

Shashwat Suri

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Education

University of British Columbia

Master's in Science, Majoring in Computer Science

- GPA: 4.0
- Awarded: International Tuition Award

August 2023 – Present

Vancouver, British Columbia, Canada

University of British Columbia

Bachelor's in Science, Majoring in Computer Science

- GPA: 3.7
- Awarded: Outstanding International Student Scholarship (OIS)
- Accomplished 16 months of industry experience under the Co-op program

August 2016 – May 2021

Vancouver, British Columbia, Canada

Specialized Skills

Vision Skills

- **Neural Radiance Fields** - Experience with NeRFs implementations, especially ones involving humans (ANeRF, DANBO, NPC) and self-calibrating NeRFs (SCNeRF, FocalPose, CamP)
- **Gaussian Splatting** - Explored various uses of Gaussians, including Optical Flow (4DGS, DeformGS), Shape from Template and Simulation capabilities like PhysGaussian
- **Deformation** - Implemented works performing Non-rigid Deformation and Non Rigid SfM
- **Classic Vision Techniques** - Have implemented and compared various classic Vision Techniques including SfM, PointNet, Bundle Adjustment, Text Analysis/Synthesis, CNNs, GANs etc

Graphics Skills

- **Simulation and Optimization** - worked with Different Eulerian, Lagrangian, and hybrid simulations using NVIDIA's Ecosystem (Omniverse, Warp, USDs) and Blender
- **Geometry Processing** - Familiar with civil engineering object representations, platforms like Blender, Unreal, and Unity, Implemented various meshing algorithms including simplification, remeshing, etc.
- **Rendering and Rasterization** - Assisting teaching courses on graphics currently, can work on shader files, worked on various shading and reflection algorithms

Machine Learning Skills

- **Deep Learning and Neural Networks** - Have worked with MLPs and CNNs for various architectures, LSTMs and GNNs for Reinforcement Learning Models, Attention Cross Attention Transformer models like GPT and ViT.
- **Classical ML Techniques** - Linear Regression, SGD, KNN, KMeans, Radial Basis Functions, Bayesian Networks etc.

Programming Languages: Python, C++, C#, Julia, Matlab, SQL, GLSL, GLTF, C, JavaScript, Java

Paradigms: Pytorch, Pytorch3d, Torchvision, Gymnasium (Reinforcement Learning), Eigen, Libgl,

Platforms: Blender, Rhino, CAD, Unreal, Unity, GitHub, Azure

Work Experience

Research Assistant - University of British Columbia **May-July 2024**
Sensorimotors Lab *Vancouver, BC, Canada*

- Processing 3D Human Data Capture for Lululemon
- Deformation fields were used to interpolate shapes between periodically captured humans

Research Assistant - University of British Columbia **January – May 2024**
Visual AI for Humans Lab and Sensorimotors Lab *Vancouver, BC, Canada*

- Executed a 3D Capture Dataset of Humans under Dr. Helge Rhodin and Dr. Dinesh Pai
- The project offered ground truth meshes of humans, a calibrated tri-camera setup, and evaluated the leading shape estimation models

Software Developer - Mott Macdonald Canada Limited **May 2021 - August 2023**
Digital Advancement Network *Vancouver, BC, Canada*

- Implementation of potential traffic collision avoidance solution using computer vision-based predictive algorithms and vehicle tracking.
- Co-developed a Geometry Data Management firmware to attach archivable, nested metadata to engineering models.

Research Assistant - University of British Columbia **January – May 2021**
Visual AI for Humans Lab *Vancouver, BC, Canada*

- Researched Direct Linear transformations and their application in human pose estimation under Dr. Helge Rhodin.
- Developed human tracking scripts through visual computation to research the accuracy and robustness of my closed-form implementation.

Software Developer Co-op - Mott Macdonald Canada Limited **May – December 2019**

Digital Advancement Network *Vancouver, BC, Canada*

- Developed for Safestroll - A smart city app to guide kids in safely navigating between school and home.
- Designed and implemented a .NET library to facilitate functional independence between Station-based and modeling geometry.

Software Developer Co-op - Mott Macdonald Canada Limited **January – August 2019**

Digital Advancement Network *Vancouver, BC, Canada*

- Implemented novel meshing algorithms to achieve interoperability within engineering design software.

Project Lead - University of British Columbia **January 2020 – May 2020**
Emerging Media Labs *Vancouver, BC, Canada*

- Project Lead for 3D Metabolism – an Augmented Reality (AR) solution to aid Biochemistry and Microbiology students visualize metabolism.
- Designed an AR app SynesthesiAR to map Fourier Transform pitch detection into visuals.

Publications

SimMaterial: Evaluating Materials through Differentiable Simulations **March 2025**

Targeting IEEE International Conference of Computer Vision *Honolulu, Hawaii*

- Used Time Varying Gaussians to track the deforming object through optical flows
- Used a physics-informed neural network and a differentiable simulator to get good estimations of simulation materials

Learning Simulatable Models of Cloth with Complex Constitutive Properties

January 2025

Submitted to 2025 IEEE Major Conference

Vancouver, Canada

- Used Differentiable Simulations to learn spring mass connections, and dampening and material parameters to represent cloth-like materials.

CasCalib: Cascaded Calibration for Motion Capture from Sparse Unsynchronized Cameras

August 2024

IEEE International Conference on Automatic Face and Gesture Recognition

Istanbul, Turkey

- Used a cascading style of calibration to address Multiview calibration and synchronization.
- Paper was built on top of my Directed Study DLT Project

HAR: Human Activity Recognition

August - December 2019

BC AI Showcase 2019

Vancouver, BC

- Predicted human activity using smartphone accelerometer data
- Used Multi-class Logistic Regression (MLR) and Radial Basis Functions (RBF)

Research Projects

SDF Colliders in Material Point Method

September–December 2024

Sensorimotors Lab

Vancouver, BC

- Implemented collider detection using Signed Distance Fields (SDFs) colliders
- Implemented code for Rendering, Detecting and Handling Collisions in Material Point Method in Nvidia Warp

Learning Heightfields through Physical Rendering

January–April 2024

Visual AI for Humans Lab

Vancouver, BC

- Leveraging Differentiable Renderers like Mitsuba 3 to learn heightfields
- Representing Objects as a combination of heightfields helps in storage and texturing of meshes

Database: Human NeRF shape accuracy

September – December 2023

Visual AI for Humans Lab and Sensorimotor Systems Lab

Vancouver, BC

- Implemented simultaneous capture of humans through motion capture, video capture, and scanning as a way to test shape accuracy of implicit models
- Have currently checked the database on multiple models including DANBO, NPC, and Vid2Avatar

Camera Preconditioning for Self-Calibrating Neural Body Models

Visual AI for Humans Lab

Vancouver, BC

- Used preconditioning for self-calibrating NeRF models using ZCA whitening to improve the robustness of NeRF models against camera noise
- Observed a marked difference against synthetic camera noise on multiple Human NeRF models

Direct Linear Transformation for Human Pose Estimation and 3D Plane Reconstruction

Jan – May 2021

Visual AI for Humans Lab

Vancouver, BC

- Formulated a closed form solution for 3D-Reconstruction using human pose estimation
- This work was used and credited in 2 thesis: M-NeRF and CasCalib