

Baiting Luo

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Education

Vanderbilt University , Tennessee Ph.D. in Computer Science <i>Advisor: Prof. Abhishek Dubey</i>	Aug 2021 – Present
Northwestern University , Illinois M.S. in Computer Engineering Thesis: Sybil Attack Detection in VANET (Northwestern Best Thesis Award) <i>Advisor: Prof. Qi Zhu</i>	Sept 2019 – June 2021
Rensselaer Polytechnic Institute (RPI) , New York B.S. in Computer Engineering <i>Dual Degree: Computer Science</i>	Sept 2015 – May 2019

Work Experience

Research Intern, Mentor: Dr. Arun Ramamurthy Siemens Corporation, Technology • Planning in Stochastic and Non-stationary Environments: <ul style="list-style-type: none">– Developed a transformer-based dynamics model integrating planning capabilities to enhance sample efficiency and robustness in non-stationary environments.	May 2025 – Present
Ph.D. Student and Research Assistant, Advisor: Prof. Abhishek Dubey Institute for Software Integrated Systems, Vanderbilt University Research Topics: Decision Making under Uncertainty, Planning, Reasoning, Machine Learning, Online/Offline Reinforcement Learning, Heuristic Search, Autonomous Cyber-Physical Systems • Efficient In-Context Planning in Latent Temporal Abstraction Space: <ul style="list-style-type: none">– Introduced In-Context Latent Temporal Abstraction Planner (I-TAP), integrating temporal abstractions and in-context learning using Vector Quantized Variational Autoencoder (VQ-VAE) and a GPT-2 style Transformer, combined with Monte Carlo Tree Search (MCTS) for efficient and robust planning in partially observable environments. (Submitted to Neurips) • Planning with Learned Action Models in High-Dimensional and Non-stationary Environments: <ul style="list-style-type: none">– Developed Latent Macro Action Planner (L-MAP) for offline reinforcement learning, leveraging a state-conditioned VQ-VAE to learn temporally extended macro-actions and a GPT-2 style Transformer for autoregressive sequence modeling, combined with Monte Carlo Tree Search (MCTS) for stochastic planning; achieved state-of-the-art performance on high-dimensional tasks while enabling low-latency decision-making in stochastic environments. (<i>ICLR 2025 Spotlight</i>)[paper][code] • Decision Making in Non-Stationary Environment: <ul style="list-style-type: none">– Proposed Adaptive Monte Carlo Tree Search for safe exploration and online adaptation to changing dynamics in model-based reinforcement learning tasks (<i>AAMAS 2024</i>)[paper][code].– Created NS-Gym toolkit for standardized evaluation of online decision-making algorithms in dynamically changing environments [paper][code]. • Runtime Safety Assurance of Autonomous Vehicles: <ul style="list-style-type: none">– Proposed Dynamic Simplex framework improving performance without compromising safety in autonomous systems through planning with multiple generative models in dynamic environments (<i>ICCPs 2023</i>)[paper][code].– Developed advanced sampling techniques for high-risk scenario generation in AV testing (<i>ICAA 2022</i>)[paper][code].– Created an automated testing framework for adversarial conditions in AV simulations (<i>ITSC 2022</i>) [paper]	Aug 2021 – Present

[\[code\]](#).

Research Assistant, Advisor: Prof. Qi Zhu
Design Automation of Intelligent Systems Lab, Northwestern University

Mar 2020 – July 2021

• **Securing Connected and Autonomous Vehicles:**

- Developed hybrid GCN-RNN model to detect Sybil attacks in connected vehicle networks (IV 2021) [\[paper\]](#).
- Created dual cyber-physical blockchain framework for efficient security in large-scale vehicular networks (IV 2021) [\[paper\]](#).

Publications

* indicates equal contribution

Baiting Luo, Ava Pettet, Aron Laszka, Abhishek Dubey, Ayan Mukhopadhyay, “[Scalable Decision-Making in Stochastic Environments through Learned Temporal Abstraction](#)”, *13th International Conference on Learning Representations (ICLR 2025 Spotlight)*. (Top 5.1%) [\[code\]](#)

Baiting Luo, Yunuo Zhang, Nathaniel S Keplinger, Samir Gupta, Abhishek Dubey, Ayan Mukhopadhyay, “Efficient In-Context Planning in the Latent Temporal Abstraction Space”, *(Submitted to Neurips)*.

Baiting Luo, Yunuo Zhang, Abhishek Dubey, Ayan Mukhopadhyay, “[Act as You Learn: Adaptive Decision-Making in Non-Stationary Markov Decision Processes](#)”, *23rd International Conference on Autonomous Agents and MultiAgent Systems (AAMAS 2024)*. (Acceptance rate: 25%) (**Vanderbilt C.F. Chen Best Paper Runner-Up Award**) [\[code\]](#)

Baiting Luo, Shreyas Ramakrishna, Ava Pettet, Christopher Kuhn, Gabor Karsai, Ayan Mukhopadhyay, “[Dynamic Simplex: Balancing Safety and Performance in Autonomous Cyber Physical Systems](#)”, *14th ACM/IEEE International Conference on Cyber-Physical Systems (ICCPs 2023)*. (Acceptance rate: 25.6%) [\[code\]](#)

