

EDUCATION

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**Stanford University** 2021–Present**Doctor of Philosophy in Computer Science**

Co-advisors: Jeannette Bohg, Marco Pavone

*Coursework: interactive and embodied learning, multi-task and meta-learning, differentiable graphics***University of Toronto** 2016–2019, 2020–2021**Bachelor of Applied Science in Engineering Science, Robotics**

Advisor: Prof. Florian Shkurti. Graduation with Honours, Dean's Honour List 2018–2021

*Coursework: robot perception, planning and control, geometric deep learning, reinforcement learning, statistical ML*RESEARCH EXPERIENCES

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**Autonomous Systems Lab**, Stanford University Stanford, CA, USA

Graduate Researcher advised by Prof. Marco Pavone and Dr. Edward Schmerling 2022-03 – Present

*Topics: uncertainty quantification for deep regularized offline reinforcement learning***Interactive Perception and Robotics Lab**, Stanford University Stanford, CA, USA

Graduate Researcher advised by Prof. Jeannette Bohg 2022-01 – Present

*Topics: robot manipulation via affordance modelling, reinforcement learning, and task and motion planning***Stanford Vision and Learning Lab**, Stanford University Stanford, CA, USA

Graduate Researcher advised by Prof. Jiajun Wu 2021-09 – 2022-02

*Topics: neuro-symbolic propositional models for long-horizon robot task planning***Robot Vision and Learning Lab**, Vector Institute & University of Toronto Toronto, Canada

Undergraduate Researcher advised by Prof. Florian Shkurti 2020-05 – 2021-05

*Topics: learning to plan in symbolic 3D scene graphs with graph neural networks* [Paper, Project page, Code]**Mobile Robotics Lab**, MILA & McGill University Montreal, Canada

Research Intern co-supervised by Prof. Gregory Dudek and Prof. David Meger 2020-01 – 2020-05

*Topics: depth prediction for visual SLAM* [Paper], *visual representation learning for self-driving control* [Paper]**Noah's Ark Lab**, Huawei Research Canada Markham, Canada

Deep Learning Research Intern, perception and localization with Dr. Bingbing Liu 2019-05 – 2020-05

*Topics: 3D semantic understanding for scene reconstruction* [Paper, Video], *road estimation and SLAM* [Paper]**Autonomous Systems and Biomech. Lab**, University of Toronto Toronto, Canada

Research Intern supervised by Prof. Goldie Nejat 2018-05 – 2018-08

*Topics: sim2real transfer of deep reinforcement learning based autonomous navigation policies* [Paper, Video]INDUSTRY EXPERIENCES

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**Mixed Reality and Robotics, Microsoft** Redmond, WA, USA

Software Engineering Intern on the Scene Understanding and Data Teams (HoloLens) 2021-05 – 2021-08

*Topics: bridging multi-agent reinforcement learning scenarios into mixed reality environments***Cloud, Google** San Francisco, CA, USA

Software Engineering Intern building ABI simulators with the Istio Networking Team 2020-05 – 2020-08

HONORS AND AWARDS

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**Stanford School of Engineering Fellowship, Computer Science** 2021

Awarded to outstanding students pursuing doctoral degrees in computer science and engineering

**Ontario Engineering Competition** 2019

Awarded first prize at Toronto's district and Ontario's provincial programming competitions

**NSERC Undergraduate Student Research Award**

2018

Awarded to undergraduate science and engineering students on the basis of research aptitude

**President's Scholarship Program**

2016

Awarded to top engineering candidates pursuing studies at the University of Toronto

**PUBLICATIONS**

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## REFEREED CONFERENCE PAPERS

- [4] Ran Cheng, Christopher Agia, Florian Shkurti, David Meger, and Gregory Dudek, "Latent attention augmentation for robust autonomous driving policies,"
- [3] Christopher Agia, Krishna Murthy Jatavallabhula, Mohamed Khodeir, Ondrej Miksik, Vibhav Vineet, Mustafa Mukadam, Liam Paull, and Florian Shkurti, "Taskography: Evaluating robot task planning over large 3d scene graphs," in *5th Annual Conference on Robot Learning*, 2021.
- [2] Ran Cheng, Christopher Agia, David Meger, and Gregory Dudek, "Depth prediction for monocular direct visual odometry," in *2020 17th Conference on Computer and Robot Vision (CRV)*, IEEE Computer Society, 2020, pp. 70–77.
- [1] Ran Cheng, Christopher Agia, Yuan Ren, Xinhai Li, and Liu Bingbing, "S3cnet: A sparse semantic scene completion network for lidar point clouds," *arXiv preprint arXiv:2012.09242*, 2020.

## REFEREED JOURNAL PAPERS

- [2] Han Hu, Kaicheng Zhang, Aaron Hao Tan, Michael Ruan, Christopher Agia, and Goldie Nejat, "A sim-to-real pipeline for deep reinforcement learning for autonomous robot navigation in cluttered rough terrain," *IEEE Robotics and Automation Letters*, vol. 6, no. 4, pp. 6569–6576, 2021.
- [1] Yuan Ren, Bingbing Liu, Ran Cheng, and Christopher Agia, "Lightweight semantic-aided localization with spinning lidar sensor," *IEEE Transactions on Intelligent Vehicles*, 2021.

**INVITED TALKS**

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| <b>Facebook AI Research.</b> Taskography: Evaluating robot task planning over large 3d scene graphs | 2021-07 |
| <b>Microsoft Research.</b> Robot task planning in structured world models                           | 2021-07 |
| <b>Embodied AI Lab, MILA.</b> Contextual graph representations for task-driven 3d planning          | 2021-06 |

**PATENTS**

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- Agia, C.G., Cheng, R., Ren, Y., Liu, B. (2022). *Systems and Methods for Generating a Road Surface Semantic Segmentation Map from a Sequence of Point Clouds* (U.S. Application No. 17/676,131). U.S. Patent and Trademark Office.
- Cheng, R., Agia, C.G., Ren, Y., Liu, B. (2022). *Methods and Systems for Semantic Scene Completion for Sparse 3D Data* (U.S. Application No. 17/492,261). U.S. Patent and Trademark Office.

**COMMUNITY SERVICE AND LEADERSHIP**

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| <b>Stanford AI Salon</b> , Stanford University   | 2021-10 – Present |
| Organizer of Stanford's AI Salon, a platform facilitating open-ended discussion between graduate students, industry, and academic leaders on contemporary ML & AI topics and their societal implications |                   |
| <b>Stanford CS Mentorship Program</b> , Stanford University  | 2021-10 – Present |
| Advising students from underrepresented and minority groups to lead fruitful careers in computer science research  |                   |
| <b>Frosh Scholars Mentorship Program</b> , Stanford University   | 2021-10 – Present |
| Mentoring first generation college students towards balanced progress in academics, career and well-being  |                   |
| <b>Pro Bono Research Mentoring</b>   | 2021-01 – Present |
| Guided three driven undergraduate research students through to applications at top graduate engineering schools  |                   |
| <b>NSight Student Mentorship Program</b> , University of Toronto   | 2018-09 – 2019-05 |
| Provided academic, social and personal support to first and second year Engineering Science students   |                   |

## SKILLS

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Languages: (*Proficient*) Python, C/C#/C++, MATLAB, Rust, L<sup>A</sup>T<sub>E</sub>X, Bash - (*Working*) Java, Assembly

Tools: Git, Linux/Unix, Unity, Docker, Wasmtime (WebAssembly), Kubernetes

Libraries: PyTorch, TensorFlow, ROS, NumPy, ml-agents, PCL, OpenCV, SciPy, scikit-learn, Pandas, Jupyter