# Doctoral researchers in Robotics, Autonomy, Control, and Machine Perception
## Aalto University

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| **Job Title** | Doctoral researchers in Robotics, Autonomy, Control, and Machine Perception |
| **Department** | T410 Dept. Electrical Engineering and Automation |
| **Institution** | Aalto University<br>, , Finland |
| **Date Posted** | Jul. 2, 2024 |
| **Application Deadline** | Open until filled |
| **Position Start Date** | Available immediately |
| **Job Categories** | Graduate Student |
| **Academic Field(s)** | Robotics |
| **Job Website** | https://aalto.wd3.myworkdayjobs.com/aalto/job/Otaniemi-Espoo-Finland/Doctoral-researchers-in-Robotics--Autonomy--Control--and-Machine-Perception_R40218 |
| **Apply By Email** | |

## Job Description

Intelligent Work Machines (IWM) Doctoral Program is looking for more PhD students (Doctoral Researchers).

The IWM doctoral program educates new generations of professionals to the PhD level with multidisciplinary engineering knowledge needed for intelligent machinery development. The doctoral training connects academic research excellence with relevant industrial research and development challenges and accelerates industrial renewal in the machine industry.

The [url=https://www.tuni.fi/en/news/intelligent-work-machines-doctoral-programme-will-start-finland]IWM doctoral program collects the leading departments and research groups in Finland. In the program there are 31 positions across five Finnish universities: Aalto University, Lappeenranta-Lahti

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University of Technology, Tampere University, University of Oulu, and University of Turku.

In this 2nd call, Aalto University is now looking for

3 PhD Students in Robotics, Autonomy, Control, and Machine Perception

We offer: *
Fully funded research with high-quality supervision from experienced researchers *
Inspiring research environment with highly motivated peers *
Networking across university boundaries *
Collaboration opportunities with industry *
Access to high-end infrastructure, career training, and support services

Interested? Read more!

Research topics
We are looking for candidates for the following topics:

1. Autonomous dexterous manipulation of fine and soft objects
Fine and soft objects are abundant in both natural and artificial environments, ranging from seeds, insects, and delicate plant fibers to biological tissues, soft polymers and gels, thin wires, electronic components, and optical fibers. Due to their softness and often undefined shapes, autonomously manipulating such objects poses a significant challenge to robotics and intelligent machines. This research aims to develop autonomous manipulation algorithms and methods for fine and soft objects using several or a large number of precision manipulators working collaboratively to achieve dexterous manipulation.

2. Generative design of model-based engineering systems
In a nutshell, the goal of this research is to do what ChatGPT can do for text, do the same for machine system design. Obviously, engineering models are much more complex than words, which is why there is a lot of work to be done on the definition of modular modelling of components. For the component library we are leveraging a knowledge graph, to automatically generate new component models and their dependencies.

3. Physics-informed AI for estimation and control
The aim of the project is to develop physics-informed machine learning and more general artificial intelligence methods especially for problems involving estimation and control. Potential target applications are, for example, the perception and guidance problems arising in autonomous systems,

distributed control systems, and robotics.

## 4. Swarm intelligence based safety at the factory floor
Investigate a fully decentralized approach to achieving safety at the flexible factory floor based on multi-agent architectures, AI, and connected and IT-enabled human.

## 5. Tactile Internet for human-robot interaction
This project aims to develop Tactile Internet technologies that enable seamless and intuitive control and collaboration between humans and robots by achieving ultra-low latency and high reliability for real-time tactile feedback in 5G and beyond networks. It seeks to identify performance bottlenecks in the end-to-end architecture and enhance the design of protocols at the transport and application layers. The project will be primarily conducted at Aalto Wearable Systems Lab, a multidisciplinary group with expertise in extended reality, wearable haptic interfaces, edge computing, and low-latency networking.

## 6. Enriching work with intelligent machines
Industry 5.0 aims for a human-centered, resilient, and sustainable industry with new technologies. This human-centered design research topic approaches human-machine interaction design from an employee experience perspective. It aims to make future work with intelligent machines meaningful by investigating the concept of work enrichment and what it may mean in Industry 5.0.

