Chris Agia

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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 Honors, Dean's Honor List 2018 – 2021

Selected Research Experiences

Interactive Perception and Robot Learning Lab, Stanford University — Stanford, CA, USA
Graduate Researcher advised by Prof. Jeannette Bohg — 2022-01 – Present
Topics: (focus) robot data curation [Site]*, task and motion planning with learned skills* [Site] *and large language models* [Site, Site, Site]*; (involved) imitation learning, deep reinforcement learning, constrained optimization*

Autonomous Systems Lab, Stanford University — Stanford, CA, USA
Graduate Researcher advised by Prof. Marco Pavone — 2022-03 – Present
Topics: (focus) reliability for robot imitation learning [Site, Site]*, foundation models for robot safety* [Site, Site, Site Site]; *(involved) uncertainty quantification, out-of-distribution detection, deep offline reinforcement learning*

Research Experiences

FAIR Embodiment & Actions, Meta — Menlo Park, CA, USA
Research Scientist Intern advised by Dr. Krishna Jatavallabhula and Dr. Franziska Meier — 2025-06 – Present
Topics: large-scale world modeling for robotics

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 [Site]*; Section 347: mobility and robotic systems*

Stanford Vision and Learning Lab, Stanford University — Stanford, CA, USA
Graduate Researcher advised by Prof. Jiajun Wu — 2021-09 – 2022-02
Topics: neuro-symbolic 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: robot task planning in structured world models with graph neural networks [Site]

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: learning for visual SLAM [Paper]*, visual representations for reinforcement learning* [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 scene reconstruction [Paper]*, segmentation and semantic 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 for robot reinforcement learning [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 and 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

Preprints

[1] F. Marchiori, R. Sinha, C. Agia, A. Robey, G. J. Pappas, M. Conti, and M. Pavone, "Preventing robotic jailbreaking via multimodal domain adaptation," 2025, In submission. [Online]. Available: `https://arxiv.org/pdf/2509.23281`.

Refereed Conference Papers

[1] C. Agia, R. Sinha, J. Yang, R. Antonova, M. Pavone, H. Nishimura, M. Itkina, and J. Bohg, "Cupid: Curating data your robot loves with influence functions," in *Proceedings of The 9th Conference on Robot Learning*, ser. Proceedings of Machine Learning Research, vol. 305, PMLR, 2025, pp. 2907–2932. [Online]. Available: `https://arxiv.org/abs/2506.19121`.

[2] M. Ganai, R. Sinha, C. Agia, D. Morton, and M. Pavone, "Real-time out-of-distribution failure prevention via multi-modal reasoning," in *Proceedings of The 9th Conference on Robot Learning*, ser. Proceedings of Machine Learning Research, vol. 305, PMLR, 2025, pp. 283–308. [Online]. Available: `https://arxiv.org/abs/2505.10547`.

[3] J. Kwok, C. Agia, R. Sinha, M. Foutter, S. Li, I. Stoica, A. Mirhoseini, and M. Pavone, "Robomonkey: Scaling test-time sampling and verification for vision-language-action models," in *Proceedings of The 9th Conference on Robot Learning*, ser. Proceedings of Machine Learning Research, vol. 305, PMLR, 2025, pp. 3200–3217. [Online]. Available: `https://arxiv.org/abs/2506.17811`.

[4] Y. Huang, C. Agia, J. Wu, T. Hermans, and J. Bohg, "Points2plans: From point clouds to long-horizon plans with composable relational dynamics," in *2025 IEEE International Conference on Robotics and Automation (ICRA)*, 2025. [Online]. Available: `https://arxiv.org/abs/2408.14769`.

[5] 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 *Proceedings of the 8th Conference on Robot Learning (CoRL)*, ser. Proceedings of Machine Learning Research, vol. 270, PMLR, 2024, pp. 689–723. [Online]. Available: `https://arxiv.org/abs/2410.04640`.

[6] J. Thumm, C. Agia, M. Pavone, and M. Althoff, "Text2interaction: Establishing safe and preferable human-robot interaction," in *Proceedings of the 8th Conference on Robot Learning (CoRL)*, ser. Proceedings of Machine Learning Research, vol. 270, PMLR, 2024, pp. 1250–1267. [Online]. Available: `https://arxiv.org/abs/2408.06105`.

[7] M. Bazzi, A. Shahid, C. Agia, J. Alora, M. Forgione, D. Piga, F. Braghin, M. Pavone, and L. Roveda, "Robomorph: In-context meta-learning for robot dynamics modeling," in *International Conference on Informatics in Control, Automation and Robotics*, 2024. [Online]. Available: `https://arxiv.org/abs/2409.11815`.

[8] 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.

[9] 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.

[10] 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.

[11] 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.

[12] 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.

[13] 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.

[14] 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.

[15] 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.

[16] 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.

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

IEEE CASE. Data-Centric Understanding of Policy Behavior and Performance with Influence Functions 2025-08

TRI. Data-Centric Understanding of Policy Behavior and Performance with Influence Functions 2025-07

SystemX Conference, Stanford University. Learning to solve long-horizon tasks (YouTube) 2023-11

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

Professional Service and Teaching

Workshop Organizing

1. "Making Sense of Data in Robotics: Challenges in Collection, Curation, and Interpretability at Scale," held at the Conference on Robot Learning (CoRL), 2025. **Lead organizer**. Workshop Site.

2. "The 2nd Workshop on Out-of-Distribution Generalization in Robotics: Towards Trustworthy AI-driven Autonomy," held at Robotics: Science and Systems (RSS), 2025. **Supporting organizer**. Workshop Site.

Additional Service
Journal Service: Reviewer for IJRR, RA-L
Conference Service: Reviewer for RSS, CoRL, CVPR, ICRA, IROS, ISER, L4DC, AeroConf

2 x Teaching assistant for Stanford AA174A/CS137A/EE160A (2023, 2024): Principles of Robot Autonomy 1
1 x Teaching assistant for Stanford AA274B/CS237B/EE260B/ME274B (2025): Principles of Robot Autonomy 2

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 No. 12,008,762). U.S. Patent and Trademark Office. Google Patents link.

- 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 No. 12,079,970). U.S. Patent and Trademark Office. Google Patents link.

Community Service and Leadership

Canadian Student Association, Stanford University 2024-01 – Present
Co-founder and President of Stanford's Canadian Student Association

Stanford AI Salon, Stanford University 2021-10 – Present
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

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 many undergraduate research students through 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

Skills

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