Zixuan Lu

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Introduction

During my undergraduate studies, I developed a strong foundation in applied mathematics and mechanics, supported by extensive training in engineering and computer science. Building on this, my graduate studies expanded my expertise to encompass computer graphics and high-performance computing, with a focus on research in physics-based animation and simulation. I am passionate about advancing my knowledge in computer graphics and leveraging advanced programming techniques to bring innovative ideas to life.

Educational Background

University of Utah, Karlet School of Computing,
Computing, *Ph.D. in pursuit* 2024.8-Now

Institute of Software, CAS & University of Chinese Academy of Sciences,
Applied Computer Science, *M.S.* 2021.9-2024.6

- **GPA**: 3.71 (avg 85/100, top 25%)
- Merit Student (2023)
- Academic Scholarship (2021, 2022), First Class Academic Scholarship (2023)
- Graduation Project: Projective Peridynamics Modeling For Hyperelasitic Codimensional Body Simulation With Contact Handling, supervised by Xiaowei He, Xueyang Zhu and Xuehui Liu, at Institute of Software, CAS.

University of Chinese Academy of Sciences, Theoretical and Applied Mechanics
(Yonghuai Guo Mechanics Experimental Class), *B.Eng.* 2017.9-2021.6

- **GPA**: 3.47 (avg 80/100)
- Yonghuai Guo Honorary Scholarships (2020, 2021)
- Graduation Project: Simplified model and CFD simulation of vascular bypass surgery, supervised by Shizhao Wang, at Institute of Mechanics, CAS.

Skills

- **Code Language**: C/C++ (advanced), CUDA (advanced), Python3, Shell, MATLAB, CMake
- **Graphic Pipeline**: OpenGL (advanced), Vulkan (a little), glsl
- **Theoretical and Numerical Framework**: CFD (FDM/FVM), FEM, MPM, Peridynamics, Continuum Mechanics (Tensor Analysis/Solid/Fuild Mechanics), Convex/Numerical/Intelligent Optimization
- **Language**: Chinese (native), English

Internship

Style3D Research, Hangzhou 2024.4-2024.8

- Research intern. Supervised by Zhendong Wang.
- Project: Rig-driven 4D garment synthesis.

Research experience

University of Utah, Karlet school of computing 2023.10-2024.5

- Research assistant. Supervised by Yin Yang.
- Real time fast cloth solver based on Projective Dynamics.

Institute of Biophysics, CAS 2020.6-2020.9

- Portable saccade and head-posture monitor instrument for pigeon and the study on its hemiencephalic dominance behavior.
- Training Program of Innovation and Entrepreneurship for Undergraduates. Supervised by Yan Yang.

Institute of Mechanics, CAS 2019.6-2020.6

- Mechanics of nonbuckling interconnects with prestrain for stretchable electronics. Supervised by Yewang Su.

Shenyang Institute of Automation, CAS 2018.7-2018.8

- The six-axis robotic arm kinematics. Awarded as "Excellent Summer Research Practice Project" by University of Chinese Academy of Sciences.

PUBLICATION

Journal

Lei Lan, **Zixuan Lu**, Jingyi Long, Chun Yuan, Xuan Li, Xiaowei He, Huamin Wang, Chenfanfu Jiang, and Yin Yang. 2024. Efficient GPU Cloth Simulation with Non-distance Barriers and Subspace Reuse. ACM Trans. Graph. 43, 6, Article 226 (December 2024), 16 pages. https://doi.org/10.1145/3687760.

- **Z. Lu**, X. He, Y. Guo, X. Liu and H. Wang, "Projective Peridynamic Modeling of Hyperelastic Membranes With Contact," in IEEE Transactions on Visualization and Computer Graphics, vol. 30, no. 8, pp. 4601-4614, Aug. 2024, doi: 10.1109/TVCG.2023.3271511.
- **Lu, Z.**, Quo, L. & Zhao, H. Mechanics of nonbuckling interconnects with prestrain for stretchable electronics. Appl. Math. Mech.-Engl. Ed. 42, 689–702 (2021). https://doi.org/10.1007/s10483-021-2715-7

Conferences

CVM 2023 2023.4, Shenzhen

- **Zixuan Lu**, Xiaowei He, Yuzhong Guo, Xuehui Liu, Projective Peridynamic Modeling of Hyperelastic Membranes with Contact, http://iccvm.org/2023/papers/s9-1-334-TVCG.pdf
- Accepted as regular paper (oral presentation), recommended to IEEE TVCG.

Chinagraph 2022 2022.7, Xining

- **Zixuan Lu**, Hao He, Di Wu, Xuehui Liu, irtual Fiber-based Constitute Model for Anisotropic Material Design[J]. Journal of Computer-Aided Design & Computer Graphics, 2024. Oral reported and recommended to JCAD.

Patent

- Xiaowei He, **Zixuan Lu**, Xuehui Liu, A semi-implicit iterative simulation method for hyperelastic material based on peridynamics, CN2022117179422, in review.

HIGHLIGHT PROJECT

- **Preidyno** group member (Previously). Mainly be responsible for the development of hyperelastic solver, hyperelastic membrane solver and collision handling module. [public repo]
- **Evolutionary computing library**, code implementation of evolutionary computing algorithm (ACA/GA/PSO/SA/TS) for classical NP hard problems and combinatorial optimization problems. [repo]

AWARD

- Image and Graphics Technology Challenge of China Society of Image and Graphics (CSIG) 2023, Real-time fluid particle physics simulation animation and optimization Track, Second Place.
- China Contemporary Undergraduate Mathematical Contest in Modeling (CUMCM) 2020, Provincial first prize (Beijing).