

Amarnath Murugan

Graphics Programmer

amarnath.murugan@utah.edu | Portfolio | LinkedIn | Github

EDUCATION

MS in Computing, Graphics & Visualization track

University of Utah

4.0/4.0 GPA | Graduating through a project on 3D Modelling

Aug 2022 - May 2024 (expected)

Salt Lake City, Utah, USA

Bachelor of Technology in Computer Science Engineering

SRM Institute of Science & Technology

Admitted with a 50% merit scholarship | Graduated with an overall score of 89%

Jul 2015 - May 2019

Kattankulathur, India

SKILLS

Skillset: Graphics Programming, Game Development, GPGPU, HCI, 3D Art workflow | **Programming:** C++, C#, Python, Julia

Libraries: OpenGL, CUDA, PyTorch, OpenMP | **Software:** Unity, Unreal, RenderDoc, NSight Compute, NSight Systems

WORK EXPERIENCE

Research Assistant

Realistic Computer Graphics Lab, University of Utah

Aug 2023 – Present

Salt Lake City, Utah, USA

- Working with Dr. Cem Yuksel on a research project for making 3D modelling easier
- Implemented geometry picking and manipulation features on a custom OpenGL/C++ engine
- Implemented sculpting using compute shaders that directly manipulate vertex buffers in the GPU

Research Assistant

High-Performance Computing Research Lab, University of Utah

Jan 2023 – July 2023

Salt Lake City, Utah, USA

- Implemented the SUMMA algorithm in Julia for distributed large tensor contractions
- Ported a finite-volume simulation CPU subroutine to GPU in Julia using CUDA. Reduced runtime from 8 s to 0.6 ms

Technical Director

Manhole Collective

Aug 2021 – Dec 2021

Mumbai, India

- Oversaw the production of the 3D animated short film '[Manhole](#)', which was funded by and created in Unreal Engine
- Created shaders for toon shading, animated wetness on skin, sewage surface animation and rendering
- Wrote custom scripts for automating mocap retargeting and adding buoyancy to a third-party fluid sim plugin
- Managed project timeline and collaboration with third-party artists. Contributed to texturing, lighting, & prop animation

Research Assistant

IMXD Lab, Indian Institute of Technology Bombay

Aug 2019 – Jan 2022

Mumbai, India

- Worked on AR/VR HCI research projects. Published 1 paper, 5 posters and 2 demos at reputed ACM & IEEE conferences
- Developed applications for HoloLens, Oculus Quest, HTC Vive, and Android using Unity

Internships

- Completed three internships related to AR/VR development using Unity at XR Labs, Merkel Haptic Systems & IMXD Lab

PROJECTS

Real-time Softbody Simulation

- Implemented mass-spring systems that run at 60 fps with large timesteps using [block coordinate descent](#) & Newton's method

Nov 2023

Hair Rendering & Simulation

- Implemented three hair shading algorithms, i.e Kajiya-Kay, LUT-based Marschner, and Procedural Marschner
- Added collisions and strand-strand interactions to a discrete elastic rods simulation. Also improved anisotropic hair stability

Apr 2023

Disk Parameterization & Remeshing

- Implemented disk parameterization for genus-0 meshes and remeshing based on the paper "[Interactive Geometry Remeshing](#)"

Apr 2023

Rendering & Animation Coursework

- Developed an OpenGL renderer in C++ with Blinn-Phong shading, shadow mapping, reflections & rigidbody dynamics

Jan 2023 - Apr 2023

Signed Distance Field (SDF) Shaders

- Wrote raymarched SDF shaders to render the mandelbrot, the mandelbulb & the character 22 from Pixar's Soul [\[Link\]](#)

Jul 2020 - Apr 2021

AWARDS

Third Place, Unreal India Shorts Program 2021

- Competed against renowned studios as an independent team to make an animated short film in 3 months. Won \$15,000

Dec 2021

First Place, Smart India Hackathon 2017

- Developed an AR/VR app for museums and won 100,000 Indian rupees, besting 52 teams comprising 230 participants

Apr 2017

COURSES

CS6610 Interactive Computer Graphics • CS6160 Computational Geometry • CS6660 Physics-Based Animation • CS6640 Image Processing • CS6230 High-Performance Computing • CS6353 Deep Learning • CS 6210 Scientific Computing