

AMARNATH MURUGAN

GRAPHICS PROGRAMMER | RESEARCHER

CONTACT

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LINKS

[Portfolio](#) | [LinkedIn](#) | [Github](#)

EDUCATION

MS CS, Graphics & Viz Specialization

University of Utah

GPA: 4.0/4.0

2022 - 2024

B.Tech Computer Science & Engineering

SRM Institute of Science & Technology

89% Score | 50% Merit Scholarship

2015 - 2019

TECHNICAL SKILLS

PROGRAMMING

C | C++ | C# | Python | Julia | GLSL

SOFTWARE

Unity | Unreal | Substance Painter

LIBRARIES

OpenGL | CUDA | PyTorch | Skimage |

OpenMP | MPI

SERVICE & TEACHING

Graduate Teaching Assistant | Univ Utah

08/2022 - 12/2022

TA for [COMP1010](#) - Programming for all.

Volunteer | SIGGRAPH RCDC

Since 02/2021

Working towards establishing a

[mentorship program](#) for undergrads

Student Ambassador | Unity

11/2017 - 06/2019

Conducted events to democratize Game development among students

AWARDS

Manhole | 3rd, Unreal Shorts Challenge

12/2021

Competed against renowned studios & filmmakers and won \$15,000 [\[Link\]](#)

Winner | Music Hack Day, Mumbai

12/2019

Won best music hack for building a multi-user VR tool for music collaboration

Winner | Smart India Hackathon '17

04/2017

Won the World's largest Hackathon at the time for an AR/VR museum app

COURSES

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

WORK EXPERIENCE

Research Assistant | University of Utah

Since 01/2023

Working on a GPU port of a Finite-Volume simulation. Reduced the runtime of a 8 second CPU-side subroutine to 600 μ s using CUDA

Technical Director | Manhole Collective

03/2020 - 01/2022

Oversaw the creation of the real-time animated short-film '[Manhole](#)', which was funded by and created in Unreal Engine. The film was screened at 5 film festivals including the prestigious *Annecy festival*

Research Assistant | IMXD Lab, IIT Bombay

02/2019 - 01/2022

Conducted research on narratives and novel interaction techniques for VR & AR. Produced 8 publications at international conferences

Virtual Intern | Empathic Computing Lab

05/2021 - 08/2021

Worked on compute shaders in Unity for editing volumetric videos

Research Intern | IMXD Lab, IIT Bombay

06/2018 - 07/2018

Conducted research on passively interactive live-action VR films

Intern | Merkel Haptic Systems

06/2017 - 07/2017

Implemented medical training and visualization demos in AR & VR

Intern | XR Labs, Chennai

12/2016 - 01/2017

Created remote monitoring and product viz demos for Hololens

PROJECT HIGHLIGHTS

Graphics Programming

Since 02/2020

- Implementing an *OpenGL* renderer in C++ that supports Blinn-Phong shading, textures, shadows, planar reflections.
- Worked on a discrete elastic rods based real-time hair system. implemented Marschner's shading model, collisions with Rigidbodies using PBD and voxel-based strand-strand repulsion.
- Implemented remeshing using disk parameterization of 3D Models.
- Implemented RigidBody & Softbody dynamics in C++.
- Wrote a raytracer with support for dielectrics, non-uniform volumes, and Bounding Volume Hierarchy.
- Wrote raymarched shaders that uses SDFs to render fractals and a volumetric animated 22 from Pixar's Soul [\[Shadertoy\]](#)

Deep PBR textures

11/2022 - 12/2022

- Implemented three modified versions of the ResNet architecture to regress a lit image to diffuse, normal & roughness maps

Manhole - Short Film

03/2020 - 01/2022

- Implemented an animated wet & grimy look for a character model through *shaders* based on a technique from '[Last of Us 2](#)'
- Wrote a script to automate retargeting of an hour of mocap data
- Implemented buoyancy on an interactive fluid simulation plugin by sampling density & velocity buffers while smoothing aliasing issues

PUBLICATION HIGHLIGHTS

- Murugan, A., Vanukuru, R., & Pillai, J. Towards Avatars for Remote Communication Using Mobile Augmented Reality | [IEEEVR'21](#)
- Sakhardande, P., Murugan, A., & Pillai, J. S. Exploring Effect of Different External Stimuli on Body Association in VR | [IEEEVR'20](#)
- Pillai, J. S., Murugan, A., & Dev, A. Cinévoqué: Design of a Passively Responsive Framework for Seamless Evolution of Experiences in Immersive Live Action Movies | [INTERACT'19](#)

SPEAKING ENGAGEMENT HIGHLIGHTS

24 Hours of Chaos

09/2021

Spoke on the development process of the film 'Manhole'

Unite India

12/2018

Spoke on 'Interest driven Cinematic VR' at Unity's national conference