

Doctoral Researcher (PhD Student) in Autonomous
Dexterous Manipulation of Fine and Soft Objects
Aalto University

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Posted Sep. 18, 2024, set to expire Jan. 18, 2025

Job Title	Doctoral Researcher (PhD Student) in Autonomous Dexterous Manipulation of Fine and Soft Objects
Department	T410 Dept. Electrical Engineering and Automation
Institution	Aalto University , , Finland
Date Posted	Sep. 18, 2024
Application Deadline	Open until filled
Position Start Date	Available immediately
Job Categories	Graduate Student
Academic Field(s)	Electrical and/or Electronics
Job Website	https://aalto.wd3.myworkdayjobs.com/aalto/job/Otaniemi-Espoo-Finland/Doctoral-Researcher--PhD-Student--in-Autonomous-Dexterous-Manipulation-of-Fine-and-Soft-Objects_R40879-1

Apply By Email

Job Description

Aalto University is where science and art meet technology and business. We shape a sustainable future by making research breakthroughs in and across our disciplines, sparking the game changers of tomorrow and creating novel solutions to major global challenges. Our community is made up of 13 000 students, 400 professors and close to 4 500 other faculty and staff working on our dynamic campus in Espoo, Greater Helsinki, Finland. Diversity is part of who we are, and we actively work to ensure our community's diversity and inclusiveness. This is why we warmly encourage qualified candidates from all backgrounds to join our community.

The Robotic Instruments group researches miniaturized robotics, focusing on advancing robotic manipulation for small-scale objects. We develop manipulation technologies utilizing diverse physical

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interaction methods, including contact, acoustic and magnetic fields, interfacial forces, and fluidic flows. Our interdisciplinary research integrates physics, mechatronics, automation, and machine learning, tackling challenges in both dextrous manipulation and noncontact manipulation. Our research spans fundamental methodologies to practical applications in biomedicine, materials, and industrial technologies. Notable applications of our robotic instruments include biomimetic tools for threading fibers, advanced scientific instruments for analyzing surface-wetting properties and protein viscosity, innovative methods for targeted drug delivery in cancer research, and tools for semiconductor and optoelectronic device integration.

We are now looking for a

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Are you passionate about multidisciplinary research in robotic manipulation and artificial intelligence?

We are seeking a doctoral researcher to join the Robotic Instruments research group at the Department of Electrical Engineering and Automation at Aalto University. This position will focus on the autonomous dexterous manipulation of fine and soft objects. Under the supervision of Prof. Quan Zhou and Dr. Houari Bettahar, you will have the opportunity to engage in challenging and rewarding research, developing innovative methods and algorithms for robotic fine manipulation of soft objects.

Fine and soft objects, such as seeds, insects, delicate plant fibers, biological tissues, soft polymers, gels, thin wires, electronic components, and optical fibers, are abundant in both natural and artificial environments. Due to their softness, irregular shapes, and fragility, autonomously manipulating these objects poses a significant challenge to robotics and intelligent machines. In this role, your research will aim to overcome these challenges by developing autonomous manipulation algorithms and methods that leverage multiple precision manipulators working collaboratively to achieve dexterous manipulation.

Your role and goals

As a doctoral researcher in the robotic instruments research group, you will play a key role in advancing the field of autonomous dexterous manipulation of fine and soft objects. Your primary responsibilities and goals will include: *

Developing novel algorithms and methods: Design and implement innovative algorithms for the autonomous manipulation of fine and soft objects. This will involve addressing the challenges posed by the softness, irregular shapes, and fragility of such objects. *

Experimental research and prototyping: Conduct experiments and develop prototypes to validate the proposed methods. You will work with state-of-the-art robotic manipulators, sensors, and AI techniques

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to achieve dexterous manipulation. *

Problem solving and innovation: Tackle complex problems related to the manipulation of objects with undefined and dynamic characteristics. Your role will require creativity and innovation, as well as an in-depth understanding of robotics, machine learning, and control systems. *

Collaboration and teamwork: Work closely with supervisors, team members, and interdisciplinary teams to integrate various technologies and approaches. You will also have opportunities to collaborate with external partners and contribute to joint projects. *

Publishing and dissemination: Communicate your findings through high-quality research papers published in leading journals and conferences. You will also present your work at international scientific forums and contribute to the academic community. *

Contributing to the group's vision: Actively participate in the group's research activities, contribute to setting the direction for future work, and help shape the broader vision of advancing robotic instrument technologies. *

Mentorship and knowledge sharing: Engage in mentoring undergraduate and master's students involved in related projects, sharing your expertise and fostering a collaborative research environment.

The position (4 years) is fully funded by HHSofMicroMan project

[url=https://www.linkedin.com/company/research-council-of-

finland/?lipi=urn%3Ali%3Apage%3Ad_flagship3_search_srp_all%3B%2FiB%2Fqgk3Ri6%2BBoHMvyA72

Council of Finland | Suomen Akatemia [url=https://www.linkedin.com/company/aalto-university/]Aalto University.

The selected candidate will need to apply for the study right in doctoral studies at Aalto University School of Electrical Engineering. Thus, please check the student information and admission criteria at [url=https://www.aalto.fi/en/school-of-electrical-engineering/become-a-doctoral-researcher-at-the-school-of-electrical-engineering]Become a doctoral researcher at the School of Electrical Engineering | Aalto University. In particular, please pay attention to the required (English) language proficiency.

Your experience and ambitions

We are looking for a passionate researcher who would have: *

A Master's degree or nearing completion of a Master's degree in Robotics and Automation, Autonomous Systems, Computer Science, or a related field *

Strong background in machine learning, robotics, and automation *

Proficiency in software programming *

Experience in path planning and decision-making for robotics *

Excellent communication skills *

Strong discipline and organizational skills in task and time management. *

Teamwork experience and a collaborative spirit

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What we offer *

An active, friendly, and highly collaborative multicultural and multi-disciplinary team - more than 11 members with complementary talents *

Training by experienced members in miniaturized robotics *

Cutting-edge modeling experience and urgent & demanding research challenges in the field of sustainable development and green transition *

Integration to our network of collaborators across the globe with various-form scientific discussions (meetings, workshops, conferences) and collaborations *

Open, fair, encouraging, collaborative, inclusive, and curiosity-driven work environment to support your ambition and success *

Details about the group can be found here: [\[url=https://www.aalto.fi/en/department-of-electrical-engineering-and-automation/robotic-instruments\]](https://www.aalto.fi/en/department-of-electrical-engineering-and-automation/robotic-instruments) Robotic Instruments | Aalto University

Aalto University follows the salary system of Finnish universities. The contract includes Aalto University occupational healthcare.

Ready to apply?

If you want to join our community, please submit your application through our recruitment system by clicking the "Apply now!" link below.

To apply, please send your application as a single PDF file: *

Letter of motivation *

CV including a list of publications *

Previous project experience demonstration if available (free format) *

Degree certificates and academic transcripts *

Contact details of at least two references (or letters of recommendation, if already available)

Applications are due by October 18, 2024. However, early applications are highly encouraged, as we may begin interviewing suitable candidates before the deadline. The position will be filled once a suitable candidate is identified. The expected start date is between November 1, 2024, and January 2, 2025. For further information, please contact Dr. Houari Bettahar ([\[url=mailto:houari.bettahar@aalto.fi\]](mailto:houari.bettahar@aalto.fi)houari.bettahar@aalto.fi).

Please note: Aalto University's employees should apply for the position via our 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.

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Contact Information

Please reference Academickeys in your cover letter when
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Contact

Finland