

Pierrick Lorang

Joint Ph.D. Candidate in Mechanical Engineering & Human-Robot Interaction, Tufts University (Expected May 2026)

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Robotics • Neuro-Symbolic AI • Task and Motion Planning • Reinforcement & Imitation Learning • Continual Adaptation • Foundation Models

AI & Robotics Research Scientist Position — Available from June 2026

EDUCATION

- **Joint Ph.D. in Mechanical Engineering & Human-Robot Interaction • Thesis in AI for Robotics** Oct 2021 - May 2026
Tufts University & Austrian Institute of Technology GmbH (AIT) — **GPA: 4.0/4.0** Medford, US & Vienna, AT
 - Joint ME & HRI Ph.D. Degree from Tufts University. Doctoral program in collaboration between the *Human-Robot Interaction Laboratory* at Tufts and the *Complex Dynamical Systems Center* at Austrian Institute of Technology.
 - Dissertation (Advisor: Prof. ✉️ Matthias.Scheutz@tufts.edu): "Neuro-Symbolic Architectures for Open-World Robotic Adaptation." Developing hybrid learning frameworks that combine symbolic reasoning and neural control to enable robots to learn new tasks from few demonstrations and adapt autonomously to novel real-world conditions.
 - **Coursework:** Artificial Intelligence (A+), Machine Learning & Data Mining (A), Reinforcement Learning (A), Probabilistic Systems Analysis (A+), Ethics for AI/Robotics (A+), Human-Robot Interaction (A), Robotics (A+), Probabilistic Robotics for HRI (A), Advanced Dynamics (A), Epistemic Planning (A), Controls (Qualifying Exam), Dynamics (Qualifying Exam), Mechanical Design (Qualifying Exam), Planning (Qualifying Exam), Graph Neural Networks (Attendance), Generative AI (Attendance)
- **M.Sc. in Mechanical Engineering - Robotics & Mechatronics • Aerospace Label** 2017 - 2020
Université de Technologie de Compiègne (UTC) — **GPA: 3.6/4.0** Compiègne, France
 - Top-tier engineering school (Sorbonne Universités, QS Top 77 Global)
 - Erasmus Exchange: Machine Learning & Mechatronics, Università di Bologna, Italy (2019-2020)
 - Selected for Georgia Tech double-diploma program in Machine Learning
 - **Relevant Coursework:** Mechatronics Systems Modeling and Control, Programming, Big Data Architectures, Electronic Functions for the Engineer, General Electricity, Basis of Linear Electronics, Electrical Machines, Fluid Transport Machinery, Elements of Strength of Materials, Methods and Programs for Solving Engineering Problems, CAD: Geometrical Modelling, Elements of the Design Function, Technology Entrepreneurship, International Markets and Economics
- **Deep Learning Specialization** 2020
Andrew Ng Online Course Coursera
- **B.Sc. Preparatory Classes for Grandes Ecoles** 2014 - 2017
Kleber High-school, Mathematics, Physics and Engineering (PSI* elite class) — **GPA: 4.0/4.0** Strasbourg, France

EXPERIENCE

- **Research Scientist in Artificial Intelligence** Oct 2021 - Present
Austrian Institute of Technology & Tufts University HRI Laboratory Vienna & Medford, MA
 - Developed and experimentally validated neuro-symbolic architectures integrating symbolic planning and deep reinforcement learning for data-efficient open-world adaptation. Currently working on real robots and large machinery.
 - Engineered hierarchical hybrid control systems for autonomous driving (CARLA), achieving strong generalization across dynamic traffic and sensor perturbations.
 - Pioneered curiosity-driven imagination framework for accelerated policy discovery via mental simulation, reducing sample complexity in novel tasks.
 - Designed few-shot neuro-symbolic imitation learning framework extracting task structure from ≤ 5 human demonstrations, enabling interpretable long-horizon generalization.
 - Deployed foundation-model-assisted automation pipelines on Kinova robotic arms and industrial forklifts for symbol and skill discovery in real-world settings.
 - Led research integrating LLMs with symbolic planning and RL for novelty adaptation in open-world robotics.
 - 5 first-author publications at premier robotics venues (ICRA², IROS, CoRL, PRL-IJCAI) and 2 co-author publications (AIJ, IFAC); plus 3 first-author and 3 co-author papers in preparation/submission.
 - Mentored Master's students, supported PhD candidates in initiating their dissertations, and contributed to grant proposal writing and funding applications.
- **Computer Vision - AI Engineer** Sept 2020 - Oct 2021
Technology & Strategy - DataLab Stuttgart, Germany
 - Developed end-to-end deep learning pipelines for object detection, semantic segmentation, and human pose estimation using PyTorch CNNs.
 - Implemented semi-supervised and unsupervised training with pseudo-labeling and augmentation, boosting performance on limited data.
 - Created production-ready computer vision systems using OpenCV, achieving robust inference on industrial datasets.
 - Built dataset creation and arrangement pipelines using pandas, NumPy, and PyTorch for scalable preprocessing.
- **R&D Engineer Intern - Autonomous Robotics** Mar 2020 - Oct 2020
Capgemini - Altran Toulouse, France
 - Designed autonomous drone navigation systems using SLAM in ROS & Gazebo with 3D LiDAR and camera sensors.

