

# Fanbo Xiang

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## Research Summary

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My research focuses on machine learning, vision, and robotics. I am currently working on simulated robotics environments. I also have solid background on software system design and HCI.

## Education

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### University of California San Diego

Ph.D. Candidate in Computer Science

2020 - Present

M.S. Computer Science (GPA 4.0)

2018 - 2020

- advisor: **Prof. Hao Su**

### University of Illinois Urbana-Champaign

B.S. Computer Science, B.S. Mathematics Dual Degree (with Highest Honors, GPA 3.97)

2014 - 2018

## Publications

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### Neural Texture Mapping for Volumetric Neural Rendering

Remote

**Fanbo Xiang**, Zexiang Xu, Miloš Hašan, Yannick Hold-Geoffroy, Kalyan Sunkavalli, Hao Su

June 2020 - Nov. 2020

- CVPR 2021 (oral)
- Research on visual capturing, differentiable rendering, and 3D representation at Adobe.
- Disentangle 3D volumetric geometry and 2D appearance in volumetric scene representation.

### SAPIEN: A Simulated Part-based Interactive Environment

San Diego, CA

**Fanbo Xiang**, Yuzhe Qin, Kaichun Mo, Yikuan Xia, Hao Zhu, Fangchen Liu, Minghua Liu, Hanxiao Jiang, Yifu Yuan, He Wang, Li Yi, Angel Chang, Leonidas Guibas, Hao Su

Jan. 2019 - Present

- CVPR 2020 (oral)
- Leading the development of a simulation environment for robotics manipulation and learning tasks.
- Leading the construction of a large-scale articulated body dataset. Developed its annotation interface.
- Designed neural networks for motion parameter estimation.
- Designed OpenGL rasterizer and OptiX raytracer for rendering.

## Academic Experience

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### Project on SPH fluid simulation

San Diego, CA

Project for Physical Simulation

Mar. - June 2019

- Implemented GPU SPH fluid simulation, including solvers for incompressible and high viscosity fluids.
- Implemented GPU marching cube, raytraced water rendering, foam and spray generation.

### Music Generation with MusicVAE and GAN

San Diego, CA

Project for Deep Learning for Sequences

Dec. 2018 - Mar. 2019

- Implemented a symbolic music generator combining MusicVAE and GAN networks.

### Project on Denoising Ray Traced Rendering

San Diego, CA

Project for Sampling and Reconstruction of Visual Appearance

Sept. 2018 - Dec. 2018

- Implemented the Adaptive Rendering with Non-Local Means Filtering using Optix and CUDA.

### HCI Researcher

Champaign, IL

MUS-ROVER project (instructed by prof. Lav Varshney)

Dec. 2016 - Dec. 2017

- Developed the web server for MUS-ROVER, an experimental platform for machine learning and teaching on music theory.
- Developed data visualization algorithms to interpret music theory results learned by language models.

## Game Developer

Association of Computing Machinery(ACM), SigMusic

*Champaign, IL*

*Jan. 2015 - May. 2018*

- Led development of games that are exhibited at Engineering Open House events.
- Built games with Unreal 4, web-based game engines, Kinect sensor, and hardware designed by our group. Collaborated with electrical engineers to design games with custom hardware inputs.

## Software Developer

DISSCO Experimental Computer Music Software

*Champaign, IL*

*Jan. - May. 2018*

- Maintained software for multi-threaded and distributed music synthesis.
- Added music synthesis methods and improved graphical interface written in GTK(C++).

## Working Experience

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### Robotics Simulation Intern

NVIDIA

*Remote*

*June - Sept. 2021*

- Research on robotics and physical simulation.

### Research Intern

Adobe

*Remote*

*June - Sept. 2020*

- Research on graphics and computer vision.
- Focus on neural capture and differentiable rendering.

### GPU Software Performance Intern

Apple Inc.

*Cupertino, CA*

*June - Sept. 2019*

- Profiling software performance for iOS applications.
- Improving GPU workloads on iOS with machine learning using CoreML framework.
- Developing applications with Objective-C and Metal.

### Software Engineer Intern

Intelligent Medical Objects

*Champaign, IL*

*May - July 2017*

- As a full stack engineer, developed Web API with ASP.NET(C#).
- Developed Web front-end with Angular 2. Developed mobile client with React-native/Redux.

## Teaching Experience

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### Teaching Assistant

Machine Learning Meets Geometry

*San Diego, CA*

*Jan. - Mar. 2021*

- Teaching geometry, computer vision, computer graphics, 3D machine learning.

### Teaching Assistant

Computer Vision

*San Diego, CA*

*Sept. - Dec. 2019*

- Teaching linear algebra, detection, tracking, and deep networks.

### Course Assistant

Introduction to Algorithms & Models of Computation

*Champaign, IL*

*Aug. - Dec. 2016*

- Teaching regular languages, Turing machine, NP-completeness, graph algorithms and dynamic programming.

## Other Skills

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<b>Programming</b>	C++, Objective-C, Python, Web(NodeJs, Angular 2), GPU(Vulkan, GLSL, CUDA, Metal)
<b>Machine Learning</b>	PyTorch, Tensorflow, CoreML
<b>Development</b>	Git, Docker, Xcode, Vim
<b>Game Engines</b>	Unreal, Unity
<b>Art</b>	3D Modeling in Blender, Image Processing in GIMP, Basic Music Composition