

EDUCATION

Stanford University

2021 – Present

Doctor of Philosophy in Computer Science

Advisors: Prof. Jeannette Bohg, Prof. Marco Pavone

Co-founder & President, Canadian Student Association at Stanford. Lead Organizer, Stanford AI Salon

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

RESEARCH EXPERIENCES

NASA Jet Propulsion Laboratory, California Institute of Technology

Pasadena, CA, USA

Visiting Researcher advised by Dr. Issa Nesnas and Dr. Saptarshi Bandyopadhyay

2023-06 – 2023-09

Topics: autonomy for deep space exploration [Paper, Project page]; Section 347: mobility and robotic systems

Autonomous Systems Lab, Stanford University

Stanford, CA, USA

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

2022-03 – Present

Topics: (focus) foundation models and safety for robotics [Paper]; (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, Code], task and motion planning with large language models [Paper, Project page]; (involved) deep reinforcement learning, 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, QC, 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, ON, Canada

Deep Learning Research Intern, perception and localization with Dr. Bingbing Liu

2019-05 – 2020-05

Topics: 3D semantic understanding for scene reconstruction [Paper], road estimation and SLAM [Paper]

Autonomous Systems and Biomech. Lab, University of Toronto

Toronto, ON, Canada

Research Intern supervised by Prof. Goldie Nejat

2018-05 – 2018-08

Topics: sim2real transfer of deep reinforcement learning based autonomous navigation policies [Paper]

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

Clear Ventures DeepTech Fellowship	2023
Awarded to promising PhD candidates and post-docs that aspire to build deep tech companies	
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

PAPERS IN-SUBMISSION

- [1] R. Sinha, A. Elhafi, C. Agia, M. Foutter, E. Schmerling, and M. Pavone, "Real-time anomaly detection and reactive planning with large language models," *arXiv preprint*, 2024, Under review. [Online]. Available: <https://openreview.net/forum?id=WPJ6Zt4ixM>.
- [2] DROID Dataset Team, "Droid: A large-scale in-the-wild robot manipulation dataset," *arXiv preprint*, 2024, Under review. [Online]. Available: <https://arxiv.org/abs/2403.12945>.

REFEREED CONFERENCE PAPERS

- [1] C. Agia, G. C. Vila, S. Bandyopadhyay, D. S. Bayard, K. Cheung, C. H. Lee, E. Wood, I. Aenishanslin, S. Ardito, L. Fesq, M. Pavone, and I. A. D. Nesnas, "Modeling considerations for developing deep space autonomous spacecraft and simulators," *IEEE Aerospace Conference (AeroConf)*, 2024, Accepted. [Online]. Available: <https://arxiv.org/abs/2401.11371>.
- [2] Open X-Embodiment Collaboration, "Open X-Embodiment: Robotic learning datasets and RT-X models," *2024 IEEE International Conference on Robotics and Automation (ICRA)*, 2024, Accepted. [Online]. Available: <https://arxiv.org/abs/2310.08864>.
- [3] C. Agia, T. Migimatsu, J. Wu, and J. Bohg, "Stap: Sequencing task-agnostic policies," in *2023 IEEE International Conference on Robotics and Automation (ICRA)*, 2023, pp. 7951–7958. DOI: 10.1109/ICRA48891.2023.10160220.
- [4] C. Agia, K. M. Jatavallabhula, M. Khodeir, O. Miksik, V. Vineet, M. Mukadam, L. Paull, and F. Shkurti, "Taskography: Evaluating robot task planning over large 3d scene graphs," in *Proceedings of the 5th Conference on Robot Learning (CoRL)*, ser. Proceedings of Machine Learning Research, vol. 164, PMLR, 2022, pp. 46–58.
- [5] R. Cheng, C. Agia, F. Shkurti, D. Meger, and G. 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.
- [6] R. Cheng, C. Agia, Y. Ren, X. Li, and L. Bingbing, "S3cnet: A sparse semantic scene completion network for lidar point clouds," in *Proceedings of the 2020 Conference on Robot Learning (CoRL)*, ser. Proceedings of Machine Learning Research, vol. 155, PMLR, 2021, pp. 2148–2161.
- [7] R. Cheng, C. Agia, D. Meger, and G. 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.

REFEREED JOURNAL PAPERS

- [1] K. Lin, C. Agia, T. Migimatsu, M. Pavone, and J. Bohg, "Text2motion: From natural language instructions to feasible plans," *Autonomous Robots, Special Issue: Large Language Models in Robotics*, 2023. DOI: 10.1007/s10514-023-10131-7.
- [2] A. Elhafi, R. Sinha, C. Agia, E. Schmerling, I. A. D. Nesnas, and M. Pavone, "Semantic anomaly detection with large language models," *Autonomous Robots, Special Issue: Large Language Models in Robotics*, 2023. DOI: 10.1007/s10514-023-10132-6.
- [3] Y. Ren, B. Liu, R. Cheng, and C. Agia, "Lightweight semantic-aided localization with spinning lidar sensor," *IEEE Transactions on Intelligent Vehicles*, vol. 8, no. 1, pp. 605–615, 2021. DOI: 10.1109/TIV.2021.3099022.

- [4] H. Hu, K. Zhang, A. H. Tan, M. Ruan, C. Agia, and G. 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. DOI: 10.1109/LRA.2021.3093551.

THESIS PAPERS

- [1] C. Agia and F. Shkurti, “Contextual graph representations for task-driven 3d perception and planning,” Undergraduate Dissertation, University of Toronto, Toronto, ON, 2021. [Online]. Available: https://drive.google.com/file/d/1LjTdgwuiJa-gIiVbbqj9vh-qoEZgqkb_/view?usp=sharing.

INVITED TALKS

SystemX Conference, Stanford University. Learning to solve long-horizon tasks	2023-11
Robot Vision and Learning Lab, UofT. Task and motion planning with skills and language models	2023-07
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

Canadian Student Association, Stanford University Co-founder and President of Stanford’s Canadian Student Association	2024-01 – Present
Stanford AI Salon, Stanford University Lead 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 Mentoring first generation college students towards balanced progress in academics, career and well-being	2021-10 – 2022-07
Pro Bono Research Mentoring Guided five undergraduate research students through to applications at top graduate engineering schools	2021-01 – Present
NSight Student Mentorship Program, University of Toronto Provided academic, social and personal support to first and second year Engineering Science students	2018-09 – 2019-05

PROFESSIONAL SERVICE AND TEACHING

Journal Service: Reviewer for IJRR, RA-L
 Conference Service: Reviewer for RSS, CoRL, ICRA, IROS, ISER, AeroConf
 Teaching assistant for Stanford **AA174A**: Principles of Robot Autonomy 1

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