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EDUCATION

University of Alberta, Faculty of Science

BSc in Computing Science (Mathematics Minor)

Edmonton, Alberta

Graduated June 2025

- Grade Point Average (Last 60 credits): 3.15 / 4.00
- Key courses: Computer Vision (A), GPU Programming (A+), Machine Learning (B+), Numerical Methods (A-), Algorithms and Data Structures; Linear Algebra I–III, Ordinary Differential Equations, Applied Statistics
- University of Alberta Programming Contest (2022)

PROJECTS

Turbulent Flow PINN (CFD to Real-time Surrogate)

Python / PyTorch / OpenFOAM / ParaView

PINN surrogate for turbulent flow reconstruction with interactive visualization

Winter 2024

- Generated ~90GB OpenFOAM CFD dataset; visualized Q-criterion and streamlines in ParaView.
- Implemented PINN PDE residual losses with PyTorch autograd; tracked train/val loss for generalization.
- Deployed a compact ~10MB surrogate in a real-time Tesla valve flow-field viewer at real-time 60 FPS.

Incremental SfM + 3D Gaussian Splatting Pipeline

C++ / OpenCV / Ceres / CUDA / Python

Team project: COLMAP-style SfM + exporter for Gaussian Splatting training

Spring 2025

- Owned core SfM pipeline: EXIF intrinsics, SIFT, GPU KNN matching, and E-matrix RANSAC initialization.
- Registered views via solvePnP/Ransac; refined with local/global Bundle Adjustment in Ceres (robust loss).
- Exported COLMAP-compatible outputs plus a Python converter to feed 3D Gaussian Splatting training.

Personal Portfolio Website

Next.js / React / TypeScript / Tailwind CSS

Interactive portfolio site with cloud-backed media and mobile-first performance tuning

2025–Present

- Built reusable UI components and video playback tools for project pages; integrated cloud media storage/CDN; optimized mobile UX, visual polish, and load performance; used UI/FX libraries; validated on Chrome/Safari.

SELECTED MINI PROJECTS

8-DoF Homography Tracker

C++ / OpenCV

Lucas–Kanade + Gauss–Newton planar tracking under perspective change

2025

- Implemented an 8-DoF homography tracker for a user-selected planar ROI using Lucas–Kanade and Gauss–Newton updates; stabilized tracking under rotation, scale, and perspective changes.

RISC-V Snake Game

RISC-V Assembly

Memory-mapped I/O, game loop, and low-level input handling

2022

- Built a complete snake game in RISC-V assembly with a fixed-timestep update loop, collision and scoring logic, and memory-mapped display/keyboard I/O on a simulated target.

Edmonton Route Finder

C++ / Python (pygame)

Client–server shortest-path routing with FIFO (named pipes) IPC

2022

- Built a lightweight route planner: a pygame map client sends two clicked coordinates via FIFO pipes; a C++ server snaps to nearest vertices and returns waypoint streams using Dijkstra on a directed road graph.

TECHNICAL SKILLS

AI/ML Engineering:

PyTorch; model design and training (data pipelines, loss functions, validation); physics-informed learning (PDE residuals via autograd); evaluation and error analysis.

AI-assisted Development:

LLM-aided coding and refactoring; debugging and log-driven iteration; test generation; documentation and code review; rapid prototyping for scripts, tooling, and demos.

Computer Vision & 3D:

OpenCV; SIFT; RANSAC; PnP; epipolar geometry; optical flow; homography tracking; SfM; bundle adjustment (Ceres); neural rendering (3D Gaussian Splatting).

CFD & Scientific Computing:

OpenFOAM; ParaView; turbulence modeling workflows; numerical methods; linear algebra; ODE/PDE modeling and validation.

Programming:

C++, Python, CUDA, SQL, MATLAB, RISC-V Assembly; Linux/WSL development.

Tools & Dev Practices:

Git/GitHub; bash; Make; CMake; Docker; debugging/profiling; reproducible builds.

Web & Apps:

Next.js/React; Vercel; Cloudflare (CDN, R2); iOS (Swift/Xcode); API integration for demo.

Creative Tools:

Unreal Engine (basic, visualization); DaVinci Resolve (demo editing); Adobe Photoshop.