

# AMARNATH MURUGAN

RESEARCHER | GRAPHICS PROGRAMMER

## LINKS

[Mail](#) | [Portfolio](#) | [LinkedIN](#) | [Github](#)

## EDUCATION

### MS CS, Graphics & Viz Specilization

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

### SOFTWARES

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

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

## WORK EXPERIENCE

### Research Assistant | University of Utah

Since 01/2023

Conducting research on accelerating Tensor operations through distributed computing and parallel execution in the GPU

### 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 the prestigious *Annecy film festival* and 4 other fests

### Research Assistant | IMXD Lab, IIT Bombay

02/2019 - 01/2022

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

### 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

### Graphics Programming

02/2020 - 08/2021

- Wrote compute shaders in HLSL to interactively modify point clouds
- Implemented a *OpenGL* renderer in C++ that can read .obj 3d models and render them using blinn shading, with added support for lights, textures and object transforms
- Wrote a raytracer from scratch in C++ with support for dielectrics, non-uniform volumes, and Bounding Volume Hierarchy.
- Wrote interactive raymarched shaders that uses SDFs to render fractals and a volumetric animated 22 from Pixar's Soul [\[Shadertoy\]](#)

### Cinévoqué

06/2018 - 06/2019

- Designed and implemented a system for live-action VR filmmaking, that can be used to create a passively responsive experience where the story evolves based on the user's gaze

## 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