Jonathan M. Salfity

jonathan.salfity@gmail.com | +1 310 634 4759 | linkedin.com/in/jsalfity | github.com/jsalfity
Austin, TX | U.S. Citizen

SUMMARY

- PhD student in robotics, control theory, and AI/ML with corporate and start-up experience.
- Research north star is to blend the best outcomes of dynamics and control theory – safety guaranteees, robustness, stability – into emerging learned-based algorithms for safe, robust autonomous systems.
- Engineering strengths from high-level systems design to implementation in hardware and in simulation.

SOFTWARE & SKILLS

Python, C++, MATLAB, Docker | Robot Operating System (ROS), Gazebo | PyTorch, TensorFlow
Robotic Mapping & Autonomy, Robotic Manipulation | Reinforcement Learning, Machine Learning
Simulation | Systems Analysis, Mechatronics, Control Engineering | Edge Compute & Cloud Compute
Technical Writing | Conference Publications | Patents | Leadership | Business Stakeholder Management

ACADEMIC

PhD., Mechanical Engineering, *UT Austin*, Systems & Control, Robotics, 2025 *(expected)*
Advisor: David Fridovich-Keil
Group: Control and Learning for Autonomous Robots
M.S., Mechanical Engineering, *UCLA*, Systems & Control, Robotics, *Department Fellow*, 2014
B.S., Mechanical Engineering, *UCLA*, *Cum Laude*, 2013

PROFESSIONAL

Gecko Materials Bay Area, CA | 2021 - Current
Co-Founder / Advisor

- Co-founded Gecko Materials with a Stanford PhD recent graduate colleague. Bringing a biomimicry, purely mechanical, industrial grade adhesive to market. (geckomaterials.com)

Empiric Solutions San Francisco, CA | 2020 - 2021
Software Engineer

- Developed backend AWS cloud resources (DynamoDB, S3, CDK) for life science IoT sensors.
- Author production API's for sensor data collection, processing, storage, and retrieval.

AI & Emerging Compute Lab, HP Labs | *HP Inc.* Palo Alto, CA | 2016 - 2020
Roboticist & Research Engineer

- Designed and implemented proof of concepts (PoCs) for mobile robots, often with compute-constrained on-board processors utilizing off-board ML servers.
- Enhanced layers of the robotics stack through PoCs, including semantic mapping, autonomy, policy management, and human-robot interaction. Technologies developed led to patent filings and demonstrations for corporate executive stakeholders.
- Programmed with ROS middleware, developed APIs and data visualization software tools to integrate with on-premise and cloud ML servers. Used Turtlebot2, Turtlebot3, and Fetch Freight in hardware and in Gazebo simulation.
- Researched robotic control through deep reinforcement learning (DRL), focusing on robustness and generalization. Reviewed state-of-the-art in robotic control mechanisms based on DRL.
- Designed and conducted experiments extending OpenAI Baselines & OpenAI Gym Environments, improved DRL training schedules for robust and generalizable learned-based control policies. Contributions include an adversarial curriculum learning algorithm and sensitivity/robustness explainability.

Digital Manufacturing Lab, HP Labs | *HP Inc.* Palo Alto, CA & Singapore | 2019 - 2020
Robotics Principal Investigator for 3D Printing

- Led technical team of robotics and AI researchers from Prof. Phạm Quang-Cương's CRI Group at Nanyang Technological University (NTU), bridging university research to HP 3D Print business unit post-processing automation.
- Developed manipulator robotic system for cleaning 3D Printed parts, transferred computer vision and robotic manipulator software to 3D Print business unit.
- Conducted preliminary research and demonstrations in robust 3D object classification, 3D part cleanliness evaluation, and visual-servoing for precise manipulation.
- Collaborated across HP 3D Print R&D and product teams to develop robotics and AI software and solutions for automated post-processing, formulating long term research projects, metrics, and results.

Hardware R&D, HP 3D Print | *HP Inc.* San Diego, CA | 2014 - 2016
Control System and Servo Engineer

- Designed and implemented HP Fused-Deposition-Modeling 3D Printer prototype from first principles and performed system identification.
- Simulated digital twin of hardware with MATLAB and Simulink to conceptualize and prototype multi-input, multi-output control laws for three spatial-axes (xyz), extruder nozzle, and temperature.
- Partnered with firmware engineers to translate theoretical control laws to discrete algorithms for real-time implementation in C.

PUBLICATIONS & REPORTS

- H Nguyen, N Adrian, JLX Yan, **J Salfity**, W Allen, QC Pham. Development of a Robotic System for Automated Decaking of 3D-Printed Parts. *IEEE International Conference on Robotics and Automation*, Paris, France, May 2020
- **J Salfity**, D Murphy, M Anthony Lewis. Robust Reinforcement Learning Based Policy Development through Internal, External Parameter Variation. *HP Data Science & Knowledge Discovery Summit*, Vancouver, WA, August 2019
- W Staehler, **J Salfity**, T Paula, D Murphy. Multiple Policy Management for Multi-Skilled Agents. *HP Data Science & Knowledge Discovery Summit*, Vancouver, WA, August 2019
- **J Salfity**, H Horii, W Allen. Smart Mobile Robots with Human Emotion Detection. *HP Data Science & Knowledge Discovery Summit*, Vancouver, WA, May 2018
- **J Salfity**, D Murphy. Mobile Robot Map Building with the Automatic Exclusion of Known Objects using Object Recognition through Computer Vision. *HP Data Science and Knowledge Discovery Summit*, Vancouver, WA, May 2018

PATENTS

12 patents filed across robotic mobility, robotic manipulation, 3D Print, edge compute, AI/ML.
6 patents in the public domain:

- W Allen, **J Salfity**, Mobile Autonomous Fleet Control, WO2020122953A1
- K Erickson, **J Salfity**, L Zhao, Modules of Three-Dimensional Printers, WO2020046267A1
- **J Salfity**, W Allen, H Horii, Control System for Mobile Robots, WO2019088990A1
- **J Salfity**, D Murphy, Mobile Robots to Generate Reference Maps for Localization, WO2019089018A1
- **J Salfity**, D Murphy, W Allen, Mobile Robots to Generate Occupancy Maps, WO2019089017A1
- S Stodder, **J Salfity**, M Majette, Correction of Filament Parameters, WO2017086908A1