# XINGJIAN (JESSIE) HAN

Center for Computing & Data Sciences
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https://cs-people.bu.edu/xjhan/

## SUMMARY

PhD in Computer Science with expertise in **computer graphics, machine learning (ML)**, and 3D AI applications. Specialized in deep learning for 3D graphics, physics-informed models, motion synthesis, and generative methods for content creation, with applications in **digital humans, biomechanics, simulation and AI-driven healthcare**.

## TECHNICAL SKILLS

**AI/ML:** PyTorch, LLMs, Transformers, Diffusion Models, Physics-Informed ML, 3D GenAI, Data Curation

**3D/Graphics:** Motion Capture, Digital Avatars, Physical Simulation, Geometric Processing, Digital Manufacturing

**Languages:** Python, C++, MATLAB, Objective-C

**Tools:** Git, Maya, Blender, Houdini, Unreal Engine, Unity, Rhino

## EDUCATION

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|---|---|---|
| **Ph.D. Computer Science** | **Boston University**, GPA: 3.8/4.0<br>Supervisor: Prof. Emily Whiting<br>Focus: Computer Graphics, Digital Humans, Character Animation<br>Thesis: "Physics Infused Human Motion Dynamics and its Applications in Computational Wearable Design", defended March 2025. | Aug 2025 |
| **Visiting Ph.D.** | **The University of Manchester**, Mechanical and Aerospace Engineering<br>Supervisor: Prof. Charlie C.L. Wang.<br>Focus: Digital Manufacturing, AI for Healthcare, 3D Printing | Sep 2024 |
| **B.A. Mathematics** | **University of California, Berkeley**, GPA: 3.5/4.0 | Aug 2018 |

## EXPERIENCE

**Graduate Research Assistant**, *Shape Design & Computation Lab, Boston University* — Boston, MA
Built physics-informed ML pipelines for motion synthesis, wearable design and biomechanics. — Sep 2019-Aug 2025

**GroundLink: A Dataset Unifying Human Body Movement and Ground Reaction Dynamics**
Present a unified dataset comprised of synchronized captured ground reaction force (GRF) and center of pressure (CoP) paired to standard kinematic motion capture to provide streamline applications for character animation and clinical research. Published in SIGGRAPH Asia 2023.

**Knitting 4D Garments with Elasticity Controlled for Body Motion**
Proposed a computational pipeline for designing and fabricating customized tight-fitting knitted garments with elasticity control that consider human comfort during motion. Published in SIGGRAPH 2021.

**Research Assistant**, *Digital Manufacturing Lab, The University of Manchester* — Manchester, UK
Focused on physics-informed motion synthesis and intelligent manufacturing for healthcare. — Oct 2023-Sep 2024

**Motion-Driven Neural Optimizer for Prophylactic Braces Made by Distributed Microstructures**
Proposed a motion-driven neural optimization framework to craft personalized braces that aim to prevent joint injuries while maintaining movement mobility. Published in SIGGRAPH Asia 2024.

**Learning Based Toolpath Planner on Diverse Graphs for 3D Printing**
Present a reinforcement learning (RL) based on-the-fly 3D printing toolpaths planner for applications of wire-frame printing, continuous carbon fiber printing and metallic printing. Published in SIGGRAPH Asia 2024.

**Researcher**, *FlexPal LTD.* (startup) — Manchester, UK
Prototyped soft robotic companion for cognitive applications; demoed at Siemens Transform 2024. — Jun 2024-Jan 2025

**ML Research Intern**, *Creative Intelligence Lab, Adobe Research* — Boston (Remote), MA
Supervisors: Jun Saito, Ruben Villegas — Jun 2021-Nov 2021

**Learn Physics of Human Motion for Character Animation**
Conducted machine learning based animation research for character control. Adopted recurrent mode-adaptive neural networks for motion synthesis with foot contact to improve physics details. Extended to publication.

**Research Intern**, *SIG Center for Computer Graphics, University of Pennsylvania* Philadelphia, PA
Supervisor: Prof. Chenfanfu Jiang May 2018-Mar 2019

**Micropolar APIC Method for Turbulent Fluid**
Proposed and developed a physically based turbulent fluid simulation by integrating Micropolar fluid theory with Affine Particle-In-Cell (APIC) methods, creating a more realistic and energetic rotational flow.

