Chris Agia

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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 [Paper, Project Site];
(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 Site], *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

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] 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

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, RAL

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