

Research Interests: Robotics, Computer Vision, Self-Supervision, Reinforcement Learning

EDUCATION

University of Illinois at Urbana-Champaign

May 2024

Doctor of Philosophy (Ph.D.) in Computer Science GPA: 4.0/4.0

Advisor: Nancy M. Amato

University of Illinois at Urbana-Champaign

May 2019

Bachelor of Science in Computer Science (with Honors) GPA: 3.8/4.0

AWARDS

- **Fellowships/Scholarships:** NSF Graduate Research Fellowship (2021), GEM Fellowship (2020), Saburo Muroga Endowed Fellowship (2019), Engineering Pathways Scholarship (2016-2019), Hispanic Scholarship Fund (2018-2020), Carol Stream Community College Scholarship (2016), S.C. Reed Scholarship (2016), H.J. Kleemann Scholarship (2015), Rotary Club of Naperville Scholarship (2015)
- **Recognitions:** Ford Fellowship (Honorable Mention) (2021), Phi Kappa Phi (2021), C. S. Larson Transfer Student Award and Scholarship (2019), Tau Beta Pi (2018), College of DuPage Student Spotlight (2016)

EXPERIENCE

University of Illinois at Urbana-Champaign - Parasol

Urbana, IL

Research Assistant - Advisor: Nancy M. Amato

June 2019 - Present

- Leverage experience (self-supervision) and spatial/contextual cues to develop robot cognition for navigation in dynamic environments and collaboration among agents
- Develop algorithms that improve runtime, sampling efficiency, path costs, and roadmap coverage and connectivity for multi-robot motion planning and robots in human environments
- Deploy robotics, machine learning, and computer vision solutions for navigation and manipulation on robot platforms such as the clearpath boxer, UR5e, and hand-e gripper

Stanford University - Hazy Research

Stanford, CA

Research Assistant - Advisor: Christopher Ré

June 2018 - March 2019

- Worked on enabling weak supervision beyond the single sentence for natural language processing applications of Snorkel, a system for rapidly creating, modeling, and managing training data
- Explored various model architectures such as bi-LSTM and multi-task learning to determine which model could best benefit from the correlations between single and cross-sentence relation extraction
- Assessed the performance of Snorkel's multi-task model (Metal) by approaching relation extraction across a varying number of sentences as dependent sub-tasks

University of Illinois at Urbana-Champaign - IGL

Urbana, IL

Research Assistant - Advisor: Richard Sowers

January 2018 - December 2018

- Adapted existing image detection systems (e.g., YOLO by Redmon et al.) to extract the context and risk associated with the urban environment surrounding roadways from dash-cam footage
- Successfully detected compound objects (e.g., a cyclist from a person and a bicycle detection), scenes, and tracked objects by using off-the-shelf video object detections as inputs to machine learning models
- Used weak supervision to improve the performance and expedite the creation of classifiers by using computer vision, pose, object-specific, and cross-temporal heuristics in noisy classifiers

PUBLICATIONS

- **Avoidance Critical Probabilistic Roadmaps for Motion Planning in Dynamic Environments**
F. F. Arias, B. Ichter, A. Faust, N. M. Amato
International Conference on Robotics and Automation (ICRA) 2021

SKILLS

- **Programming Languages/Other:** Python, C++, C, Java, R, Haskell, Javascript, Pytorch, ROS
- **Version Control:** Git, Subversion **Operating Systems:** Linux, OS X, Windows 10
- **Languages:** English (fluent), Spanish (fluent)

PROFESSIONAL ACTIVITIES

Marovi Foundation

Chicago, IL

Co-founder

November 2020 - Present

- Provide resources and opportunities for aspiring programmers, immigrants, and Hispanics in Spanish and English by sharing the lessons learned through my immigration experience and journey to graduate school

Affiliations

- Google CS Research Mentorship Program (2021), GEM Consortium (2020-Present), Diversifying Future Leadership in the Professoriate Alliance (2020-Present), Society of Hispanic Professional Engineers (2018-Present), The Leadership Alliance (2018-Present), Tau Beta Pi (2018), Morrill Engineering Program (2016-2018)