in Modeling*. April 2021.

### **A View of Tunnel Deficiency from Environment and Cyclist Identity**

Xiaoyu Liu. *First Place, 2019-2020 UM-SJTU Joint Institute Academic Writing Contest*. April 2021. URL: [ji-academic-writing](https://academic-writing.com)

### **“Hive of Life” – Instant Hexagonal Modular Shelter**

Xiaoyu Liu, Yijun Yuan, Fan Zhang, Runxi Wang, Yiwei Yin. *Best Presentation Award, 2019 UM-SJTU Joint Institute Winter Design Expo*. December 2019.

### **Pocket Lab: Design and Implementation of High School Chemistry Lab Management System**

Xiaoyu Liu. *First Prize, 33rd Shanghai Adolescents Science & Technology Innovation Contest*. March 2018.