Shashwat Suri

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Education

University of British Columbia
Master's in Science, Majoring in Computer Science

August 2023 − Present
Vancouver, Canada

- GPA: 4.0
- Awarded: International Tuition Award

University of British Columbia
Bachelor's in Science, Majoring in Computer Science

August 2016 - May 2021
Vancouver, Canada

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

Specialized Skills

Computer Vision Skills

- *Neural Radiance Fields* - Human-oriented (ANeRF, DANBO, NPC) and self-calibrating (SCNeRF, CamP)
- *Gaussian Splatting* - Optical Flow (4DGS, DeformGS), Shape from Template (GaMeS, SuGaR) and Simulation (PhysGaussian, SpringGauss)
- *Classic Vision Techniques* - SfM, PointNet, Bundle Adjustment, Text Analysis/Synthesis, CNNs, GANs etc

Graphics Skills

- *Simulation* - Discretizations (Eulerian, Lagrangian, Hybrid), Blender, NVIDIA's Ecosystem (Omniverse, Warp, USDs)
- *Geometry Processing* - Civil Engineering (Rhino, CAD), Game Dev (Unreal, Unity), Mesh and Topology Processing (Subdivision, Remeshing)
- *Rendering and Rasterization* - Shaders (glsl), Differentiable Rendering (mitsuba 3)

Software Engineering Skills

- *DevOps* - Azure WebApps, Azure Functions, GitHub Functions and Azure/Docker Containers
- *Programming Languages* - Python, C#, C++, Bash, PowerShell, Java and PostgreSQL
- *Environments* - Azure, Git, AWS, VS/VSCode, Vim/NeoVim, Windows and Linux

Machine Learning Skills

- *Deep Learning and Neural Networks* -MLPs, LSTMs, GNNs, Reinforcement Learning Models, GPT, ViT, Cross-attention transformer models.
- *Classical ML Techniques* - SGD, KNN, KMeans, RBFs, SfM, CNNs, GANs 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
Visual AI for Humans Lab and Sensorimotors Lab

August 2023 − Present
Vancouver, Canada

- Leveraged deformation fields to interpolate shapes between periodically captured human meshes to be used for a project with a sportswear company
- Independently executed a 3D Capture Dataset of Humans under Dr. Helge Rhodin and Dr. Dinesh Pai.
- Invited as a Research Scientist to Bielefeld University in Germany to collaborate on research regarding deforming Gaussians under Dr. Rhodin

Software Developer - Mott MacDonald
Digital Advancement Network

May 2021 - August 2023
Vancouver, Canada

- Collaborated with data architects for requirement gathering and designed project management dashboards in Microsoft PowerBI. The project required active collaboration with stakeholders, comprehensive documentation, solutioning, standards compliance, and meeting dynamic requirements through scrum practices and agile workflow
- Individually hosted and owned multiple Azure DevOps microservices through Docker, PostgreSQL, Redis and Azure containers. This was used by core engineering team for Toronto Transit Commission Scarborough Extension Project
- Created various project templates for version history, data robustness and automated deployments using GitHub workflows, Azure Function Apps and GitHub Functions
- Co-developed a Geometry Data Management API to attach archivable metadata to engineering models using contemporary software development practices

- Ensured prompt technical support and high availability of engineering application environments by prompt monitoring, incident and problem management, root cause analysis and remediation
- Organized and collaborated on multiple digital advancement initiatives, developing system integrations, automating and streamlining release pipelines through Git and Azure tools, and documenting best development practices

Research Assistant - University of British Columbia   January − May 2021
Visual AI for Humans Lab   *Vancouver, Canada*
- Researched Direct Linear Transformations and their application in human pose estimation under Dr. 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   May − December 2020
Digital Advancement Network   *Vancouver, Canada*
- Demonstrated quick requirement assimilation and solution development by generating and presenting novel visualizations for stress testing in SAP applications within 2 weeks of project bidding.
- Configured and enhanced existing engineering environments like Autodesk and Rhino by designing and implementing .NET libraries, facilitating functional independence between station-based and modeling geometry.

Project Lead - University of British Columbia   January 2020 − May 2020
Emerging Media Labs   *Vancouver, Canada*
- Lead 3D Metabolism Project - an Augmented Reality solution to aid Biochemistry students visualize metabolism.
- Designed an AR app - *SynesthesiAR*, which maps Fourier Transform pitch detection into visuals.

Software Developer Co-op - Mott MacDonald   January − August 2019
Digital Advancement Network   *Vancouver, Canada*
- Implemented novel meshing algorithms to achieve interoperability within engineering modeling and CAD-based design software. These implementations were meticulously documented and presented to engineers and stakeholders
- Delivered new solutions and enhancements using existing low-code tools like PowerShell automations scripts to enhance software asset management and compliance in the company

Publications

SimMaterial: Evaluating Materials through Differentiable Simulations   March 2025
Targeting IEEE International Conference of Computer Vision   *Honolulu, Hawaii*
- Time Varying Gaussians to track the deforming object through optical flows
- Physics-informed neural network with differentiable simulators to estimate constitutive materials

Learning Simulatable Models of Cloth with Complex Constitutive Properties   January 2025
Submitted to 2025 IEEE Major Conference   *Vancouver, Canada*
- Differentiable Simulations to learn mass-spring connections and material parameters to represent cloth-like materials.
- Conference name avoided due to submission instructions, script and submission details can be provided upon asking

CasCalib: Cascaded Calibration for Motion Capture   August 2024
from Sparse Unsynchronized Cameras
IEEE International Conference on Automatic Face and Gesture Recognition   *Istanbul, Turkey*
- Cascading style of calibration to address multiview calibration and synchronization.
- Devised novel direct linear transformation algorithms, multiperson conditions and time synchronization

HAR: Human Activity Recognition   December 2019
BC AI Showcase 2019   *Vancouver, Canada*
- Predicted human activity using smartphone accelerometer data
- Used Multi-class Logistic Regression (MLR) and Radial Basis Functions (RBF)

Projects

SDF Colliders in Material Point Method   **September–December 2024**

Sensorimotors Lab   *Vancouver, Canada*
- Designed and implemented implicit simulatable geometry though Signed Distance Fields
- Implemented code for 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, Canada*
- 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, Canada*
- 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   **September - December 2023**

Visual AI for Humans Lab   *Vancouver, Canada*
- Used preconditioning for self-calibrating NeRF models using ZCA whitening to improve the robustness of NeRF models against camera noise
- Achieved a marked difference against synthetic camera noise on multiple Human NeRF models

Direct Linear Transformation for Human Pose Estimation and 3D Plane   **January - May 2021**
Reconstruction (Directed Learning Project)

Visual AI for Humans Lab   *Vancouver, Canada*
- Formulated a closed form solution for 3D-Reconstruction using human pose estimation
- This solution was used and credited for pose based calibration in 2 theses: M-NeRF and CasCalib