

Xuan LI

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RESEARCH TOPICS

- **Physics-grounded AIGC:** Generate *simulation-ready assets* that can be directly used in downstream tasks in virtual environments, such as robot training and physics-based interactivity.
- **Accurate and efficient physics simulation:** Focus on increasing both accuracy and efficiency of simulations, aiming to shrink the *simulation-to-reality* gap for migrating virtual robot behavior from digital twins to real robots.
- **Differentiable physics:** Utilize differentiable simulations to solve inverse problems such as shape/topology optimization and system identification, facilitating *reconstruction* and *robot design*.

EDUCATION

University of California, Los Angeles

Ph.D. in Applied Mathematics (Advised by Dr. Chenfanfu Jiang.)

Los Angeles, California

Sept 2020 - March 2025 (Expected)

State University of New York at Stony Brook

M.S. in Computer Science

Stony Brook, New York

Aug 2017 - May 2020

Tsinghua University

B.S. in Mathematical Sciences

Beijing, China

Aug 2013 - July 2017

EXPERIENCE

NVIDIA Research

Research Intern (Manager: Dr. Ming-Yu Liu)

Project: Physics-Grounded 4D Generation

Santa Clara, California

June 2024 – Nov 2024

MIT-IBM Watson AI Lab

Research Intern (Manager: Dr. Chuang Gan)

Project: Applications of Differentiable Physics

Cambridge, Massachusetts

Jul 2022 – Sep 2022

Adobe Research

Deep Learning Research Intern (Manager: Dr. Hailin Jin)

Project: SVG Vector Font Generation

San Jose, California

May 2019 – Nov 2019

PUBLICATIONS

1. Chang Yu*, **Xuan Li*** (**equal contributions*), Lei Lan, Yin Yang, Chenfanfu Jiang. XPBI: Position-Based Dynamics with Smoothing Kernels Handles Continuum Inelasticity. *SIGGRAPH Asia*. 2024.
2. Lei Lan, Zixuan Lu, Jingyi Long, Chun Yuan, **Xuan Li**, Xiaowei He, Huamin Wang, Chenfanfu Jiang, Yin Yang. Efficient Cloth Simulation Using Non-distance Barriers and Subspace Reuse. *ACM Transactions On Graphics (SIGGRAPH Asia)*. 2024.
3. **Xuan Li**, Minchen Li, Xuchen Han, Huamin Wang, Yin Yang, Chenfanfu Jiang. A Dynamic Duo of Finite Elements and Material Points. *SIGGRAPH*. 2024.
4. Ying Jiang*, Chang Yu*, Tianyi Xie*, **Xuan Li***, Yutao Feng, Huamin Wang, Minchen Li, Henry Lau, Feng Gao, Yin Yang, Chenfanfu Jiang. VR-GS: A Physical Dynamics-Aware Interactive Gaussian Splatting System in Virtual Reality. *SIGGRAPH*. 2024.
5. Yunuo Chen*, Tianyi Xie*, Zeshun Zong*, **Xuan Li**, Feng Gao, Yin Yang, Ying Nian Wu, Chenfanfu Jiang. Atlas3D: Physically Constrained Self-Supporting Text-to-3D for Simulation and Fabrication. *Arxiv*. 2024.
6. Boqian Li*, **Xuan Li***, Ying Jiang*, Tianyi Xie, Feng Gao, Huamin Wang, Yin Yang, Chenfanfu Jiang. GarmentDreamer: 3DGS Guided Garment Synthesis with Diverse Geometry and Texture Details. *Arxiv*. 2024.
7. Tianyi Xie*, Zeshun Zong*, Yuxing Qiu*, **Xuan Li***, Yutao Feng, Yin Yang, Chenfanfu Jiang. PhysGaussian: Physics-Integrated 3D Gaussians for Generative Dynamics. *Conference on Computer Vision and Pattern Recognition (CVPR)*. **Highlight (11.9%)**. 2024.
8. Yutao Feng, Yintong Shang, **Xuan Li**, Tianjia Shao, Chenfanfu Jiang, Yin Yang. PIE-NeRF: Physics-based Interactive Elastodynamics with NeRF. *Conference on Computer Vision and Pattern Recognition (CVPR)*. 2024.
9. Jessica Weakly*, **Xuan Li***, Tejas Agarwal, Minchen Li, Spencer Folk, Chenfanfu Jiang, Cynthia Sung. Bistable Aerial Transformer

