# 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*

## Research 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 $\leq$5 human demonstrations, enabling interpretable long-horizon generalization.
  - Deployed foundation-model-assisted automation pipelines on Kinova robotic arms and industrial forklifts for symbol and skill discovery in real-world settings.
  - Led research integrating LLMs with symbolic planning and RL for novelty adaptation in open-world robotics.
  - 5 first-author publications at premier robotics venues (ICRA$^2$, IROS, CoRL, PRL-IJCAI) and 2 co-author publications (AIJ, IFAC); plus 3 first-author and 3 co-author papers in preparation/submission.
- **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
  *Advanced Science Research Center, City College of New York* — *New York, NY*
  - Designed MEMS biosensors for detecting cancerous cells in advanced nanotechnology facilities.
  - Contributed to fabrication and testing of high-sensitivity prototypes for medical diagnostics.

## 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 (5) & 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** 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 Novelties in Open Worlds," ***Artificial Intelligence Journal***, 2024.

## Languages

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