

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, transformers, 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 [Paper, Project page];**(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 robot planning with learned skills [Paper, Project page], task and motion planning with large language models; (involved) deep reinforcement learning, robotic skill affordances, optimization***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

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| 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] Kevin Lin, Christopher Agia, Toki Migimatsu, Marco Pavone, and Jeannette Bohg, “Text2motion: From natural language instructions to feasible plans,” *arXiv preprint arXiv:2303.12153*, 2023.

REFEREED CONFERENCE PAPERS

- [5] 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 *Conference on Robot Learning*, PMLR, 2022, pp. 46–58.
- [4] Christopher Agia, Toki Migimatsu, Jiajun Wu, and Jeannette Bohg, “Stap: Sequencing task-agnostic policies,” *arXiv preprint arXiv:2210.12250*, 2022.
- [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

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| 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 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

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

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 RSS, ICRA, IROS, RA-L, CoRL

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