

Christopher Agia

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EDUCATION	B.A.Sc in Engineering Science, University of Toronto (exp.) 2021 Robotics Major with Minor in Eng. Business, Professional Experience Year (2020) GPA: 3.82/4.0 <i>President's Scholarship Program, Dean's Honour List, NSERC USRA Grant</i>
SKILLS	Programming (<i>Proficient</i>) Python, Rust, C/C++, MATLAB - (<i>Working</i>) Java, Assembly, Bash, Latex Software Tools Git, Linux/Unix, Docker, Wasmtime (WebAssembly), Kubernetes Libraries PyTorch, TensorFlow, ROS, NumPy, PCL, OpenCV, SciPy, scikit-learn, Pandas, Jupyter
EXPERIENCE	Software Engineering Intern, Google May 2020 - Present <i>Extending service mesh proxy solutions, Istio Networking Team, Google Cloud</i> <ul style="list-style-type: none">Architecting a Proxy-Wasm ABI test harness and simulator to enable proxy extensions written in any language (delivered as WebAssembly modules) to be tested in a safe and controlled environmentCode will be donated and adopted as the official ABI test harness for WASI - serves to benefit the Istio, Envoy and Proxy-Wasm open-source communities for rapid testing of language agnostic plugins Deep Learning Research Intern, Huawei - Noah's Ark Lab May 2019 - May 2020 <i>Research and development for Autonomous Vehicles, Perception and Localization Team</i> <ul style="list-style-type: none">Project lead for a novel sparse CNN based on the Minkowski Engine achieving state-of-the-art performance for 2D/3D Semantic Scene Completion. Patent pending, paper under review [1], 2020Designed an F-CNN model that learns (end-to-end) to segment roads and predict surface elevation from sequential LiDAR scans at real-time speeds with over 95% accuracy. Patent pending, 2020Supported the development of a global graph-based mapping method to improve multi-level surface localization and circumvent estimation errors across all UTM zones. Patent pending, 2020Created a custom PyTorch pipeline to construct, modify and train virtually any encoder/decoder deep CNN on three open source data sets. Used to improve over 10 leading LiDAR segmentation networks Autonomy Engineer - Object Detection, aUToronto Aug 2019 - May 2020 <i>UofT Self-Driving Vehicle Group, Object Detection Team, SAE/GM AutoDrive Challenge</i> <ul style="list-style-type: none">Lead the development of a PointPillars 3D LiDAR detection pipeline (vehicle-pedestrian)Worked collaboratively in deploying computer vision systems to reach standard level-4 autonomy Software Engineering Intern, General Electric May 2017 - Aug 2017 <i>Protection and control systems, Applications Engineering Team, GE Power</i> <ul style="list-style-type: none">Built a memory map cross-referencing tool to streamline the upgrade process of client systemsActualized the current Install-Base and Firmware Revision History databases used by internal teams
RESEARCH	Machine Learning Researcher Vector Institute, University of Toronto May 2020 - Present <i>Advised by Prof. Florian Shkurti, Robot Vision and Learning Group</i> <ul style="list-style-type: none">Investigated the use of high-level visual abstraction (via attention maps) in Deep Reinforcement Learning frameworks (DDPG, DQN) for optimal self-driving control. Paper under review [2], 2020 Machine Learning Researcher Mila AI Institute, McGill University Jan 2020 - May 2020 <i>Co-Supervised by Prof. David Meger & Prof. Gregory Dudek, Mobile Robotics Lab</i> <ul style="list-style-type: none">Explored the benefit of dense depth prediction for direct visual odometry. Paper accepted [3], CRV2020 Robotics Researcher University of Toronto May 2018 - Aug 2018 <i>Advised by Prof. Goldie Nejat, Autonomous Systems and Biomechatronics Lab</i> <ul style="list-style-type: none">Worked with a team of graduate researchers to bridge the Simulation-to-Reality gap in Deep Reinforcement Learning (A3C) for autonomous rough terrain navigation. Paper under review [4], 2020