- Developed multi-agent drone fleet architecture with human-machine interaction capabilities under agile management.
 - Implemented DevOps infrastructure on Linux for scalable deployment of autonomous systems.
- **Assistant Research Engineer - MEMS** Sept 2018 - Feb 2019
New York, NY
Advanced Science Research Center, City College of New York
- Designed MEMS biosensors for detecting cancerous cells in advanced nanotechnology facilities.
 - Contributed to fabrication and testing of high-sensitivity prototypes for medical diagnostics.
- **Chairman – Aerospace Engineering Association** Oct 2017 – Sept 2018
Compiègne, France
UTSpace
- Led the re-establishment of an aerospace engineering student association providing hands-on experience in rocket and nanosatellite design for participation in C'Space, organized by Planète Sciences and CNES.
 - Managed a multidisciplinary engineering project involving the design and construction of a sounding rocket integrating an autonomous retractable drone, ejected at 2000 m altitude (Project *Prométhée*).
 - Oversaw system architecture, mechanical integration, and project planning while coordinating technical teams under strict aerospace safety and performance constraints.
 - Directed communication and outreach efforts, including promotion of the association and recruitment of executive board members and engineers.
 - Handled administrative responsibilities: creation of banking contracts, development of partnerships (FabLab, industrial partners including Thales), C'Space registration, procurement management, and co-organization of an ESA conference.
 - Managed treasury operations, including grant funding acquisition, budget planning, and financial tracking.

TECHNICAL SKILLS

- **Languages:** Python, PyTorch, C++, ROS/ROS2, MATLAB
- **ML/AI:** Symbolic AI, Reinforcement, Imitation, Diffusion, Transformer, Hugging Face, Stable-Baselines3, scikit-learn
- **Planning & Simulation:** Search Algorithms, PDDL, Fast Downward, Mujoco, Gazebo, CARLA, Isaac Sim, MoveIt
- **Computer Vision:** OpenCV, YOLO, Mask R-CNN, Vision Transformers (ViT) like OWLv2 / CLIP
- **Foundation Models:** LLM & VLM (GPT, Claude, LLaMA, etc), Vision-Language-Action Models (VLA)
- **Cloud Computing Tools:** Linux, Git, Docker, Singularity, CUDA, NumPy, Pandas, Tmux, Weights & Biases

PUBLICATIONS & SUBMISSIONS

First-Author Publications (6) & Submissions (4):

- **P. Lorang** et al., "Expert-Free, Data-Efficient Symbol and Skill Discovery for Long-Horizon Robot Tasks," *In Preparation*, 2026.
- **P. Lorang** et al., "Build on Priors: Distilling Knowledge from Controls and Foundation Models for Efficient and Adaptive Neuro-Symbolic Architectures," *IEEE RA-L*, *Under Review*, 2026.
- **P. Lorang** et al., "Neuro-Symbolic Epistemic Agents for POMDP-Based Task Planning" *ICAPS*, *Under Review*, 2026.
- T. Duggan*, **P. Lorang***, H. Lu*, M. Scheutz, "Comparing the Cost and Performance of Vision-Language-Action Models Against Classical Neuro-Symbolic Approaches," *Adv. Robotics Research Journal*, *Under Review*, 2026.
- **P. Lorang** et al., "Few-Shot Neuro-Symbolic Imitation Learning for Long-Horizon Planning and Acting," *CoRL*, 2025.
- **P. Lorang** et al., "Curiosity-Driven Imagination: Discovering Plan Operators and Learning Associated Policies for Open-World Adaptation," *ICRA*, 2025.
- **P. Lorang**, "Breaking Task Impasses Quickly: Adaptive Neuro-Symbolic Learning for Open-World Robotics," *ICRA Doctoral Consortium*, 2025.
- **P. Lorang** et al., "A Framework for Neurosymbolic Goal-Conditioned Continual Learning in Open Worlds," *IROS*, 2024.
- **P. Lorang** et al., "Adapting to the 'Open World': The Utility of Hybrid Hierarchical RL and Symbolic Planning," *ICRA*, 2024.
- **P. Lorang** et al., "Speeding-Up Continual Learning Through Information Gains in Novel Experiences," *IJCAI PRL Workshop*, 2022.

Co-Author Publications (2) & Submissions (2):

- H. Lu, **P. Lorang**, M. Scheutz, "Understanding and Explaining Vision-Language-Action Models Through Probing," *In Preparation*, 2026.
- H. Lu, **P. Lorang**, M. Scheutz, "Novelty Adaptation Through Hybrid LLM-Symbolic Planning and LLM-Guided RL," *ICRA*, *Under Review*, 2026.
- k. Goebel, **P. Lorang**, V. Staderini, P. Zips, "Integrating LLMs and Classical Planning for Pallet Logistics: A Case Study," *IFAC*, 2026.
- S. Goel, P. Lymperopoulos, R. Thielstrom, E. Krause, P. Feeney, **P. Lorang**, et al., "A Neurosymbolic Cognitive Architecture Framework for Handling Novelty in Open Worlds," *Artificial Intelligence Journal*, 2024.

LANGUAGES

French: Native **English:** Fluent **German:** Limited Working Proficiency **Italian:** Limited Working Proficiency