Samuel Schmidgall

Robotic Learning @ GMU & NRL | sschmidg@gmu.edu | Google Scholar (click me)

Research Areas

Robotic Learning, Reinforcement Learning, Meta-learning, Online Learning, Neuromorphic Computing

Professional Experience

Space Robotics Department @ Naval Research Laboratory **Washington, D.C.**
Computer Scientist since June 2021
– Research in robotic learning for quadrupedal locomotion using neuromorphic hardware to dramatically improve energy-efficiency of deep learning based methods for robotic control.
Undergraduate Research Intern May 2019 – May 2021
– Developed online learning algorithms for neuromorphic controllers on robotic learning applications via meta-learning online fast- and slow-weight learning rules.

George Mason University **Fairfax, VA**
Graduate Research Assistant, Maryam Parsa since Aug 2022
– Research in brain-inspired artificial intelligence on neuromorphic systems for robotic learning applications.

Mason Experimental Geometry Laboratory **Fairfax, VA**
Undergraduate Research Assistant, Matthew Holzer January 2020 – May 2020
– Research in wave propagations for locked fronts in a discrete time discrete space population model
Undergraduate Research Assistant, Anton Lukyanenko & Damoon Soudbakhsh August 2018 – May 2019
– Research in robotic motion planning, finding optimal localized trajectories for the planning of multiple vehicles.

Gartner **Arlington, VA**
Data Science Intern May 2018 – March 2019
– Extracting and predicting performance based on resume features & language modelling for chat-bot automation.

Asymmetriq **Marshall, VA**
Software Engineering Intern May 2017 – May 2018
– Using deep-learning vision models for improving online license plate character detection.

Education

George Mason University **Fairfax, VA**
PhD in Electrical and Computer Engineering since August 2022
– **RoboticsML:** CS685 Autonomous Robotics, CS896 Research in Robotic Learning, ECE527 Learning from Data, ECE528 Introduction to Random Processes
Bachelor of Science in Computer Science August 2017- May 2021
– **RoboticsML:** CS498 Research in Reinforcement Learning for Robotics I-II, MATH491 Research in Robotic Motion Planning, CS480 Artificial Intelligence, STAT472 Introduction to Statistical Learning, CS484 Data Mining
– **CompSci:** CS483 Analysis of Algorithms, CS367 Systems Programming, CS330 Theoretical CS, CS310 Data Structures, CS471 Operating Systems, CS455 Comp Networking, CS499 Cryptography
– **MathPhysics:** Math315 Real Analysis, MATH322 Adv Linear Algebra, MATH452 Adv Mathematical Statistics, MATH213 Calculus I-III, PHYS261 Physics I-II

Publications

Journal
– **Schmidgall, S.**, Hays, J., (2023). Toward a Robotic Motor Cortex. *Frontiers in Neurorobotics (Under Review).*
– **Schmidgall, S.**, Maryam, P., Dannenberg, H., (2023). Brain-inspired learning in artificial neural networks. *Nature Machine Intelligence (Under Review).*
– **Schmidgall, S.**, Hays, J. (2022). Learning to Learn Online with Neuromodulated Synaptic Plasticity in Spiking Neural Networks. *Neural Networks. (Under Review).*
– Holzer, M., Richey, Z., Rush, W., **Schmidgall, S.**, (2022). Locked fronts in a discrete time discrete space population model. *Journal of Mathematical Biology.*

- **Schmidgall, S.**, Ashkanazy, J., Lawson, W., Hays, J, (2021). SpikePropamine: Differentiable Plasticity in Spiking Neural Networks. *Frontiers in Neurorobotics*.

Conference

- **Schmidgall, S.**, Risi, S., (2023). A neural structure that supports rapid learning for robotic locomotion. *The 2023 Genetic and Evolutionary Computation Conference (GECCO). (Under Review).*
- **Schmidgall, S.**, Parsa, M., (2022). *lava-spikepropamine*: A lava-based library for learning with synaptic plasticity in spiking neural networks. *Neuro-Inspired Computational Elements (NICE). (Under Review).*
- **Schmidgall, S.**, Parsa, M., (2022). Biological connectomes as a representation for the architecture of artificial neural networks. *International Conference on Learning Representations (ICLR). (Under Review).*
- **Schmidgall, S.**, Hays, J., (2022). Stable Lifelong Learning: Spiking neurons as a solution to instability in plastic neural networks. *Neuro-Inspired Computational Elements (NICE).*
- Lukyanenko, A., Camphire, H., Austin, A., **Schmidgall, S.**, Soudbakhsh, D., (2021). Optimal Localized Trajectory Planning of Multiple Non-holonomic Vehicles. *5th Conference on Control Technology and Applications (CCTA).*
- **Schmidgall, S.** (2021). Self-constructing Neural Networks through Random Mutation. *International Conference on Learning Representations (ICLR).*
- **Schmidgall, S.**, (2020). Adaptive Reinforcement Learning through Evolving Self-Modifying Neural Networks. *The 2020 Genetic and Evolutionary Computation Conference (GECCO).*

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Activities and Awards

- **2022 Alan Berman Research Publication Award** for paper *SpikePropamine: Differentiable Plasticity in Spiking Neural Networks.*
- **Invited reviewer** at the NSF "Brain-Inspired Dynamics for Engineering Energy-Efficient Circuits and Artificial Intelligence" Program.
- **Reviewer editor** for *Neural Networks*
- **Invited speaker** at the Intel Labs INRC Spring 2022 Continual Learning Workshop
- **Invited speaker** at the Spring 2022 Naval Applications of Machine Learning (NAML) Oral Presentation
- **Best Poster Award** MEGL Symposium Poster Presentation Spring 2020
- **Best Poster Award** Joint Mathematics Meeting Conference Spring 2019