Joshua R. Bhagat Smith

+1 501-499-2407 | joshsmith1005@gmail.com | jbs023.github.io

Education

Oregon State University Corvallis, OR
PhD Robotics and AI 2020-2024

University of Arkansas Fayetteville, AR
MS Computer Science 2015-2017

University of Arkansas Fayetteville, AR
BS Computer Engineering 2011-2015

Skills

Software/Tools: Python | C++ | Java | ROS | DDS | Pytorch | JAX | Docker | Kubernetes | Protobuf

Technical Skills: Machine Learning | Reinforcement Learning| Signal Processing | Sensor Fusion | Control Systems | Modeling & Simulation | Human-Robot Interaction | Robotics Software

Soft Skills: Cross-functional Collaboration | Technical Writing | Strategic Decision Making | Knowledge Sharing | Research Presentation | Leadership | Mentoring

Professional Experience

Senior Research Scientist, Systems Technology & Research (STR) 2026-

Researching AI & ML techniques to develop advanced autonomy capabilities.

AI & ML Lead Engineer, Peraton 2024-2026

Technical lead on R&D projects focused on distributed ML pipelines and simulation frameworks.

- Designed and implemented a multi-GPU MLOps Platform that orchestrated distributed training of foundation models on custom datasets, enabling efficient hyperparameter optimization and model fine-tuning.
- Developed modeling and simulation tools for multi-robot underwater systems, supporting rapid and controlled pre-deployment experimentation.
- Contributed to adaptive control algorithms that detect internal malfunctions, enabling robots to maintain safe operation in real-world environments.

Graduate Research Assistant & Lab Manager, Oregon State University 2020-2024

Researched time-series ML modeling of physiological data for adaptive cognitive state estimation.

- Implemented a real-time cognitive state estimation system, processing physiological signals (e.g., heart-rate, pupil diameter, EEG) from wearable sensors to support adaptive robot decision making.
- Created a novel Bayesian meta-learning framework for estimating a human's workload across multiple dimensions, enabling few-shot model adaptation for more accurate estimates for unknown tasks.
- Led human-subject evaluations to define performance parameters for supervising 500+ uncrewed aircraft, and analyzed eye-tracking data to assess operator workload, situational awareness, and attentional focus.
- Developed a human–swarm interface allowing one operator to control four 200-agent robot swarms, using heuristics and discrete-time Markov chain models to convey the swarm's long-term behavior.

Senior Software Engineer, HERE Technologies 2017-2020

Developed distributed systems and ML pipelines for vehicle sensor data processing.

- Enhanced model accuracy for lane topology and sign localization by translating ML-research code into a concrete, scalable implementations.
- Developed cloud infrastructure for distributed data processing, analyzing millions of kilometers of data daily.
- Owned the research codebase, focused on CI/CD pipelines, reproducible tests, and code review standards.

Research Intern, NASA Langley Research Center Summer 2016

Worked with real-world UAVs for infrastructure inspection.

- Researched and implemented near-ground UAV navigation methods to avoid obstacles, allowing the UAV to safely navigate near high-voltage power lines.

Publications

UNPUBLISHED MANUSCRIPTS (IN PREP. OR UNDER REVIEW):

J. Bhagat Smith, P. Baskaran, J.A. Adams. "Influence of Honeybee Inspired Drifter Agents." PloS one, 2025. (In Review).

J. Bhagat Smith, J.A. Adams. " Evaluating Multi-Dimensional Workload Algorithm for Real-World Application Domain", IEEE Transactions on Field Robotics, 2025. (In Preparation).