## SELECTED EARLY EXPERIENCE

**Modeling/VR Development Assistant**, *Phoebe A. Hearst Museum of Anthropology, UC Berkeley* Berkeley, CA
Supervisor: Dr. Christopher Hoffman Jan 2018-May 2018

**HeartCAVE 3D Reconstruction**
Developed a multi-platform VR interface for a digital museum experience. Adopted photogrammetry to create and integrated 3D exhibitions models into the HearstCAVE VR. Partnered with Mingei International Museum (UCSD) and UC campuses to enhance museum accessibility and foster immersive, flexible user interactions.

**Research Assistant**, *Department of Electrical Engineering and Computer Science, UC Berkeley* Berkeley, CA
Supervisor: Prof. Carlo H. Sequin Sep 2017-May 2018

**Sculpture Design and Math Models**
Employed various CAD tools (Maya, Blender, Rhino) for the procedural generation of 2-Manifold sculpture geometries, capturing and modifying the features of sculpture work from ceramists (Eva Hild and Charles O. Perry) to create more generalized functions for the design of 2-manifold free-form surfaces.

**Co-Founder**, *MapsReo LLC.* (startup) Berkeley, CA
Led dev team for location-based social app adopted by UC students. Jul 2017-Mar 2018

## PUBLICATIONS

[1] **Xingjian Han***, Yu Jiang* (equal contributions), Weiming Wang, Guoxin Fang, Simeon Gill, Zhiqiang Zhang, Shengfa Wang, Jun Saito, Deepak Kumar, Zhongxuan Luo, Emily Whiting, Charlie C.L. Wang, "Motion-Driven Neural Optimizer for Prophylactic Braces Made by Distributed Microstructures", ACM SIGGRAPH Asia 2024.

[2] Yuming Huang*, Yuhu Guo*(equal contributions), Renbo Su, **Xingjian Han**, Junhao Ding, Tianyu Zhang, Tao Liu, Weiming Wang, Guoxin Fang, Xu Song, Emily Whiting, Charlie C.L. Wang, "Learning Based Toolpath Planner on Diverse Graphs for 3D Printing", ACM SIGGRAPH Asia 2024.

[3] **Xingjian Han**, Benjamin Senderling, Stanley To, Deepak Kumar, Emily Whiting, Jun Saito, "GroundLink: A Dataset Unifying Human Body Movement and Ground Reaction Dynamics", ACM SIGGRAPH Asia 2023.

[4] Zishun Liu, **Xingjian Han**, Yuchen Zhang, Xiangjia Chen, Yukun Lai, Eugeni L. Doubrovski, Emily Whiting, Charlie C.L. Wang, "Knitting 4D Garments with Elasticity Controlled for Body Motion", ACM Symposium on Computational Fabrication (SCF) 2022, Demo & Poster session.

[5] Zishun Liu, **Xingjian Han**, Yuchen Zhang, Xiangjia Chen, Yukun Lai, Eugeni L. Doubrovski, Emily Whiting, Charlie C.L. Wang, "Knitting 4D Garments with Elasticity Controlled for Body Motion", ACM SIGGRAPH 2021.

## INVITED TALK

*"Knitting 4D Garments with Elasticity Controlled for Body Motion"* Apr 2024
Apparel Design Engineering Lab, The University of Manchester Manchester, UK

*"Computational Design for Human Body Movements"* Jan 2025
Sports Research Lab, New Balance Athletics, Inc. Boston, MA

## SERVICES

**Technical paper reviewer** for ACM SIGGRAPH, ACM SIGGRAPH Asia, Computer Graphics Forum

## TEACHING

**CS 131 Combinatoric Structures**, Teaching Assistant, Boston University Summer 2023
**CS 581 Computational Fabrication**, Teaching Assistant, Boston University Spring 2022
**CS 132 Geometric Algorithm**, Guest Lecturer, Teaching Assistant, Boston University Spring 2021
**CS 237 Probability in Computing**, Teaching Assistant, Boston University Fall 2020