Yunuo Zhang, **Baiting Luo**, Ayan Mukhopadhyay, Abhishek Dubey, “[Observation Adaptation via Annealed Importance Resampling for Partially Observable Markov Decision Processes](#)”, *International Conference on Automated Planning and Scheduling (ICAPS 2025)*. (Acceptance rate: 22.8%)

Yunuo Zhang, **Baiting Luo**, Ayan Mukhopadhyay, Gabor Karsai, Abhishek Dubey, “ESCORT: Efficient Stein-variational and Sliced Consistency-Optimized Temporal Belief Representation for POMDPs”, *(Submitted to Neurips)*

Nathaniel S. Keplinger, **Baiting Luo**, Ilyas Bektas, Yunuo Zhang, Kyle Hollins Wray, Aron Laszka, Abhishek Dubey, Ayan Mukhopadhyay, “[NS-Gym: Open-Source Simulation Environments and Benchmarks for Non-Stationary Markov Decision Processes](#)”, *(Submitted to Neurips)* [\[code\]](#)

Yunuo Zhang, **Baiting Luo**, Ayan Mukhopadhyay, Daniel Stojcsics, Daniel Elenius, Anirban Roy, Susmit Jha, Miklos Maroti, Xenofon Koutsoukos, Gabor Karsai, Abhishek Dubey, “[Shrinking POMCP: A Framework for Real-Time UAV Search and Rescue](#)”, *IEEE International Conference on Assured Autonomy (ICAA 2024)*.

Ava Pettet, Yunuo Zhang, **Baiting Luo**, Kyle Wray, Hendrik Baier, Aron Laszka, Abhishek Dubey, Ayan Mukhopadhyay, “[Decision Making in Non-Stationary Environments with Policy-Augmented Search](#)”, Extended Abstract in the *23rd International Conference on Autonomous Agents and MultiAgent Systems (AAMAS 2024)*. (Acceptance rate: 40%) [\[code\]](#)

Baiting Luo, “[Adaptive Decision-Making in Non-Stationary Markov Decision Processes](#)”, Doctoral Consortium in the *23rd International Conference on Autonomous Agents and MultiAgent Systems (AAMAS 2024)*.

Shreyas Ramakrishna*, **Baiting Luo***, Christopher Kuhn, Gabor Karsai, Abhishek Dubey, “[ANTI-CARLA: An Adversarial Testing Framework for Autonomous Vehicles in CARLA](#)”, *IEEE 25th International Conference on Intelligent Transportation Systems (ITSC 2022)*. [\[code\]](#)

Shreyas Ramakrishna, **Baiting Luo**, Yogesh Barve, Gabor Karsai, Abhishek Dubey, “[Risk-Aware Scene Sampling for Dynamic Assurance of Autonomous Systems](#)”, *IEEE International Conference on Assured Autonomy (ICAA 2022)* [\[code\]](#)

Baiting Luo, Xiangguo Liu, Qi Zhu, “[Credibility Enhanced Temporal Graph Convolutional Network Based Sybil Attack Detection On Edge Computing Servers](#)”, accepted by *32nd IEEE Intelligent Vehicles Symposium (IV 2021)*. (Acceptance rate: 49.3%)

Xiangguo Liu, **Baiting Luo**, Ahmed Abdo, Nael Abu-Ghazaleh, Qi Zhu, “[Securing Connected Vehicle Applications with An Efficient Dual Cyber-Physical Blockchain Framework](#)”, accepted by *32nd IEEE Intelligent Vehicles Symposium (IV 2021)*. (Acceptance rate: 49.3%)

Awards and Honors

- Vanderbilt Provost’s Pathbreaking Discovery Award, 2025
- Vanderbilt C.F. Chen Best Paper Runner-Up Award, 2024
- AAMAS Student Scholarship, 2024
- Vanderbilt University Graduate School Travel Grant, 2024
- Vanderbilt University Graduate School Travel Grant, 2023
- Northwestern Best MS Computer Engineering Thesis Award, 2021
- Dean’s Graduate Fellowship, 2021
- Russell G. Hamilton Scholar, 2021

External Services

Conference (Sub-) Reviewer

- Neural Information Processing Systems (Neurips 2025)
- Knowledge Discovery and Data Mining (KDD 2025)
- International Conference on Autonomous Agents and Multiagent Systems (AAMAS 2025)
- International Joint Conference on Neural Networks (IJCNN 2025)
- International Conference on Neural Information Processing (ICONIP 2024)
- IEEE International Transportation Systems Conference (ITSC 2022)

Journal Reviewer

- IEEE Transactions on Intelligent Vehicles
- ACM Transactions on Computing for Healthcare
- IEEE Internet of Things Journal

Program Committee Member

- Artifact Evaluation Committee, ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS 2024/2025)
- International Conference on Data Mining and Big Data (DMBD 2024)

Core Coursework

Machine Learning, Advanced Machine Learning, Deep Learning, Advanced Deep Learning: Representation Learning, AI Programming, Reinforcement Learning, Design & Analysis of Algorithms, Data Structures, Computer Vision, Massively Parallel Programming w/ CUDA, Database Systems

Skills

Programming Languages: Python, C++, C, Java, SQL, \LaTeX

Frameworks & Libraries: Scikit-Learn, PyTorch, TensorFlow, NumPy, Pandas, Mujoco