AMARNATH MURUGAN

GRAPHICS PROGRAMMER | RESEARCHER

CONTACT

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LINKS

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

- 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 µs 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 reflectioncs.
- Worked on a discrete elastic rods based real-time hair system. implemtend Marschner's shading model, collisions with Rigidbodies using PBD and voxel-based strand-strand repulsion.
- Implemented remeshing using disk parameterization of 3D Models.
- Implemeted Ridigbody & 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