

Jason J. Jabbour

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🌐 <https://jabbourjason.com/>

EDUCATION

Harvard University

Ph.D. in Computer Science

Cambridge, MA

September 2022 – May 2027 (expected)

University of Virginia (UVA)

B.S. in Systems Engineering / Minor: Computer Science

Concentration: Software & Information Systems

Charlottesville, VA

September 2018 – May 2022

GPA: 3.95/4.0

WORK & RESEARCH EXPERIENCE

Harvard University, Edge Computing Lab

Ph.D. Research Assistant / Reinforcement Learning

Cambridge, MA

September 2022 – Present

- Collaborating with Google to create a real-world based benchmark for reinforcement learning applications
- Investigating the difficulties of bringing RL agents into production and proposing relevant metrics
- Evaluating Google's chip floor planning and web navigation RL applications using real-world oriented metrics

Johns Hopkins University Applied Physics Laboratory

Machine Learning Security Engineer Intern

Laurel, MD

Summer 2022

- Designed and built a prototype AI system for securing network traffic on US Navy ships
- Simulated cyber-attacks on US Navy ships navigating to waypoints using ROS, Gazebo, and OpenAI Gym
- Trained a reinforcement learning agent to detect attacks on a US Navy ship's network traffic and trigger alerts
- Created a Flask-based dashboard for visualizing network traffic and detected attacks

Harvard University, Edge Computing Lab

Undergraduate Research Assistant / Reinforcement Learning

Cambridge, MA

September 2021 – June 2022

- Utilized artificial intelligence to overcome limitations of cheap hardware on a constrained quadruped robot
- Modeled a reinforcement learning problem of a constrained robot in simulation using OpenAI Gym and PyBullet
- Investigated methods for reducing the Sim2Real gap in robotic systems with limited sensing feedback
- Applied TinyML optimization techniques to reduce the size of a reinforcement learning model by 1000%
- Implemented a pipeline for deploying a Stable Baselines model on an embedded system using TFLite

Cornell University, Department of Mathematics

Undergraduate Research Assistant / Mathematics

Ithaca, NY

Summer 2020

- Applied optimal control theory to study bifurcations in the construction of elastic Möbius bands using MATLAB
- Computed the critical twist angle of a Möbius band using numerical methods including the Runge-Kutta method
- Discovered the emergence of a supercritical pitchfork bifurcation at points of instability
- Discovered that all branches emerging from bifurcations occurring before 180° lead to the same Möbius shape

University of Virginia, Department of Computer Science

Undergraduate Research Assistant / Machine Learning

Charlottesville, VA

September 2019 – May 2022

- Applied voice-based machine learning techniques to improve Alzheimer's patient-caregiver relationships
- Led the development of a recommender system to provide adaptive recommendations to Alzheimer caregivers
- Modeled the recommender system as a contextual multi-armed bandit reinforcement learning problem
- Developed the recommender system using Python, SQL, XML RPC, AWS EC2, and HTML injection methods
- Worked with healthcare professionals at OSU to deploy the RL driven system in real-world caregiver homes

University of Virginia Facilities Management

Undergraduate Research Assistant / Control Theory

Charlottesville, VA

September 2021 – May 2022

- Developed an HVAC control algorithm (CA) to optimize ventilation in a university conference room
- Built the CA to recommend ventilation every 15 minutes based on a cost comparison of lost occupant productivity and energy consumption using indoor air quality, occupancy, weather, and HVAC operation data streams
- Trained a random forest machine learning model to recognize occupancy patterns in a university conference room
- Optimized HVAC controls to improve indoor air quality and save \$5,000 in energy costs annually

