Huanyu Chen

(+1) 213-706-4641 • huanyuc@usc.edu • huanyuchen.com

Research Summary

I develop **physics-based and differentiable methods for simulation and geometry** — covering deformable materials, contact, and shape overlap — spanning forward simulation, inverse design, and gradient-based optimization, and working across modern representations such as meshes, point clouds, and Gaussian splats. I am increasingly focused on connecting these differentiable primitives with **learning-based methods** for world models, robotics, and embodied AI.

Education

University of Southern California *Sept. 2021 – present*

Ph.D. candidate in Computer Science (*expected 2027*)
M.Sc. in Computer Science
Advisor: Prof. Jernej Barbič

University of Science and Technology of China *Sept. 2017 – Jun. 2021*

B.Sc. in Mathematics (Honors)
School of the Gifted Young & Loo-Keung Hua Class of Math Talents
Thesis: Efficient Bijective Spherical Parameterizations [link]

Publications

Beyond Kirchhoff–Love: A Volumetric Approach to Thin-Shell Mechanics [link]
Huanyu Chen, Yumeng He, Jernej Barbič
ACM Transactions on Graphics (TOG) 45(6) (SIGGRAPH Asia 2026), Dec. 2026. To appear.

Weak Nonlinearity and Linear Equalization for Isotropic Hyperelastic Materials [link]
Huanyu Chen, Jernej Barbič
Computer Graphics Forum (Symposium on Computer Animation 2026), Jul. 2026. ***Best Presentation Award.***

ANIME-Rod: Adjustable Nonlinear Isotropic Materials for Elastic Rods [link]
Huanyu Chen, Jiahao Wen, Jernej Barbič
ACM Transactions on Graphics (TOG) 44(4) (SIGGRAPH 2025), Aug. 2025.

Capturing Animation-Ready Isotropic Materials Using Systematic Poking [link]
Huanyu Chen, Danyong Zhao, Jernej Barbič
ACM Transactions on Graphics (TOG) 42(6) (SIGGRAPH Asia 2023), Dec. 2023.

ArticulateArena: A Metric for Articulated Kinematics [link]
Yumeng He, Yongfei She, **Huanyu Chen**, Chun Yuan, Peihao Li, Joseph Masterjohn, Yin Yang, Ying Jiang, Chenfanfu Jiang
arXiv preprint arXiv:2609.33931, Sept. 2026. Under review.

Work Experience

Graduate Research Assistant, University of Southern California *Aug. 2026 – present*

Advisor: Prof. Jernej Barbič Project funded by NSF Award No. 2622123, *HCC: Neural Representations of Elastic Materials*
Capturing highly accurate volumetric deformation fields of soft, rubber-like elastic materials via computed tomography (CT) scanning, providing full-interior ground truth for calibrating and validating soft-material simulation models.

Tesla, Palo Alto, CA *May 2026 – Aug. 2026*

Robotics Intern, Optimus Mentors: Dr. Huzaifa Unjhawala, Dr. Bo Zhang
Accelerated high-performance contact computation in the physics engine for humanoid-robot simulation.

Tencent America, Los Angeles, CA *May 2025 – Aug. 2025*

Game Engine Research Intern, LightSpeed Studios Mentor: Dr. Kui Wu

Prototyped a super real-time (1000 FPS), example-based vehicle plastic deformation system for a game engine.

Meta, Redmond, WA *May 2023 – Aug. 2023*

Research Scientist Intern, Meta Reality Labs Mentor: Prof. Miguel Otaduy

Developed grasp-stability metrics for haptics based on control theory, and deployed on grasp pose optimization.

Service

Reviewer for SIGGRAPH, SIGGRAPH Asia, Computer Graphics Forum, Pacific Graphics, Extreme Mechanics Letters, Visual Informatics.

Invited Talks

Isotropic Distortion Energies: One Machine for Parameterization, Deformation, and Dynamics *Oct. 2026*

Guest lecture, MATH 285J, University of California, Los Angeles. [slides & code]

Teaching Experience

Teaching Assistant, University of Southern California

CSCI 520 — Computer Animation and Simulation *Spring 2023, 2025, 2026*

CSCI 570 — Analysis of Algorithms *Fall 2025*

CSCI 350 — Introduction to Operating Systems *Fall 2024*

CSCI 677 — Advanced Computer Vision *Fall 2023*

Awards and Honors

Symposium on Computer Animation (SCA) [link]

Best Presentation Award *Jul. 2026*

University of Southern California

Annenberg Fellowship *(top 10% of admitted PhD students)* *2021 – 2025*

University of Science and Technology of China

Outstanding Graduates *(top 2 students in a class of 62)* *Jun. 2021*

Loo-Keung Hua Scholarship *(top 10% of math students at USTC)* *Dec. 2019, 2020*

National Scholarship *(top 2% of students in China)* *Sept. 2018*

Harvard/MIT Mathematics Tournament (HMMT) [link]

Sweepstakes No. 1 (Four Seasons Education) *Nov. 2016*

Overall Individual No. 25

Princeton University Mathematics Competition (PUMaC) [link]

Geometry A No. 4 *Nov. 2016*

Updated November 2026