XIAO (SEAN) ZHAN

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EDUCATION

Massachusetts Institute of Technology, PhD Student — Sept 2023 - Current
EECS Graduate Alumni Fellowship

Brown University (Applied Math - Computer Science) Bachelor of Science — Sept 2019 - May 2023
CS Honors, CS Senior Prize, Sigma Xi Honors Society

Cate School, Secondary School — Sept 2015 - May 2019
Cum Laude, Graduated with Highest Honor

PUBLICATIONS

CharacterMixer: Rig-Aware Interpolation of 3D Characters. Xiao Zhan, Rao Fu, Daniel Ritchie.
Eurographics 2024.

ShapeCrafter: A Recursive Text-Conditioned 3D Shape Generation Model. Rao Fu, Xiao Zhan, Yiwen Chen, Daniel Ritchie, Srinath Sridhar.
NeurIPS 2022.

EXPERIENCE

Research Intern — May 2022 - Aug 2022
Pixar Research, advised by Mark Meyer — *Pixar Animation Studios, CA*

- Implemented a part-based neural skinning model to predict corrective shapes for character rigging. Outperformed linear blend skinning by an 80% increase in accuracy.
- Conducted literature review, wrote C++ code to augment data, implemented 3 neural models and 2 training pipelines, ran over 100 experiments. Learned to iterate fast and work with large codebases.

Research Assistant — Jan 2021 - Present
Brown Visual Computing — *Brown University, RI*

- **3D Character Interpolation and Generation**, advised by Daniel Ritchie
  - Developed a novel technique to generate and pose new characters by interpolating existing characters of different mesh and skeleton topology.
- **Recursive Text-Conditioned 3D Shape Generation**, advised by Srinath Sridhar, Daniel Ritchie
  - Devised novel neural model for recursive text-to-shape generation: vector-quantized feature embedding for shape representation, BERT for text feature extraction, and conditional autoregressive model for recursive generation.

Lead Full Stack Developer — Jun 2020 – Jun 2021
Boykin Lab — *Brown University, RI*

- Developed two React apps that allow researchers to study people's perception of fairness in criminal justice.
- Used MongoDB and built a Node.js backend API to integrate the two apps and Qualtrics survey tool. Used React-Redux and built an intuitive and user-friendly frontend based on researchers' feedback.

PROJECTS

Single Image Relighting (Graphics) [**Python**] Implemented "Generating Digital Painting Lighting Effects via RGB-space Geometry." Improved the refined lighting stage, expanded on the paper by adding specular highlights.

Path Tracer (Graphics) [C++] Implemented a path tracer with 4 basic types of BRDFs, soft shadows, Russian Roulette path termination and event splitting with BRDF importance sampling and multiple importance sampling.

Mesh Processing (Graphics) [C++] Implemented mesh subdivision, simplification, and denoising.

Finite Element Simulation (Graphics) [C++] Implemented finite element simulation with internal elastic and viscous damping forces, collision detection, and RK4 integration.

ARAP (Graphics) [**C++**] Dissected and implemented "As-Rigid-As-Possible Surface Modeling".

Jello Cube (Graphics) [**C++**] Created a jello cube simulation. Implemented various OpenGL shaders for visualizing the cube, wrote physics environment.

Style Transfer (Vision, ML) [**Python**] Implemented vanilla CNN-based style transfer model that transfers artworks' style onto images. Improved the vanilla model by implementing Adaptive Instance Normalization.

Stereo Vision Reconstruction (Vision) [**Python**] Given 3D markers and 2D point correspondence, reconstructed world coordinates of subjects by estimating cameras' projection and fundamental matrices using RANSAC.

Automated Stock Investment (ML) [**Python**] Created a deep reinforcement learning actor-critic agent to manage portfolio and gain profit (quadrupled initial portfolio value). Significantly improved the agent's performance by adding a lifting layer such that GRUs operate on higher dimensional space.

Fork (Software) [**Java**] Built Fork, a decision-making app that suggests restaurants to groups. Wrote a modular and extensible backend with Java and SQL, helped build the React.js frontend and a concurrent socket module.

Rings (Software) [**React**] Led Hackathon team to develop Rings, a team time management app designed for friends and coworkers. Built a fully functional frontend with React in 1.5 days.

Autonomous Drone Flight (Vision, Software) [**Python**] Programmed a DJI Tello drone, incorporated OpenPose to achieve autonomous flight. The drone is able to track and follow a person and respond to gestures.

ACTIVITIES

- **GAAP Mentor '23-'24** - Massachusetts Institude of Technology
  Mentoring underrepresented undergraduates during the Ph.D. admission process. Having 1-on-1 meetings with two students biweekly and helping them with formulating their thoughts in writing.
- **Teaching Assistant '20-'23** - Intro to Computer Graphics, Deep Learning, Functional Programming
  Created presentations, handouts, and solutions for homework. Held weekly lab sections for students. Graded homework and projects, held 1-on-1 meetings to give students constructive feedback on assignments.
- **President '22-'23, Treasurer '20-'22** - Chinese Student Association
  Coordinate with the Activities Office and outside venues for event planning, set per-semester goals, delegate tasks to each executive-board members and provide guidance. Increased club membership by 20% and funding by 50% compared to past years.

AWARDS

MIT EECS Graduate Alumni Fellowship	2023
Brown CS Senior Prize	2023
Brown CS Undergrad Research Symposium 2nd Place (out of 19 projects)	2023
Brown CS Undergrad Research Symposium Audience Favorite	2022
Brown Undergrad Teaching and Research Award	2021
Hack@Brown 2021 Winner of Contrary Capital Award (1st out of 66 projects)	2021

SKILLS

Languages	Python, C++, C, MATLAB, JavaScript, Java
Libraries	TensorFlow, PyTorch
Frameworks	React, React-Redux, Node.js, Flask
Soft Skills	Problem-solving, Communication, Team Player