CONFERENCE PAPERS

- Gao, Y., **Jabbour, J.**, Ko, E., Wijayasingha, L., Kim, S., Wang, Z., Ma, M., Rose, K., Gordon, K., Wang, H., & Stankovic, J. (2023). Integrating Voice-Based Machine Learning Technology into Complex Home Environments. *8th ACM/IEEE Conference on Internet of Things Design and Implementation*. (Submitted). [Paper]
- Caruso, M., **Jabbour, J.**, Neale, C., Summerville, A., Walters, A., Heydarian, A., Small, A., & Varnosfaderani, M. (2022, April). Developing a Dynamic Control Algorithm to Improve Ventilation Efficiency in a University Conference Room. *Systems and Information Engineering Design Symposium (SIEDS)*. (pp. 145-150). IEEE. [Paper] **Best Paper Award** 🏆
- Neuman, S., Plancher, B., Duisterhof, B., Krishnan, S., Banbury, C., Mazumder, M., Prakash, S., **Jabbour, J.**, Faust, A., Croon, G., & Janapa Reddi, V. (2022). Tiny Robot Learning: Challenges and Directions for Machine Learning in Resource-Constrained Robots. *IEEE International Conference on Artificial Intelligence Circuits and Systems (AICAS)*. [Paper]
- Gao, Y., **Jabbour, J.**, Schlegel, E., Ma, M., McCall, M., Wijayasingha, L., Ko, E., Gordon, K., Rose, K., Wang, H., & Stankovic, J. (2021). Out-of-the-Box Deployment to Support Research on In-Home Care of Alzheimer's Patients. *IEEE Pervasive Computing*, 21(1), (pp. 37-47). [Paper]
- Jabbour, G., & **Jabbour, J.** (2021, March 3-5). The Insider Threat Minimization and Mitigation Framework. In M. Nunes, P. Isaias & P. Powell (Eds.), *Proceedings of the 14th IADIS International Conference on Information Systems*, IS 2021, (pp. 69–77). IADIS. (ISBN: 978-989-8704-27-6). [Paper] **Best Paper Award** 🏆

JOURNAL PAPERS

- Ko, E., Kim, S., Schlegel, E., Gao, Y., **Jabbour, J.**, Wang, Z., Nuwan, L., Wright, K., Wang, H., Stankovic, J., Gordon, K., & Rose, K. (2023) Implementing Smarthealth Technology: A Case Study of a Spousal Caregiver for a Person Living with Alzheimer's Disease. *Western Journal of Nursing Research* 2023. (Submitted).
- Jabbour, G., & **Jabbour, J.** (2021). Mitigating the Insider Threat to Information Systems using Fully Embedded and Inseparable Autonomic Self-Protection Capability. *The IADIS International Journal on Computer Science and Information Systems*, 16(1), (pp. 81-95). [Paper]

WORKSHOPS & ABSTRACTS

- **Jabbour, J.**, Neuman, S., Mazumder, M., Banbury, C., Prakash, S., Plancher, B., Janapa Reddi, V. (2022). Closing the Sim-to-Real Gap for Ultra-Low-Cost, Resource-Constrained, Quadraped Robot Platforms. *3rd Workshop on Closing the Sim2Real Gap at the Robotics Science and Systems (RSS) Conference 2022*, New York, NY. [Paper]
- Rose, K., Gordon, K., Schlegel, E., McCall, M., Gao, Y., **Jabbour, J.**, & Ko, E. (2021). Pandemic Deployment of a Smart Health Technology to Improve Stress in Dementia Family Caregivers. *Innovation in Aging*, 5(Suppl 1), (pp. 450-450). [Abstract]
- Wang, W., **Jabbour, J.**, & Borum, A. (2020, August 14-16). Bifurcations in the Construction of Elastic Mobius bands. *Young Mathematicians Conference*, Ohio State University, Columbus, Ohio. [Abstract]

PRESENTATIONS

- **Jabbour, J.** (2022). *Securing Network Traffic Data using Reinforcement Learning*. [Unpublished presentation]. Johns Hopkins University Applied Physics Laboratory AOS QNI Group. Laurel, MD. [Slides]
- **Jabbour, J.** (2021). *Taking Tiny Steps Towards Applying Reinforcement Learning to Achieve Walking Gaits on a Constrained Quadraped Robot*. [Unpublished presentation]. VLSI-Arch Undergraduate Research Presentations. Harvard University, Cambridge, MA. [Slides]

TEACHING EXPERIENCE

Head Grader , Statistics, <i>UVA Department of Applied Mathematics</i>	June 2021 – May 2022
Head Grader , Linear Algebra, <i>UVA Department of Applied Mathematics</i>	June 2021 – August 2021
Teaching Assistant , Probability, <i>UVA Department of Applied Mathematics</i>	Sept. 2020 – December 2020
Lead Teaching Assistant , Programming in Python, <i>UVA Department of Computer Science</i>	Sept. 2019 – May 2022

TECHNICAL SKILLS

Programming: Python, C++, Java, R, MATLAB, HTML, CSS, PHP, JavaScript, x86 Assembly, Git, Lean
Software: AutoCAD Civil 3D, Autodesk Inventor, SketchUp, Figma, Minitab, Spline 3D Design, Linux