

# Cody Reading

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## WORK EXPERIENCE

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### Senior Researcher

July. 2024 – Present

*Huawei Technologies | Python, PyTorch*

*Markham, Canada / London, United Kingdom*

- Developed a real-time mobile robot pipeline for navigation, implementing SLAM (FastSLAM), path planning (A\*/DWA), and wheel controller algorithms, deploying in both simulation and on real hardware
- Built an interactive demo integrating LLM-based control with a ViperX robotic arm to play checkers, using Deepseek R1, Qwen 2.5, or Llama 3
- Implemented a 3D scene graph estimation and segmentation technique, enabling object search and pick/place for a mobile robot equipped with a robotic arm
- Developed a 3D object labeling tool for generating perception labels (6D pose, 2D bounding boxes, and 2D masks) for multiple objects in indoor environments

### Machine Learning Research Associate

Jan. 2022 – Aug. 2023

*Monsters Aliens Robots Zombies | Python, PyTorch*

*Toronto, Canada*

- Developed a facial de-aging tool Vanity AI designed for VFX applications, reducing manual artist time by 80%
- Built an image editing application with Streamlit involving both learned (with StyleGAN) and classical operations
- Implemented mask tracking for facial regions using a combination of StyleGAN and mesh-based visual alignment
- Worked tightly with VFX artists to receive and integrate daily feedback based on quality and usability

### Software Engineer - Autonomous Driving

Jan. 2018 - Aug. 2018

*NVIDIA Corporation | C++*

*Holmdel, United States*

- Developed a vehicle trajectory generation library within the NVIDIA DriveWorks SDK from multi-sensor data
- Implemented configurable trajectory sampling and continuous pose estimation using interpolation
- Added 3D pose and coordinate transformation functionality using the Eigen C++ library
- Verified functionality of the trajectory generation library using the Google Test framework
- Integrated trajectory generation library into DriveWorks simulation software

## ACADEMIC EXPERIENCE

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### Computer Vision Researcher - 3D Generation

Sept. 2023 – April 2024

*Simon Fraser University | Python, PyTorch*

*Burnaby, Canada*

- Developed a 3D generative method that efficiently optimizes 3D Gaussians following sketch and text descriptions for high-quality geometric and appearance control
- Created a depth extraction method from Stable Diffusion by learning latent space update directions
- Built an image composition method guided by Stable Diffusion to correct foreground/background inconsistencies

### Computer Vision Researcher - 3D Perception

Sept. 2019 – Dec. 2021

*University of Toronto | Python, PyTorch*

*Toronto, Canada*

- Developed a monocular 3D object detection method achieving 1st place on the KITTI and Waymo benchmarks
- Developed a 3D multi-object tracking method achieving 2nd place on the nuScenes 3D MOT benchmark
- Engineered infrastructure using SLURM, Bash, Python, and W&B to support large-scale experimentation
- Built an experiment tracking and advanced visualization framework using Weights & Biases and Matplotlib to track model configuration, metrics for independent object classes, and feature visualizations
- Implemented unit tests using the Unittest framework to verify functionality and prevent regressions

### Semantic Segmentation Research Co-op

May 2017 - Aug. 2017

*University of Waterloo | Python, C++, Caffe*

*Waterloo, Canada*

- Trained the SegNet and FCN segmentation methods on the Cityscapes, Playing-for-data, and Synthia datasets.
- Created a custom data layer for SegNet and FCN to allow multi-dataset training with customizable proportions
- Automated and simplified the segmentation training procedures by adding multi-stage training.
- Developed ROS nodelets in C++ with OpenCV to perform segmentation inference and stereo processing.

## EDUCATION

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### University of Toronto

*Master's of Applied Science, Aerospace Engineering*

Toronto, Canada

*Sept. 2019 – Dec. 2021*

### University of Waterloo

*Bachelor of Applied Science, Honours Mechatronics Engineering*

Waterloo, Canada

*Sept. 2013 – April 2019*

## PUBLICATIONS

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### Bayes' Rays: Uncertainty Quantification for Neural Radiance Fields

*L. Goli, C. Reading, S. Sellán, A. Jacobson, A. Tagliasacchi*

CVPR 2024

*Highlight*

### BANF: Band-limited Neural Fields for Levels of Detail Reconstruction

*A. Shabanov, S. Govindarajan, C. Reading, L. Goli, D. Rebain, K. M. Yi, A. Tagliasacchi*

CVPR 2024

### InterTrack: Interaction Transformer for 3D Multi-Object Tracking

*J. Willes, C. Reading, S. Waslander*

CRV 2023

*Oral Presentation*

### Categorical Depth Distribution Network for Monocular 3D Object Detection

*C. Reading, A. Harakeh, J. Chae, S. Waslander*

CVPR 2021

*Oral Presentation*

### Unlimited Road-scene Synthetic Annotation (URSA) Dataset

*M. Angus, M. ElBalkini, S. Khan, A. Harakeh, O. Andrienko, C. Reading, S. Waslander, K. Czarnecki*

ITSC 2018

## TECHNICAL SKILLS

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**Languages:** Python, Bash, C/C++, MATLAB

**Developer Tools:** Git, GitHub, GitLab, VS Code, Docker, Apptainer

**Libraries:** PyTorch, NumPy, Kornia, Open3D, Diffusers, Nerfstudio, Threestudio, Weights & Biases, Streamlit

**Concepts:** Computer Vision, Generative Models, Diffusion Models, 3DGS, Object Detection and Tracking