

## EDUCATION

### **Aalto University School of Electrical Engineering**

**D.Sc. (Tech.)**

**Expected 2026**

Supervisor: Prof. Ville Kyrki

Intelligent Robotics Group

Thesis: Semantic-dynamic scene understanding for localization, mapping, and querying in robotic grid maps

**M.Sc. (Tech.)**

**2018**

Major: Control, robotics, and autonomous systems

Minor: Computer science

Thesis: Motion-based extrinsic parameter calibration of a robot's multisensor system

**B.Sc. (Tech.)**

**2016**

Major: Automation and systems technology

Minor: Software engineering

Thesis: Semantic mapping in robotics

**2011**

## WORK EXPERIENCE

**Aalto University**

**Espoo, Finland**

**April 2022 -**

Doctoral candidate

Apr. 2022 -

**GIM Robotics**

**Espoo, Finland**

**May 2017 - April 2022**

Lead robotics engineer

Jul. 2020 - Apr. 2022

Line manager

Jan. 2019 - Apr. 2022

Project manager

Oct. 2018 - Apr. 2022

Senior robotics engineer

Jul. 2018 - Jul. 2020

Robotics engineer

May 2017 - Jul. 2018

**Polea Oy**

**Espoo, Finland**

**June 2013 - May 2017**

Lead developer

Aug. 2016 - May. 2017

Software engineer

Jun. 2013 - Aug. 2016

## PUBLICATIONS

### **Conference proceedings**

Matti Pekkanen, Francesco Verdoja, Ville Kyrki (Sep. 2024) "Object-Oriented Mapping in Dynamic Environments" In Proceedings of IEEE Int. Conf. on Multisensor Fusion and Integration for Intelligent Systems (MFI) 2024

Matti Pekkanen, Francesco Verdoja, Ville Kyrki (Sep. 2024) "Localization Under Consistent Assumptions Over Dynamics" In Proceedings of IEEE Int. Conf. on Multisensor Fusion and Integration for Intelligent Systems (MFI) 2024

Matti Pekkanen, Tsvetomila Mihaylova, Francesco Verdoja, Ville Kyrki (Sep. 2025) "Do Visual-Language Maps Capture Latent Semantics?" In Proceedings of IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2025

Matti Pekkanen, Francesco Verdoja, Ville Kyrki (Jun. 2026) "QuASH: Using Natural-Language Heuristics to Query Visual-Language Robotic Maps" In Proceedings of IEEE International Conference on Robotics and Automation (ICRA) 2026

### **Workshop papers**

Matti Pekkanen, Francesco Verdoja, Ville Kyrki (May 2024) "Modeling Movable Objects Improves Localization in Dynamic Environments".

Presented at the "3rd Workshop on Future of Construction: Lifelong Learning Robots in Changing Construction Sites" workshop at the 2024 IEEE Int. Conf. on Robotics and Automation (ICRA)

Matti Pekkanen, Tsvetomila Mihaylova, Francesco Verdoja, Ville Kyrki (May 2024) "Evaluating the Quality of Robotic Visual-Language Maps"

Presented at the "First Workshop on Vision-Language Models for Navigation and Manipulation" workshop at the 2024 IEEE Int. Conf. on Robotics and Automation (ICRA)

### **GRANTS**

**Stipendium**                      **Lamarr Institute**                      **2024**

Stipendium for research visit at the Rheinische Friedrich-Wilhelms-Universität Bonn by Lamarr Institute for Machine Learning and Artificial Intelligence

### **SUPERVISION EXPERIENCE**

**Master's thesis**                      **Aalto University**                      **2018**

Henri Varjotie, "Accuracy analysis of scan registration in Normal Distributions Transform based simultaneous localization and mapping using radar and laser scanning"

**Bachelor's thesis**                      **Aalto University**                      **2024**

Victor Laitila, "Visual-language maps and their applications in mobile robotics"

**Bachelor's thesis**                      **Aalto University**                      **2024**  
Noel Nironen, "Applications of Large Language Models in Mobile Robotics"

**Bachelor's thesis**                      **Aalto University**                      **2025**  
Noel Nironen, "Scene graphs in mobile robotics"

**Bachelor's thesis**                      **Aalto University**                      **2025**  
Kalle Huhta-Koivisto, "Object search in cluttered and constrained spaces"

## **TEACHING EXPERIENCE**

**Teaching assistant**                      **Aalto University**                      **Fall 2022**  
Course: Digital and optimal control

**Teaching assistant**                      **Aalto University**                      **Fall 2023-**  
Course: State-space methods and discrete-time control

## **SERVICE TO PROFESSION**

Reviewer in Robotics and Automation Letters (RA-L), 2024, 2025, 2026 IEEE Int. Conf. on Robotics and Automation (ICRA), 2025, 2026 IEEE Int. Conf. on Robotics and Automation (ICRA)