

Postdoctoral Researcher, Time-Varying Electromagnetic
Systems
Aalto University

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Posted Oct. 31, 2024, set to expire Mar. 2, 2025

Job Title Postdoctoral Researcher, Time-Varying
Electromagnetic Systems

Department T411 Dept. Electronics and Nanoeng

Institution Aalto University
, , Finland

Date Posted Oct. 31, 2024

Application Deadline Open until filled

Position Start Date Available immediately

Job Categories Post-Doc

Academic Field(s) Electrical and/or Electronics

Job Website https://aalto.wd3.myworkdayjobs.com/aalto/job/Otaniemi-Espoo-Finland/Postdoctoral-Researcher--Time-Varying-Electromagnetic-Systems_R41315

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 School of Electrical Engineering is one of the six schools of Aalto University. Our portfolio covers fields from natural sciences to engineering and information sciences. In parallel with basic research, we develop ideas and technologies further into innovations and services. We are experts in systems

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science; we develop integrated solutions from care of the elderly to space robotics. The School is an international unit with close to 60 professors and 2 000 full-time students, including over 200 doctoral students.

<http://www.aalto.fi/en/department-of-electronics-and-nanoengineering/designer-materials-and-devices>]The Designer Materials and Devices Group at the Department of Electronics and Nanoengineering is looking for a highly motivated Postdoctoral Researcher to work on Time-Varying Electromagnetic Systems, related to

<https://www.defense.gov/News/Releases/Release/Article/3880782/>]a large international project [Self-Programmable Metasurface Networks for Wireless Communications and IoT](#)..

Scientific context

A key challenge for 6G, which is expected to operate at sub-THz frequencies, is overcoming high signal attenuation caused by the atmosphere and urban materials like concrete. To address this, 6G will rely on reconfigurable intelligent surfaces (metasurfaces), passive structures that can optimize wireless environments by directing electromagnetic waves without costly active components. Incorporating active control elements into metasurfaces introduces time as a fourth design dimension, overcoming the limitations of passivity, linearity, and reciprocity. This addition enables advanced functionalities like wave mixing, parametric processes, frequency conversion and amplification, beam steering across momentum and frequency domains, and reciprocity breaking. These innovations will significantly enhance the performance and flexibility of 6G communication systems, allowing for more efficient and adaptable signal management.

Your role and goals

As a postdoctoral researcher, you will contribute to pioneering research in time-varying systems, including metasurfaces and photonic time crystals. The research will have both fundamental and applied science components. The research methodology will have both theoretical, simulation, fabrication, and experimental parts.

There are possibilities for research collaboration and extended visits to the following project partners: A. Alù (City University of New York), H. Krishnaswamy (Columbia University), M. Rinaldi (Northeastern University), and S. Shakkottai (University of Texas at Austin), Z. Sun (Aalto University), and N. Ravaja (University of Helsinki).

The expected starting date for the position is negotiable but preferably January 1, 2025 and it is intended for full-time work. The selected person will work under supervision of <https://scholar.google.fi/citations?user=JxBegwAAAAJ&hl=en>]Assistant Professor Viktor Asadchy and <https://scholar.google.fi/citations?user=qICNcXEAAAAJ&hl=en>]Emeritus

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Professor Sergei Tretyakov. The successful applicant will have a possibility to cooperate with world-class researchers, publish in high-profile journals, supervise students, attend scientific conferences, and go on research visits to the external collaborators.

Your experience and ambitions

As a successful candidate for this position, you must have: * A doctoral (PhD) degree in electrical engineering, physics, or similar. * Strong background in electrodynamics and excellent mathematical skills. * Experience in metasurface design. * Ability to generate own research ideas. * Proficiency in electromagnetic simulation software, such as COMSOL Multiphysics, CST Studio Suite, or ANSYS HFSS and electronic design software, such as ADS. * High proficiency in Matlab, Python, or similar programming software. * Solid list of publications. * Prior student advisor experience. * High motivation, patience, and stress resistance. * Excellent written and verbal communication, including presentation skills. * Highly proficient English language skills. * Excellent organizational skills, attention to details, and ability to meet deadlines. * Willingness to learn and work collaboratively in a research environment.

Skills, knowledge, and abilities in the following areas are not required but highly desirable: *

Experience in time-varying systems, RF circuit design, diffraction gratings and antenna array theory. * Industrial experience. * Solid grant writing experience. * Eligibility and willingness to apply for research funding (less than 7 years passed after the first PhD). * Experience in machine learning or computational electromagnetics.

The applicant is expected to: * Publish in top journals and participate in scientific conferences. * Lead research proposal preparation. * Guide master's and doctoral students. * Participate as a teaching assistant for courses at Aalto. * Undertake one or several research visits abroad to external partners.

The primary language of communication within the group is English.

What we offer

Aalto University follows the salary system of Finnish universities. The salary ranges for a postdoc from 4020 € to 4200 € per month, depending on previous experience, and the postdoc contract will be made for at least 2 years (6-month probation). The contract includes Aalto University occupational healthcare. Among European cities, Helsinki is special in being safe, clean, and close to nature, with a high quality of life. English is widely spoken in Finland, and the University offers free introductory courses in Finnish. The university is located at Otaniemi campus in Espoo (10 km from the city center of Helsinki), which is one of the largest hubs of high-tech in Northern Europe. Our Department is very international with professors and students coming from all around the world.

Join us!

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To apply, an application must include:

1. CV (including list of publications, and names of three references)
2. Letter of motivation (maximum 2 pages).
3. Certified copies of doctoral, master's, and bachelor's degree certificates (or equivalents) with their transcript of records. Include their translations if the originals are not in English.

All material should be submitted in English in pdf format. The application should be sent through our recruitment site (link 'Apply' below) by November 27, 2024. Email applications will not be considered. We encourage candidates to apply early. Screening of applications will begin immediately and continue until the position is filled. Aalto University reserves the right for justified reasons to leave the position open.

Please note: Aalto University's employees and visitors should apply for the position via our internal system Workday -> find jobs (not external aalto.fi webpage on open positions) by using their existing Workday user account.

If you wish to hear more about the position, you can reach out to Prof. Viktor Asadchy (viktar.asadchy at aalto.fi). In recruitment process related questions please contact HR Partner Ms. Karoliina Walldén (karoliina.wallden at aalto.fi).

Want to know more about us and your future colleagues?

You can watch these videos:

[url=https://www.youtube.com/watch?v#61;5k_og_6zUJQ]https://www.youtube.com/watch?v#61;5k_og_6z

and [url=https://www.youtube.com/watch?v#61;dUfEGVM-

ZP8&feature#61;youtu.be]https://www.youtube.com/watch?v#61;dUfEGVM-

ZP8&feature#61;youtu.be

About Finland

Finland is a great place for living with or without family - it is a safe, politically stable and well-organized Nordic society. Finland is consistently ranked high in quality of life and was just listed again as the happiest country in the world: [url=https://worldhappiness.report/news/its-a-three-peat-finland-keeps-top-spot-as-happiest-country-in-world/]https://worldhappiness.report/news/its-a-three-peat-finland-keeps-top-spot-as-happiest-country-in-world/. For more information about living in Finland:

[url=https://www.aalto.fi/en/careers-at-aalto/living-in-finland]https://www.aalto.fi/en/careers-at-

aalto/living-in-finland & [url=https://www.aalto.fi/en/services/welcome-to-aalto-university-and-finland-info-package]https://www.aalto.fi/en/services/welcome-to-aalto-university-and-finland-info-package

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Contact Information

Please reference Academickeys in your cover letter when
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Contact

Finland