

EDUCATION

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

Autonomous Systems Lab, Stanford University

Stanford, CA, USA

Graduate Researcher advised by Prof. Marco Pavone and Dr. Edward Schmerling

2022-03 – Present

*Topics: (focus) integrated task and motion planning, foundation models for robotics; (involved) neural network uncertainty quantification, out-of-distribution detection, deep offline reinforcement learning***Interactive Perception and Robot Learning Lab**, Stanford University

Stanford, CA, USA

Graduate Researcher advised by Prof. Jeannette Bohg

2022-01 – Present

*Topics: (focus) long-horizon motion planning with learned manipulation primitives [Paper, Project Site], task and motion planning with large language models; (involved) deep reinforcement learning, robotic skill affordances***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 logic models for AI 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

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

Stanford School of Engineering Fellowship, Computer Science

2021

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

Ontario Engineering Competition Awarded first prize at Toronto’s district and Ontario’s provincial programming competitions	2019
NSERC Undergraduate Student Research Award Awarded to undergraduate science and engineering students on the basis of research aptitude	2018
President’s Scholarship Program Awarded to top engineering candidates pursuing studies at the University of Toronto	2016

PUBLICATIONS

PAPERS IN-SUBMISSION

- [1] Christopher Agia, Toki Migimatsu, Jiajun Wu, and Jeannette Bohg, “Taps: Task-agnostic policy sequencing,” *arXiv preprint arXiv:2210.12250*, 2022.

REFEREED CONFERENCE PAPERS

- [4] 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.
- [3] Ran Cheng, Christopher Agia, Florian Shkurti, David Meger, and Gregory Dudek, “Latent attention augmentation for robust autonomous driving policies,” in *2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2021, pp. 130–136. DOI: 10.1109/IROS51168.2021.9636449.
- [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*, pp. 1–1, 2021. DOI: 10.1109/TIV.2021.3099022.

INVITED TALKS

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

PATENTS

- 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

Stanford AI Salon , Stanford University 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	2021-10 – Present
Stanford CS Mentorship Program , Stanford University Advising students from underrepresented and minority groups to lead fruitful careers in computer science research	2021-10 – Present

Frosh Scholars Mentorship Program, Stanford University 2021-10 – Present
Mentoring first generation college students towards balanced progress in academics, career and well-being

Pro Bono Research Mentoring 2021-01 – Present
Guided three driven undergraduate research students through to applications at top graduate engineering schools

NSight Student Mentorship Program, University of Toronto 2018-09 – 2019-05
Provided academic, social and personal support to first and second year Engineering Science students

PROFESSIONAL SERVICE

Reviewer for ICRA, IROS, RAL

SKILLS

Languages: (*Proficient*) Python, C/C#/C++, MATLAB, Rust, L^AT_EX, 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