- (BAT): A Quadrotor Fixed-Wing Hybrid that Morphs Dynamically via Passive Soft Mechanism. *Journal of Mechanisms and Robotics (JMR)*. 2024.
10. **Xuan Li**, Yi-Ling Qiao, Peter Yichen Chen, Krishna Murthy Jatavallabhula, Ming Lin, Chenfanfu Jiang, Chuang Gan. PAC-NeRF: Physics Augmented Continuum Neural Radiance Fields for Geometry-Agnostic System Identification. *International Conference on Learning Representations (ICLR)*. **Notable-Top-25%**. 2023.
 11. **Xuan Li**, Yu Fang, Lei Lan, Huamin Wang, Yin Yang, Minchen Li, Chenfanfu Jiang. Subspace-Preconditioned GPU Projective Dynamics with Contact for Cloth Simulation. *SIGGRAPH Asia*. 2023.
 12. Zeshun Zong, **Xuan Li**, Minchen Li, Maurizio M. Chiaramonte, Wojciech Matusik, Eitan Grinspun, Kevin Carlberg, Chenfanfu Jiang, Peter Yichen Chen. Neural Stress Fields for Reduced-order Elastoplasticity and Fracture. *SIGGRAPH Asia*. 2023.
 13. Yu Fang*, Minchen Li*, Yadi Cao, **Xuan Li**, Joshua Wolper, Yin Yang, Chenfanfu Jiang. Augmented Incremental Potential Contact for Sticky Interactions. *IEEE Transactions on Visualization and Computer Graphics (TVCG)*. 2023.
 14. Haozhe Su*, **Xuan Li***, Tao Xue, Chenfanfu Jiang, Mridul Aanjaneya. A Generalized Constitutive Model for Versatile MPM Simulation and Inverse Learning with Differentiable Physics. *Symposium on Computer Animation (SCA)*. 2023.
 15. **Xuan Li**, Yadi Cao, Minchen Li, Yin Yang, Craig Schroeder, Chenfanfu Jiang. PlasticityNet: Learning to Simulate Metal, Sand, and Snow for Optimization Time Integration. *Neural Information Processing Systems (NeurIPS)*. 2022.
 16. Zeshun Zong*, **Xuan Li***, Jianping Ye, Sian Wen, Yin Yang, Danny M. Kaufman, Minchen Li, Chenfanfu Jiang. Topology Optimization with Frictional Self-Contact. *Arxiv*. 2022.
 17. **Xuan Li**, Minchen Li, Chenfanfu Jiang. Energetically Consistent Inelasticity for Optimization Time Integration. *ACM Transactions On Graphics (SIGGRAPH)*. 2022.
 18. **Xuan Li***, Yu Fang*, Minchen Li, Chenfanfu Jiang. BFEMP: Interpenetration-Free MPM-FEM Coupling with Barrier Contact. *Computer Methods in Applied Mechanics and Engineering (CMAME)*. 2022.
 19. **Xuan Li***, Jessica McWilliams*, Minchen Li, Cynthia Sung, Chenfanfu Jiang. Soft Hybrid Aerial Vehicle via Bistable Mechanism. *International Conference on Robotics and Automation (ICRA)*. **Best Paper Award in Mechanisms and Design**. 2021.
 20. Yue Li*, **Xuan Li***, Minchen Li*, Yixin Zhu, Bo Zhu, Chenfanfu Jiang. Lagrangian-Eulerian Multi-Density Topology Optimization with the Material Point Method. *International Journal for Numerical Methods in Engineering (IJNME)*. 2021.
 21. Hui Zhao, **Xuan Li**, Na Lei, Xiaoling Wang, Shaodong Wang, Wencheng Wang, Xiangfeng Gu. Polycube Shape Space. *Pacific Graphics (PG)*. 2019.
 22. Hui Zhao, **Xuan Li**, Huabin Ge, Na Lei, Min Zhang, Xiaoling Wang, Xianfeng Gu. Conformal Mesh Parameterization using Discrete Calabi Flow. *Geometric Modeling and Processing (GMP)*. 2018.
 23. Hui Zhao, Na Lei, **Xuan Li**, Peng Zeng, Ke Xu, Xianfeng Gu. Robust Edge-Preserved Surface Mesh Polycube Deformation. *Pacific Graphics (PG) Short Paper*. 2017.

PATENT

1. Zhaowen Wang, Zhifei Zhang, **Xuan Li**, Matthew Fisher, and Hailin Jin. Differentiable Rasterizer for Vector Font Generation and Editing. US11392806B2. Adobe Inc. 2022.

Media Publicity

- **3DPrinting.com** [Atlas3D: Self-Supporting 3D Models from Text](#)
- **Radiance Fields**. [VR-GS: Physics Based Gaussian Splatting in VR](#)
- **Radiance Fields**. [PhysGaussian gives 3D Gaussian Splatting Physics](#)
- **Medium**. [PhysGaussian Blends Physics with 3D Rendering Innovation](#)
- **Medium**. [Revolutionizing Visualization With New PhysGaussian Technique](#)
- **Medium**. [PhysGaussian: Bridging the Gap Between Physics and 3D Graphics](#)
- **Marktechpost**. [Meet PhysGaussian: An AI Technique that Produces High-Quality Motion Synthesis into 3D Gaussians](#)
- **Two Minute Papers**. [NVIDIA's New AI Is 20x Faster...But How?](#)
- **Radiance Fields**. [PIE-NeRF Serves Up a New Slice: Physics-Based NeRFs](#)
- **Medium**. [Revolutionizing 3D Modeling with PIE-NeRF Innovation](#)
- **Decoder**. [PAC-NeRF learns physical properties of objects from videos](#)
- **UCLA Newsroom**. [UCLA team receives best paper award at international robotics conference](#)

SERVICE

Reviewer

- ECCV 2024
- SIGGRAPH 2023, 2024
- SIGGRAPH Asia 2023
- TVCG 2023
- ICLR 2023
- NeurIPS 2023, 2024
- ICRA 2021
- ACML 2024

Professional Role

- Supporting Chair, Symposium on Computer Animation (SCA), 2023

TEACHING

Teaching Assistant, University of California, Los Angeles

- Math 31A: Differential and Integral Calculus - Fall 2022
- Math 32A: Calculus of Several Variables - Fall 2022
- Math 70: Introduction to Probability - Spring 2023
- Math 151A: Applied Numerical Methods - Winter 2023, Spring 2023, Winter 2024
- Math 164: Optimization - Summer 2023, Fall 2024
- Math 269A: Advanced Numerical Analysis - Fall 2023
- Math 269B: Advanced Numerical Analysis - Winter 2023

Teaching Assistant, University of Pennsylvania

- CIS 563: Physically Based Animation - Fall 2020

Teaching Assistant, State University of New York at Stony Brook

- CSE 215: Foundations of Computer Science (Discrete Mathematics) - Spring 2018
- CSE 303: Introduction to the Theory of Computation - Fall 2017