PROJECTS	IntelliCare Ontario Engineering Competition (OEC) Feb 2019
	<ul style="list-style-type: none"> Full hospital ER software suite including a deep neural network for prediction of patient triage score, algorithms for allocation of resources to patients, and tracking of key hospital performance metrics
	eBotics University of Toronto Engineering Competition (UTEK) Jan 2019
	<ul style="list-style-type: none"> Created a logistics planning algorithm that assigns mobile robots to efficiently retrieve warehouse packages - approximated solution to Travelling Salesman Problem with A* Path Planning, Clustering
	Autonomous Packing Robot Engineering Science Robotics Competition Jan 2018 - May 2018
	<ul style="list-style-type: none"> Designed, fabricated and programmed a robot that systematically sorts and packs up to 50 pills/minute to assist those suffering from dementia. Features an efficient UI for inputting packing instructions
PUBLICATIONS	[1] C. Agia , R. Cheng, Y. Ren, B. Liu, "S3CNet: A Sparse Semantic Scene Completion Network for LiDAR Point Clouds," <i>Under review, 2020</i>
	[2] R. Cheng, C. Agia , D. Meger, F. Shkurti, G. Dudek, "Abstraction Augmentation for Deep Reinforcement Learning," <i>Under review, 2020</i>
	[3] R. Cheng, C. Agia , D. Meger, G. Dudek, "Depth Prediction for Monocular Direct Visual Odometry," <i>IEEE 2020 17th Conference on Computer and Robot Vision (CRV)</i> , Ottawa, ON, Canada, 2020, pp. 70-77, doi: 10.1109/CRV50864.2020.00018
	[4] K. Zhang, H. Hu, A.H. Tan, M. Ruan, C. Agia , G. Nejat, "A Sim-to-Real Pipeline for Deep Reinforcement Learning for Autonomous Robot Navigation in Cluttered Rough Terrain," <i>Under review, 2020</i>
AWARDS	Dean's Honour List, 2018-2019.
	1 st Place Programming, Ontario Engineering Competition (\$2,500), 2019.
	1 st Place Programming, University of Toronto Engineering Competition, 2019.
	NSERC Undergraduate Student Research Award (\$6,000), 2018.
	3 rd /50 Place, Engineering Science Robotics Competition, 2018.
	President's Scholarship Program (\$6,000), 2016.
	Patents
	1. "A Sparse Convolution based Semantic Scene Completion method for LiDAR Point Clouds," 2020.
	2. "Road Surface Semantic Segmentation from LiDAR Point Clouds," 2020.
INTERESTS	Initiatives ML4Good, Sustainability . Building an open source, machine learning powered tool that provides practitioners with carbon footprint estimates associated with training their ML/AI models
	Extracurricular NSight Student Mentorship Program, Academic Teaching/Counselling, Reading (Philosophy & Finance), Varsity Blues Soccer, Health and Fitness, Music (Guitar, Bass, Drums)

REFERENCES

"Chris was a student who worked as intern in my team on deep learning related applications e.g. semantic segmentation. He is smart and hard working. I will be more than happy to recommend him for a machine learning researcher/engineer position."

"He is very excellent, we are very impressed by his performance during the time working with us, I highly recommend anyone who looks at this message to give him the highest remark, he deserves it!"

Bingbing Liu

Technology Specialist / Project Manager (Autonomous Vehicles)

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Huawei - Noah's Ark Lab

"Christopher is one of few with the coupled ability of diving deep into business challenges yet is nimble enough to quickly pick up new and advanced concepts when required. During his time in my team, he identified strategies to improve the efficiency of client side system upgrade processes, as well as internal firmware and software defect tracking mechanism. He shows great potential as a future leader, and is a pleasure to work with."

Liga Ele

Senior Customer Applications Engineering Manager

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General Electric