

Alvin Shi

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Research Interests

Computer graphics and simulation, with particular focus on abstract phenomena and artist-centered tools and algorithms. Applications in world models, movies, and games.

Education

Yale University, New Haven, CT | 2021 – 2027 (Expected)

- Ph.D., Computer Science | Supervised by Theodore Kim

University of Chicago, Chicago, IL | 2017 - 2021

- BS, Mathematics | Minors in Physics & Media Arts and Design – 3.98/4.00 GPA – Summa Cum Laude

Publications

SIGGRAPH 2026: Shi, A., Bertails, F., Darke, A. M., & Kim, T. (2026). Curvature Space Editing of Highly-Coiled Hair. *Proceedings of SIGGRAPH*

SIGGRAPH 2025: Shi, A., Wu, H., & Kim, T. (2025). Hyper-Dimensional Deformation Simulation. *Proceedings of SIGGRAPH*

SIGGRAPH Asia 2024: Wu, H.*, Shi, A.*, Darke, A. M., & Kim, T. (2024). Curly-Cue: Geometric Methods for Highly Coiled Hair *Proceedings of SIGGRAPH Asia* (*Co-first authors)

The Symposium on Computer Animation (SCA) 2023: Shi, A.*, Wu, H.*, Parr, J., Darke, A. M., & Kim, T. (2023). Lifted Curls: A Model for Tightly Coiled Hair Simulation. *Proceedings of the ACM on Computer Graphics and Interactive Techniques* (*Co-first authors) **(Best Paper Award)**

The Symposium on Computer Animation (SCA) 2023: Shi, A., & Kim, T. (2023). A Unified Analysis of Penalty-Based Collision Energies. *Proceedings of the ACM on Computer Graphics and Interactive Techniques*

Teaching

Building Game Engines (TA) | Fall 2025, Fall 2026

Regular responsibilities were grading and holding office hours. Guest lectured on sprite-sheets and animation control.

Computer Graphics (TA) | Spring 2023, Fall 2023, Fall 2024, Spring 2026

Regular responsibilities were grading and holding office hours. Guest lectured on photorealistic rendering and raytracing. Rated 5.0/5.0 for Spring 2026!

Real-Time 3D Graphics (TA) | Spring 2025

Regular responsibilities were grading and holding office hours.

Advanced Topics in Computer Graphics (TA) | Fall 2022

Regular responsibilities were grading and holding one-on-one preparation meetings with students for their 40-minute paper presentations.

Awards

Certificate of College Teaching Preparation | Poorvu Center | 2027 (Expected)

Earning a certificate requires the student to teach and observe other teachers, participate in workshops provided by the center, and prepare a teaching portfolio with two sample syllabi.

Distinguished Teaching Award | Yale Computer Science | 2025-2026

Only two students in Yale's Computer Science department obtain this award each year.

Best Paper Award: *Lifted Curls* | Symposium on Computer Animation | 2023

Service

Local 33 | Organizer & Trustee | Fall 2022 – Present

As one of two trustees, I regularly verified that all of the union's budgetary deposits and withdrawals were consistent with the financial reports. As an organizer, I was the point of contact for the CS department, notifying students of events, performing orientation presentations, and getting students to sign their membership cards.

CounterGRAPH | Organizer | Fall 2026, 2027

Responsibilities included scheduling the event, handling invitations, and planning writing/discussion sessions.

Summer Geometry Initiative (MIT) | Project Mentor | Summer 2026

For two weeks, I managed four undergraduates and taught them concepts for visualization and geometry-building in higher dimensions.

Countering Racial Bias BoF | Organizer | SIGGRAPH 2025, 2026

Duties included scribing the event, handling invitations, scheduling, and reserving restaurants.

Game Developers Conference (GDC) | Conference Associate | Spring 2024

Duties included greeting panelists, managing lines and badging, maintaining machines during demo sessions, and answering attendee questions.

UChicago Game Design | President | Fall 2019 – Spring 2021

While at UChicago, I was president for two years, establishing UChicago Game Design's online presence during COVID and collaborating with Ashlyn Sparrow and The Media Arts, Data, and Design (MADD) center to make inroads with the greater-Chicago development scene.

Reviewer For: *Proceedings of SIGGRAPH, Proceedings of SIGGRAPH Asia, ACM Transactions on Graphics (TOG), Eurographics.*

Press Coverage

Yale News: *With help from the cosmetics field, animators figure out the math of highly coiled hair.* (2026, July 15). Yale Engineering.

The Washington Post: Ortega, L. (2024, November 30). Animations of coiled hair for Black film characters improve with new algorithms. *The Washington Post*.

The Guardian: Oladipo, G. (2025, February 7). ‘This is Black hair’: Technological advances are making waves in animation. *The Guardian*.

Allure: Gant, E. (2024, November 14). We’re Much Closer to A Disney Princess With Type 4 Hair. *Allure*.

NPR: Rascoe, A. (2025, March 16). An animation breakthrough makes it possible to more accurately illustrate Black hair. *NPR*.

PopCultureBrain: (2025, March 11). *Coming Soon: Real Black Hair in Animation.* TikTok. **14 million views and 1.8 million likes on TikTok!**

Industry Transfer

Blazing a New Trail of Curls, Pixar (SIGGRAPH 2026): By Communicating me and my collaborators’ findings to David Eberle and the research team, Pixar animation incorporated our work in *Lifted Curls* to animate Blaze, a character in *Toy Story 5*.

Practical Methods for Kinky-Coily Hair in Animation Production, Netflix (SIGGRAPH 2026): Through discussions with Curtis Andrus, Michael Davison, and Netflix artists and animators, Netflix animation integrated me and my collaborators’ findings in *Curly-Cue* to their grooming pipeline.

Employment History

Yale Computer Graphics Lab | PhD Student | Sept 2021 – Present

- Developed superhelix-based systems for detailing afro-textured hairstyles
- Reformulated collision energies to accelerate strand, cloth, and flesh simulation
- Created a novel torsion energy for stable twist response in highly-coiled strand simulation
- Implemented and analyzed the use of DCT/DST speedups in model-reduction for fluid simulation

Adobe Research | Research Intern | Jun 2023 – Dec 2023

- Trained neural representations of localized forces for stylized fluid animation
- Formulated novel techniques for auto differentiation of customized frame-matching loss functions

Center for Collaborative Arts and Media | Fellow | Jan 2022 – Jun 2023

- Developed and debugged interactive game development demos for first-time-coders in Unity
- Launched CCAM Discord channel for collaboration with student game development organizations and community outreach initiatives

The Mystery League | Puzzle Developer | Mar 2021 – Jun 2021

- Implemented AR-System for Geographical walkaround puzzle involving 13 geolocations, image-scanning, and independently made high-fidelity 3D Blender models
- Co-developed phone tree traversal puzzle, text adventures, and playtested other multimedia ARGs involving assets made in YouTube, Blender, and the Unity game engine

Hack Arts Lab | Lab Assistant | Sept 2019 – Mar 2020

- Instructed collaborators and patrons on proper use of 3D printers, programmable sewing machines, laser cutters, power tools, and fabrication software
- Collaborated with other assistants to maintain promotional materials, outreach systems, and streamlined checkout interfaces for the Media Arts, Data, and Design Center