

11 Doctoral Researchers for research groups on
Photonics
Aalto University

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Posted Mar. 22, 2024, set to expire Dec. 30, 2024

Job Title 11 Doctoral Researchers for research groups on
Photonics

Department T411 Dept. Electronics and Nanoeng

Institution Aalto University
, , Finland

Date Posted Mar. 22, 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/XMLNAME-11-Doctoral-Researchers-for--research-groups-on-Photonics_R39141

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.

[url=https://prein.fi/]PREIN Flagship is a Photonics Research and Innovation platform focusing on light-based solutions from scientific excellence to industrial and societal impact. To address the need of the industry for new high-level experts, the I-DEEP consortium was established based on the activities of

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the Flagship for PREIN, the photonics national research infrastructure FinnLight and Photonics Finland. The I-DEEP programme addresses the urgent need for training experts in the rapidly growing photonics industry.

I-DEEP consortium is now looking for
11 Doctoral Researchers for research groups on Photonics.
Join us in shaping the future!

Scientific environment

You will mainly be working in the [[url=https://www.aalto.fi/fi/otanano/micronova](https://www.aalto.fi/fi/otanano/micronova)]Micronova facility. Micronova's facilities allow flexible processing and integration of micro- and nanoelectronic, micromechanical, photonic and fluidic devices. Substrate materials include silicon, III-V semiconductors, glass and quartz. The main wafer size is 150 mm, but also 200 mm and 100mm are supported for some processes. For some purposes even smaller samples are used. All necessary main process technologies are available, including optical and nanolithography, CMOS and BiCMOS, dry and wet etching, focused ion beam milling, micropackaging, wafer bonding, thin film processing and epitaxial deposition.

Micronova is part of [[url=https://www.aalto.fi/en/otanano](https://www.aalto.fi/en/otanano)]OtaNano - Finland's national research infrastructure for micro- and nanotechnology, jointly run by VTT Technical Research Centre of Finland and Aalto University.

Your experience and ambitions

We are looking for applicants who have *

A keen interest in research, e.g., learning how to build your own instruments, perform your own experiments, and analyze your results. *

Excellent student track records

A good command of English is required.

An applicant must have completed by 31 July 2024 or preferably earlier (to start employment on 1 August 2024) or by 31 December 2024 or preferably earlier (to start employment on 1 January 2025) *
a master's degree awarded by a university, or *
a study programme that in the awarding country gives eligibility for doctoral level studies in Photonics and relevant fields (e.g., Physics, Electrical engineering, Nanotechnology, Material Sciences, Quantum).

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

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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.](https://www.aalto.fi/en/doctoral-education/how-to-apply-for-doctoral-studies)

What we offer *

Opportunity to work in a dynamic community of world-class researchers and professionals where students are rigorously selected and highly motivated. This leads to an exceptionally interactive and intellectually challenging atmosphere at Aalto. *

We have a flexible modern work culture. We value the balance and well-being of work and leisure in all aspects of life. *

We offer you an interesting job in an inspiring work environment. You will be able to work in a community where we promote socially significant goals in science and education. We will familiarize you with your tasks and you will be part of a nice and competent team that will provide you with support for your work tasks also in the future. We encourage and offer opportunities for continuous development of your own expertise. *

The expected starting date for the position is either 1st August 2024 or 1st January 2025. Presence in Finland for the duration of the contract is compulsory. *

Employment contracts will be made for three years with the funding from the Finnish Ministry of Education and Culture. The contract includes a prerequisite to apply, receive and accept doctoral study right within the probation period of the first 6 months. *

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 approximately 2700 €/month (gross), and it increases as the Doctoral Researcher progresses in the research and studies. *

The contract includes Aalto University occupational healthcare. Aalto University provides excellent learning and development opportunities, and a commuter ticket benefit. Unisport offers versatile sports facilities and exercise services with a staff discount. *

We work in a hybrid way, and the primary workplace is Otaniemi, Espoo. The Otaniemi campus is a thriving and connected community of 100 nationalities. Life at the transformed campus is vibrant and filled with amazing architecture, calming nature, and a variety of cafes, restaurants, services and good connections along the metro and city train lines. See how the campus looks like on our virtual tour: [\[url=https://virtualtour.aalto.fi/\]https://virtualtour.aalto.fi/](https://virtualtour.aalto.fi/) *

In the first weeks, you will be assigned your own onboarding buddy who will help you get started with your work and studies at Aalto.