PREPRINTS:

J. Bhagat Smith, J.A. Adams. "Workload Estimation for Unknown Tasks: A Survey of Machine Learning Under Distribution Shift.", *arXiv preprint arXiv:2403.13318*, 2024)

J.A. Adams, C.A. Sanchez, V. Mallampati, **J. Bhagat Smith**, E. Burgess, A. Dassonville. "OSU-Wing PIC Phase I Evaluation: Baseline Workload and Situation Awareness Results.", *arXiv preprint arXiv:2411.18750*, (2024)

PEER REVIEWED PUBLICATIONS:

J. Bhagat Smith, J.A. Adams. "Estimating Workload for Supervisory Human–Robot Teams: An Initial Analysis of Meta-Learning," in *IEEE Transactions on Human-Machine Systems*, doi: 10.1109/THMS.2025.3640359., 2025

V. Mallampati, **J. Bhagat Smith**, E. Burgess, C.A. Sanchez, & J. A. Adams. "Workload Modeling for 1: N UAS Delivery Operations." in *Human Factors and Ergonomics Society Annual Meeting* (Vol. 69, No. 1, pp. 1749-1751), (2025)

J. Bhagat Smith, M.R. Giolando, V. Mallampati, P. Baskaran, J.A. Adams. "Experimental Design Principles for Develop Machine Learning Models for Human-Robot Interaction" in *Springer Nature, Discovering Frontiers in Human-Robot Interaction*, 2024.

J. Bhagat Smith, P. Baskaran, J.A. Adams. "Improving Transparency in Human-Collective Visualizations" in *IEEE International Symposium on Robot and Human Interactive Communication*, Pasadena, CA, USA, pp. 1-7 2024.

J. Bhagat Smith, V. Mallampati, P. Baskaran, M.R. Giolando, J.A. Adams, 'Design Principles for Building Robust Human-Robot Interaction Machine Learning Models" in *Companion of the ACM/IEEE International Conference on Human-Robot Interaction*, Late Breaking Report, 2024

F. Aderinto*, **J. Bhagat Smith***, M.R. Giolando, P. Baskaran, J.A. Adams, "Improving Human-Robot Team Transparency with Eye-tracking based Situation Awareness Assessment" in *Companion of the ACM/IEEE International Conference on Human-Robot Interaction*, Late Breaking Report, USA, 2024 **[Best LBR Nominee]**

J. Bhagat Smith*, S.A Toribio*, P. Baskaran, J.A. Adams. "Uncertainty-Aware Visual Workload Estimation for Human-Robot Teams" in *Conference on Cognitive and Computational Aspects of Situation Management (CogSIMA)*, Philadelphia, PA, USA, 2023, pp. 1-8

J. Bhagat Smith, P. Baskaran and J. A. Adams, "Decomposed Physical Workload Estimation for Human-Robot Teams" in *IEEE International Conference on Human-Machine Systems (ICHMS)*, Orlando, FL, USA, 2022, pp. 1-6

P. Baskaran, , **J. Bhagat Smith**, J.A. Adams. "Visual Task Recognition for Human-Robot Teams" in *IEEE International Conference on Human-Machine Systems*, Orlando, FL, USA, 2022, pp. 1-6

A. Moore, M. Schubert, T. Fang, **J. Smith**, N. Rymer. "Lidar-derived Navigational Geofences for Low Altitude Flight Operations" in *AIAA AVIATION FORUM*, Virtual Event, 2020.

A. Moore, M. Schubert, S. Balachandran, M. Consiglio, C. Munoz, **J. Smith**, D. Lewis, P. Schneide. "Inspection of Electrical Transmission Structures with UAV Path Conformance and Lidar-based Geofences" in *IEEE Power & Energy Society Innovative Smart Grid Technologies Conference (ISGT)*, Washington, DC, USA, 2018, pp. 1-5. 2018.

J. Smith, M. Gashler. "An Investigation of How Neural Networks Learn from the Experiences of Peers Through Periodic Weight Averaging" in *IEEE International Conference on Machine Learning and Applications (ICMLA)* Cancun, Mexico, 2017, pp. 731-736

Mentoring

Mentees:

2024 **Vivek Mallampati**, Junior PhD student, OSU
2024 **Favour Aderinto**, Junior PhD student, OSU
2023 **Robert Lucas**, Undergraduates Research Assistant, OSU
2022 **Simone Angelo S. Toribio**, Research Experience for Undergraduates Student, OSU