

EDUCATION

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**Stanford University**

2021 – Present

**Doctor of Philosophy in Computer Science**

Advisors: Prof. Jeannette Bohg, Prof. Marco Pavone

Co-founder &amp; 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

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**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 for robotic safety [Paper, 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, 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

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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

<b>Clear Ventures Deeptech Fellowship</b>	2023
Awarded to promising PhD candidates and post-docs that aspire to build deep tech companies	
<b>Stanford School of Engineering Fellowship, Computer Science</b>	2021
Awarded to outstanding students pursuing doctoral degrees in computer science and engineering	
<b>Ontario Engineering Competition</b>	2019
Awarded first prize at Toronto's district and Ontario's provincial programming competitions	
<b>NSERC Undergraduate Student Research Award</b>	2018
Awarded to undergraduate science and engineering students on the basis of research aptitude	
<b>President's Scholarship Program</b>	2016
Awarded to top engineering candidates pursuing studies at the University of Toronto	

## PUBLICATIONS

### PAPERS IN-SUBMISSION

- [1] C. Agia, R. Sinha, J. Yang, Z. Cao, R. Antonova, M. Pavone, and J. Bohg, "Unpacking failure modes of generative policies: Runtime monitoring of consistency and progress," 2024, Under review. [Online]. Available: <https://sites.google.com/view/detecting-policy-failure>.
- [2] Y. Huang, C. Agia, J. Wu, T. Hermans, and J. Bohg, "Points2plans: From point clouds to long-horizon plans with composable relational dynamics," 2024, Under review. [Online]. Available: <https://sites.google.com/view/points2plans>.
- [3] J. Thumm, C. Agia, M. Pavone, and M. Althoff, "Text2interaction: Establishing safe and preferable human-robot interaction," 2024, Under review.

### REFEREED CONFERENCE PAPERS

- [1] R. Sinha, A. Elhafsi, C. Agia, M. Foutter, E. Schmerling, and M. Pavone, "Real-time anomaly detection and reactive planning with large language models," in *Robotics: Science and Systems*, Outstanding Paper Award, 2024. [Online]. Available: <https://arxiv.org/abs/2407.08735>.
- [2] DROID Dataset Team, "Droid: A large-scale in-the-wild robot manipulation dataset," in *Robotics: Science and Systems*, 2024. [Online]. Available: <https://arxiv.org/abs/2403.12945>.
- [3] Open X-Embodiment Collaboration, "Open X-Embodiment: Robotic learning datasets and RT-X models," in *2024 IEEE International Conference on Robotics and Automation (ICRA)*, Best Paper Award, 2024. [Online]. Available: <https://arxiv.org/abs/2310.08864>.
- [4] 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," in *IEEE Aerospace Conference (AeroConf)*, 2024. [Online]. Available: <https://arxiv.org/abs/2401.11371>.
- [5] 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. [Online]. Available: <https://arxiv.org/abs/2210.12250>.
- [6] 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. [Online]. Available: <https://arxiv.org/abs/2207.05006>.
- [7] 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.
- [8] 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. [Online]. Available: <https://arxiv.org/abs/2012.09242>.
- [9] 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. [Online]. Available: <https://arxiv.org/abs/2303.12153>.
- [2] A. Elhafsi, 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. [Online]. Available: <https://arxiv.org/abs/2305.11307>.
- [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.

## REFEREED WORKSHOP PAPERS

- [1] C. Agia, R. Sinha, J. Yang, Z. Cao, R. Antonova, M. Pavone, and J. Bohg, “Unpacking failure modes of generative policies: Runtime monitoring of consistency and progress,” in *Robotics: Science and Systems Workshops (RSS)*, 2024. [Online]. Available: [https://drive.google.com/file/d/1vEyKj5n8yaEowa\\_tgEDxoQxGPC7KU7zJ/view](https://drive.google.com/file/d/1vEyKj5n8yaEowa_tgEDxoQxGPC7KU7zJ/view).
- [2] M. Foutter, R. Sinha, C. Agia, A. Elhafsi, E. Schmerling, and M. Pavone, “Adapting a foundation model for space-based tasks,” in *Robotics: Science and Systems Workshops (RSS)*, 2024. [Online]. Available: [https://drive.google.com/file/d/1bGCMUyAWWrn\\_WLer32w4yahnoGFzJq4u/view](https://drive.google.com/file/d/1bGCMUyAWWrn_WLer32w4yahnoGFzJq4u/view).
- [3] A. Elhafsi, R. Sinha, C. Agia, E. Schmerling, I. A. D Nesnas, and M. Pavone, “Semantic anomaly detection with large language models,” in *Robotics: Science and Systems Workshops (RSS)*, 2023. [Online]. Available: <https://sites.google.com/view/rss2023-safe-autonomy/accepted-papers?authuser=0>.
- [4] K. Lin, C. Agia, T. Migimatsu, M. Pavone, and J. Bohg, “Text2motion: From natural language instructions to feasible plans,” in *International Conference on Robotics and Automation Workshops (ICRA)*, 2023. [Online]. Available: <https://openreview.net/pdf?id=M1yTyG5P7C1>.

## 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](https://drive.google.com/file/d/1LjTdgwuiJa-gIiVbbqj9vh-qoEZgqkb_/view?usp=sharing).

## INVITED TALKS

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<b>SystemX Conference, Stanford University.</b> Learning to solve long-horizon tasks	2023-11
<b>Robot Vision and Learning Lab, UofT.</b> Task and motion planning with skills and language models	2023-07
<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>Canadian Student Association, Stanford University</b> Co-founder and President of Stanford’s Canadian Student Association	2024-01 – Present
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<b>Stanford AI Salon, Stanford University</b> Lead Organizer of Stanford’s AI Salon, a platform facilitating open-ended discussion between graduate students, industry,	2021-10 – Present
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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 – 2022-07  
Mentoring first generation college students towards balanced progress in academics, career and well-being

**Pro Bono Research Mentoring** 2021-01 – Present  
Guided five 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 AND TEACHING

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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

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Languages: (*Proficient*) Python, C/C#/C++, MATLAB, Rust,  $\text{\LaTeX}$ , 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