Join us!

You can apply for min. 1 or max. 5 of the open positions in this call. You will be asked to prioritize your choices, using the position codes. You will find each position code after the name of the position in the

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list below - please remember your choices when you move forward with your application. To apply, please submit the following application materials through our aalto.fi recruitment site by 30th April 2024 Finnish time. Click "Apply now". We will start reviewing candidates immediately.

Please note: Aalto University's employees should apply for the position via the 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 and a pdf-file. You can send in max. Five (5) documents up to 5M bit in size. Application material should include: * Letter of motivation (max. one page). Please describe your background and future plans, and in particular, the reasons for selecting the project(s).

* 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=https%3A%2F%2Ftenk.fi%2Fsites%2Fdefault%2F06%2FTENK_CV_template_2020.docx&wdOrigin=BROWSELINK]TENK_CV_template_2020.docx (live.com)) * A study transcript provided by the applicant's university that lists studies completed and grades achieved. * 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). If the degree is still pending, then a plan for its completion must be provided. * Plan for obtaining a certificate of English/Finnish/Swedish language knowledge for doctoral study application if the position is offered (in order to have it on time for application, see more from [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)

We will go through applications, and we may invite suitable candidates to interview already during the application period. The positions will be filled as soon as suitable candidates are identified. Chosen candidates should apply for doctoral study right immediately after accepting the position.

Please find detailed descriptions of the open positions by research group below:

POSITION 1: Magneto-plasmonic metamaterials for ultrafast all-optical magnetic switching (Position code: VAN DIJKEN)

We are looking for a highly motivated doctoral student to work on multidisciplinary experiments at the boundary of optics/plasmonics and magnetism. The aim of the project is to induce ultrafast magnetic switching in tailored magneto-plasmonic metamaterials using femtosecond laser pulses, which is relevant for next-generation magnetic memory devices. As a doctoral student you will design and fabricate the magneto-plasmonic metamaterials using finite-difference time-domain simulations, state-

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of-the-art material deposition techniques, and advanced photo- and electron-beam lithography processing. Moreover, you will learn how to characterize the magnetic, plasmonic, and magneto-optical properties of the samples using a wide range of experimental techniques. The doctoral project is conducted in the Nanomagnetism and Spintronics group at the Department of Applied Physics of Aalto University. We closely collaborate with the University of Lorraine in France on all-optical magnetic switching. As a doctoral student you will be able to visit this institute for at least three months. For more information, please contact Prof. Sebastiaan van Dijken, [\[url=mailto:sebastiaan.van.dijken@aalto.fi\]](mailto:sebastiaan.van.dijken@aalto.fi)sebastiaan.van.dijken@aalto.fi

POSITION 2: Optical Metrology (Position code: IKONEN)

Metrology Research Institute is the National Standards Laboratory of optical quantities in Finland. The doctoral student takes part in maintaining and developing the national standards, and in customer calibration. The research within the group is divided into fields of radiometry, photometry, spectrophotometry, and electrical measurements. We have recently started new projects funded by the European Union on developing new LED-based standard light sources for the UV region, on characterizing personal UV dosimeters, on absolute optical power measurements, and on quantum technologies. The research for the thesis will be related with these projects. Suitable backgrounds for the candidate include electronics, optics, or physics.

For more information, please contact Dr. Petri Kärh  and Prof. Erkki Ikonen (firstname.surname@aalto.fi).

POSITION 3: Optical nanostructured memristors with 2D nanomaterials (Position code: LIPSANEN)

The development of optical memristors utilizing 2D materials is a highly promising field for the advancement of high-performance neuromorphic computing devices. 2D materials possess distinct characteristics that offer significant advantages in terms of both energy efficiency and integration density. This research project involves a collaboration at the national and international level. The research falls into PREIN's thematic area 'development of materials and structures'.

