Yibo Liu

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Research Interests

My current research focuses on computer graphics, physics-based simulation, geometry processing, particularly on learning-based paradigms to enhance simulations. Previous research interests included multimodal language models, knowledge base and graph neural networks.

Education

University of Victoria | BC, Canada *Sept 2023 - present*

Ph.D. in Computer Science (Computer Graphics)
Supervisor: Dr. Teseo Schneider

New York University (Courant Institute of Mathematical Science) | NY, USA *Sept 2019 - Dec 2022*

M.S. in Computer Science | GPA: 3.53 / 4

Beijing University of Posts and Telecommunications | Beijing, China *Sept 2015 - June 2019*

B.Eng. in Electronic Information Science and Technology
Thesis: *Breast Cancer Detection with Mask R-CNN*

Uniersity of California, Berkeley | CA, USA *July 2016 - Aug 2016*

Visiting Student, Summer Program

Publications

[SIGGRAPH Asia 2025] "Neural Kinematic Bases for Fluids", **Yibo Liu**, Zhixin Fang, Sune Darkner, Noam Aigerman, Kenny Erleben, Paul Kry, Teseo Schneider. In *ACM SIGGRAPH Asia Conference Proceedings*, Sept. 2025.

[Under Review] "Emergent Crowds Dynamics from Language-Driven Multi-Agent Interaction", **Yibo Liu**, Liam Shatzel, Brandon Haworth, Teseo Schneider. *arXiv* 2508.15047, Aug. 2025.

[CVPR 2024] "MMMU: A Massive Multi-discipline Multimodal Understanding and Reasoning Benchmark for Expert AGI", Xiang Yue, Yuansheng Ni, Kai Zhang, Tianyu Zheng, Ruoqi Liu, Ge Zhang, Samuel Stevens, Dongfu Jiang, Weiming Ren, Yuxuan Sun, Cong Wei, Botao Yu, Ruibin Yuan, Renliang Sun, Ming Yin, Boyuan Zheng, Zhenzhu Yang, **Yibo Liu**, Wenhao Huang, Huan Sun, Yu Su, Wenhu Chen. In *Proceedings of CVPR*, 2024.

[Preprint] "Endowing Language Models with Multimodal Knowledge Graph Representations", Ningyuan Huang, Yash R. Deshpande, **Yibo Liu**, Houda Alberts, Kyunghyun Cho, Clara Vania, Iacer Calixto. *arXiv* 2206.13163, Jun. 2022.

[EMNLP 2021 Workshop] "VisualSem: a high-quality knowledge graph for vision and language", Houda Alberts, Ningyuan Huang, Yash Deshpande, **Yibo Liu**, Kyunghyun Cho, Clara Vania, Iacer Calixto. In *Proceedings of the 1st Workshop on Multilingual Representation Learning*, pp. 138-152, Nov. 2021.

[SIGKDD 2021] "Table2Charts: Recommending Charts by Learning Shared Table Representations", Mengyu Zhou, Qingtao Li, Xinyi He, Yuejiang Li , **Yibo Liu**, Wei Ji, Shi Han, Yining Chen, Daxin Jiang, Dongmei Zhang. In *Proceedings of the 27th ACM SIGKDD Conference on Knowledge Discovery and Data Mining*, pp. 2389-2399, Aug. 2021.

Talks

Oct 2021 | I presented "VisualSem: a high-quality knowledge graph for vision and language" at EMNLP 2021 Workshop on Multilingual Representation Learning.

Experiences

PhD Researcher | University of Victoria *Sept 2023 - present*

- Developed a physics-informed neural framework for real-time fluid simulation; first-author publication accepted at SIGGRAPH Asia 2025.
- Proposed multi-agent orchestration system for crowds animation; mentored a undergrad collaborator; first-author publication under review; ongoing extension on narrative synthesis.
- Working on geometry processing project.

Research Intern | Microsoft Research Asia | Beijing, China *Aug 2020 - Feb 2021*

Data, Knowledge and Intelligence group

- Contributed to the research project *Table2Charts*, which uses reinforcement learning model to generate charts from tabular data; publication accepted at SIGKDD 2021.
- Delivered *Table2Charts* technique to *Bing* search engine and to *Microsoft Excel* spreadsheet intelligence chart recommendation.
- Designed and implemented multilingual key-phrase extraction algorithm for questionnaire word cloud used in *Microsoft Forms* Ideas and in *Microsoft Teams* poll, meeting the online and offline requirements.

Research Assistant | Geometric Computing Lab, New York University *May 2022 - May 2023*

Supervisors: Dr. Teseo Schneider and Dr. Daniele Panozzo

- Contributed to the project *GPU Accelerated Contact Simulations in PolyFEM Library*.
- Implemented CUDA kernels for sparse Newton descent, computing Hessians for elastic energy assembly.
- Integrated an algebraic multigrid (AMG) iterative solver, accelerating large-scale linear solves.

Research Assistant | CILVR Lab, New York University *Mar 2020 - May 2021*

Supervisors: Dr. Iacer Calixto and Dr. Clara Vania

- Developed the project *Learning Robust Mulilingual Multimodal Knowledge Graph Representations*.
- Publication accepted at EMNLP Workshop MRL; presented as the speaker.

Peer Reviewing Services

International Conference on Learning Representations (ICLR) Reviewer	*2026*
AAAI Conference on Artificial Intelligence (AAAI) Reviewer	*2025*
International Conference on Learning Representations (ICLR) Reviewer	*2025*
Transactions on Visualization and Computer Graphics (TVCG) Reviewer	*2024*

Volunteers

Judge | NASA Space Apps Challenges 2025 Victoria | Victoria, Canada	*Oct 2025*
Student Volunteer | SIGGRAPH Asia 2024 | Tokyo, Japan	*Dec 2024*

Teaching Assistantship

Give lectures, lead lab sessions, grade assignments, proctor exams for the following courses:

CSC 586 Geometry Modeling	*2026 winter*
CSC 305 Intoduction to Computer Graphics	*2025 summer*
CSC 116 Introduction to C++	*2024 fall*
SENG 350 Software Architecture	*2024 fall*
CSC 503 & SENG 474 Data Mining	*2023 fall, 2024 winter, 2025 spring*

Skills

Research Expertise: Physics-Based Simulation, Geometry Processing, Fluids Simulation, Crowds Animation, Character Animation, Physics-informed Neural Networks, Agentic AI, Multimodal LLM Understanding, Knowledge Base, Graph Neural Networks;

Graphics: C/C++; Blender, Unity, Paraview; Parallel Computing (CUDA, MPI);

ML/NLP: Python; PyTorch, Tensorflow; Hugging Face Transformers, SpaCy, NLTK, Gensim; OpenCV, PIL, Librosa; NumPy, Pandas, HDF5, SciPy, Scikit Learn;

DevOps: C# (Unity, .NET); Java; HTML/CSS, Django, MySQL; Bash Shell, Git, Linux

Hardware: VHDL, Microcontroller programming, STM32