Yufei Zhu

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Education

Now – Mar. 2022 | **Örebro University , Sweden**
- PhD student in Robot Navigation & Perception Lab, supervised by Martin Magnusson, co-supervised by Andrey Rudenko (TUM), Tomasz P. Kucner (Aalto), Achim J. Lilienthal (TUM). Expected to graduate in **Sep. 2026**.
- Research project : Learning Spatio-Temporal Representations of Human Dynamics for Prediction and Robot Navigation, which is part of DARKO EU project (Dynamic Agile Production Robots That Learn and Optimise Knowledge and Operations)
- **Research topics :** Human Motion Prediction | Spatiotemporal Pattern Learning | Probabilistic Modeling | Neural Implicit Representations | Generative Modeling

2017 – 2015 | **KTH Royal Institute of Technology , Sweden**
- Master of Science in System, Control and Robotics
- Thesis project : Motion planning framework for unmanned aerial vehicles in dynamic environments
- Courses : Machine learning, Image analysis and computer vision, Applied estimation, Speech and speaker recognition, Robotics and autonomous systems, Dynamics and motion control

Research

My research focuses on learning probabilistic representations of human motion patterns (*maps of dynamics*) that encode environment-level spatio-temporal dynamics, enabling long-term human motion prediction and human-aware robot navigation. I advance these representations through implicit neural representations for continuous spatio-temporal motion fields, online adaptation to evolving environments, and integration into generative models such as flow matching, toward controllable multi-modal trajectory generation.

Publications : [page]

[1] **Y. Zhu**, S. M. Yang, A. Rudenko, T. P. Kucner, A. J. Lilienthal, and M. Magnusson. "NeMo-map : Neural Implicit Flow Fields for Spatio-Temporal Motion Mapping" *ICLR 2026*
[2] **Y. Zhu**, S. M. Yang, M. Magnusson, and A. Wang. "HiCrowd : Hierarchical Crowd Flow Alignment for Dense Human Environments" *ICRA 2026*
[3] **Y. Zhu**, A. Rudenko, T. P. Kucner, A. J. Lilienthal, and M. Magnusson. "Long-Term Human Motion Prediction Using Spatio-Temporal Maps of Dynamics" *IEEE Robotics and Automation Letters (RAL) 2025*
[4] **Y. Zhu**, A. Rudenko, L. Palmieri, L. Heuer, A. J. Lilienthal, and M. Magnusson. "Fast Online Learning of CLiFF-maps in Changing Environments" *ICRA 2025*
[5] T. R. Almeida*, **Y. Zhu***, A. Rudenko, T. P. Kucner, J. A. Stork, M. Magnusson, and A. J. Lilienthal. "Trajectory Prediction for Heterogeneous Agents : A Performance Analysis on Small and Imbalanced Datasets" *IEEE Robotics and Automation Letters (RAL) 2024*
[6] **Y. Zhu**, H. Fan, A. Rudenko, M. Magnusson, E.Schaffernicht, and A. J. Lilienthal. "LaCE-LHMP : Airflow Modeling-Inspired Long-Term Human Motion Prediction By Enhancing Laminar Characteristics in Human Flow" *ICRA 2024*
[7] **Y. Zhu**, A. Rudenko, T. P. Kucner, L. Palmieri, K. O.Arras, A. J. Lilienthal, and M. Magnusson. "CLiFF-LHMP : Using Spatial Dynamics Patterns for Long-Term Human Motion Prediction" *IROS 2023*

Experience

Mar. 2026 – Present | **Visiting PhD Student, UC San Diego , USA**
- Conducting research with Prof. Rose Yu on geometry-conditioned generative models for human motion generation under physical constraints

controllable generative modeling | flow matching | spatio-temporal representation learning

Jan. 2025 – Mar. 2025 | **Research Intern, Miraikan Accessibility Lab , Japan**
- Developed hierarchical crowd-flow alignment navigation methods for dense human environments

Python | crowd navigation | RL | MPC

Sep. 2024 – Mar. 2024 | **Research Intern, Robert Bosch GmbH, Corporate Research , Germany**
- Exploration for automated MoD collection and lifelong support from a mobile robot, online update of MoDs

ROS | Python | Git | online EM algorithm

Feb. 2022 – Apr. 2019 | **Software Engineer, Klarna Bank AB , Sweden**
- Develop and maintain performance testing tool in Klarna
- Develop a code generator for Python and Javascript
- Develop and maintain services for process automation

Python | Git | Docker | Jenkins | AWS | PostgreSQL | Splunk | Datadog | Grafana | Snyk

Jan. 2019 – Aug. 2017 | **Software Engineer, Ericsson AB , Sweden**
Develop and maintain Ericsson Charging System in Ericsson Multimedia Telephony Application Server

C++ | Git

Sep. 2021 – Sep. 2020 | **Master Thesis, KTH Royal Institute of Technology , Sweden**
Build a motion planning framework for UAV collision-free navigation in a dynamic environment. The framework integrates motion planner, UAV control system, and UAV simulation. The motion planning algorithm is developed based on RRT^X and CHOMP algorithm. The project is open-sourced at github.

C++ | ROS | Python | Unity | Git

Skills

Programming	Python, C/C++, Javascript , SQL , Shell scripting, Matlab
Database	PostgreSQL
AWS	EC2, Lambda, S3, API Gateway, Auto scaling.
Operating System	Linux
Other Tools	Robot Operating System(ROS), Docker, Git, Jenkins, Splunk, Datadog, Grafana, LaTeX