## 7. Learning for provably safe and robust robotic systems
Modern data-driven techniques have rapidly progressed beyond modeling and systems identification, with a growing focus in learning high-level dynamical properties of a system, such as safe-set invariance, reachability, input-to-state stability, etc. This project will holistically leverage nonlinear control theory, optimization, and machine learning towards endowing robotic systems with rigorous safety and performance guarantees, in a manner that is interpretable, data efficient, and formally verifiable.

Requirements and conditions *
You need to have *
a Master's degree in an area applicable to one of the topics listed above. *
sufficient proficiency in English, Finnish, or Swedish (typically demonstrated with an official certificate, e.g., IELTS/TOEFL). *
The expected starting date in the position is by January 1, 2025. Presence in Finland for the duration of the contract is mandatory. *
Employment contracts will be made for three years with the funding from the Finnish Ministry of Education and Culture. Employment contract includes a prerequisite to apply, receive and accept doctoral study right within the probation period of the first 6 months. *

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If you already have a study right for a doctoral degree at Aalto University, it needs to be awarded 1 November 2023 or thereafter for you to be eligible for these positions. *
The annual workload of research and teaching staff at Aalto University is 1612 hours. *
Aalto University follows the salary system of Finnish universities. The starting salary is 3000 €/month (gross), and it increases as the Doctoral Researcher progresses in the research and studies. *
The contract includes Aalto University occupational healthcare. *
The working language is English.

Applicants must fulfill the admission criteria of the Aalto Doctoral Programme and, if chosen for a position, apply for, obtain and accept the right to pursue doctoral studies at Aalto University. For more information on the general requirements and the application process for doctoral studies, please visit [url=https://www.aalto.fi/en/doctoral-education/how-to-apply-for-doctoral-studies.]https://www.aalto.fi/en/doctoral-education/how-to-apply-for-doctoral-studies.

To Apply
To apply, please submit the following application materials through our aalto.fi recruitment site by 13th August 2024 (23:59 EEST / UTC &#43;3). To begin the submission process, click on "Apply now" on the bottom of this page. In the application form, please specify which of the research topics you are primarily interested in (up to 4 topics).

Please note: Aalto University's employees should apply for the position via internal HR system Workday (Internal Jobs) by using their existing Workday user account (not via the external webpage for open positions). Aalto University's students and visitors should apply as external candidates with personal (not Aalto) email.

All material should be submitted in English as PDF. Application material should include:

1. Letter of motivation (1-2 pages). Please describe your background and future plans, and in particular the reasons for selecting the topic(s).
2. A curriculum vitae and possible list of publications with complete study and employment history, contact details of referees from 2 senior academic people. We will contact your referees, if recommendation letters are required.
(please see CV example [url=https://view.officeapps.live.com/op/view.aspx?src&#61;https%3A%2F%2Ftenk.fi%2Fsites%2Fdefault%2F 06%2FTENK_CV_template_2020.docx&wdOrigin&#61;BROWSELINK]TENK_CV_template_2020.docx))
3. A study transcript provided by the applicant's university that lists studies completed and grades achieved.
4. A copy of the M.Sc. degree certificate or equivalent. (for doctoral study application it will need to be

officially translated into Finnish, English or Swedish).

Please note that our recruitment system allows at most 5 attachments, so please combine the copies of certificates and transcripts into one PDF, if necessary.

Any questions?
For additional information, please contact Prof. Ville Kyrki (ville.kyrki&#64;aalto.fi). Aalto University reserves the right to leave the position open, extend the application period, reopen the application process, and consider candidates who have not submitted applications during the application period. For questions about applying, please contact HR partner Camilla Hanganpää (camilla.hanganpaa&#64;aalto.fi).

About Aalto University and Finland
For more information about living in Finland: https://www.aalto.fi/en/careers-at-aalto/for-international-staff and [url=https://www.aalto.fi/en/careers-at-aalto/living-in-finland]https://www.aalto.fi/en/careers-at-aalto/living-in-finland.

Read more about working at Aalto: [url=https://www.aalto.fi/en/careers-at-aalto]https://www.aalto.fi/en/careers-at-aalto

**Contact Information**

Please reference Academickeys in your cover letter when applying for or inquiring about this job announcement.

**Contact**

Finland