For more information, please contact Prof. Harri Lipsanen, [\[url=mailto:harri.lipsanen@aalto.fi\]](mailto:harri.lipsanen@aalto.fi)harri.lipsanen@aalto.fi

POSITION 4: Organic Electronics (Position code: SOLDANO)

In this position, you will have the opportunity to conduct experimental research in both materials and device physics. The main research work will be carried out in the field of organic transistors and light-emitting devices, with a particular interest in the general understanding of the device properties as well as the overall development and improvement of the performances. In particular, organic light-emitting devices (transistors) are a rather yet largely unexplored device platform, holding tremendous potentials both in terms of fundamental studies as well as technological applications. Large efforts are expected to be devoted to study physical phenomena such as charge/field-effect transport and light

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emission/sensing, with a particular interest in new semiconductor and luminescent materials and material's interface. The work is expected to result in high-impact scientific publications and communications at national/international conferences. Doctoral training will include study of materials properties, device fabrication and electro-optical characterization, using facilities available in the Organic Electronics Lab and Aalto University facility (Micronova). More information can be found at <https://organicelectronics.aalto.fi/>.

For more information, please contact Prof. Caterina Soldano, caterina.soldano@aalto.fi

POSITION 5:

Bottom-up fabrication of plasmonics nanostructures with tailored optical responses (Position code: KUZKYK)

Molecular self-assembly provides an attractive route to bottom-up fabrication of complex plasmonic assemblies with unique optical response. Such assemblies hold great promise for applications in various field, including, photothermal therapy, biosensing, photocatalysis, topological insulators, stimuli responsive metamaterials etc. The project will be focused on design and DNA-origami-based fabrication of plasmonics nanostructure with optical responses tailored for photothermal therapy and biosensing.

Research group

The Molecular Nanoengineering group operates at the interface of nanoscience, DNA nanotechnology, molecular self-assembly and nanophotonics with particular focus on DNA-based self-assembled systems with functionalities tailored for biosensing, active plasmonics and nanomachinery. The group is led by Associate Professor Anton Kuzyk.

For examples of our previous research see

<https://scholar.google.fi/citations?user=yL5QQkwAAAAJ&hl=en>

For more information, please contact Prof. Anton Kuzyk,

[[url=mailto:anton.kuzyk@aalto.fi](mailto:anton.kuzyk@aalto.fi)]

POSITION 6:

3D Printed Optics (Position code: PARTANEN)

New potential design paradigm for Optics - Practical and versatile ways of making Graded Index (GRIN) Optics. We offer exciting new doctoral student job opportunities for Mechanical Engineering students. Our focus includes studying mechatronics and developing compact 3D Printing devices that will produce Optical components capable for GRIN Optics and Free Form Surface designs. The goal for this research project is to develop technical solutions that can be implemented from derivatives of designs that take advance of mass produces color 2D printing inkjet solutions and convert them to 3D printing devices for optical designs. You will be surrounded by an experienced 3D Printing team that has long experience of developing both new devices and applications of Additive Manufacturing (AM). In addition, you will work closely with a team that develops optical polymer materials for 3D Printing

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from Aalto University and a second team from UEF that develops 3D printing of Optics. Learn more about the research group from [[url=https://www.aalto.fi/en/school-of-engineering/addlab-aalto-university-digital-design-laboratory-0](https://www.aalto.fi/en/school-of-engineering/addlab-aalto-university-digital-design-laboratory-0)]here.

For more information, please contact Prof. Jouni Partanen
([[url=mailto:jouni.partanen@aalto.fi](mailto:jouni.partanen@aalto.fi)])jouni.partanen@aalto.fi).

POSITION 7:

New generation photo-curing inkjet resins for optics (Position code: NISKANEN)

We are looking for highly motivated doctoral researcher to develop next generation inkjetable materials.

The aim of the project is to develop new next generation inkjetable and rapidly photocuring polymeric materials and formulations for optical applications. To carry out the design of the materials successfully, we need a clear materials-structure-property understanding, as well as wide enough library of precursors. Furthermore, the synthesis of the oligomeric precursors and compositions of resins with tailored refractive indices, viscosity, jetting, and curing rate must be controlled. Next still more demanding challenge is to develop a voxel-by-voxel manufacturing process that combines several transparent resins in differing ratios for each voxel. Reaching this objective will allow us to manufacture 3D structures with pre-defined refractive index gradients. A successful candidate can demonstrate experience and knowledge in polymer synthesis and properties and has received their MSc degree recently.

For more information, please contact Prof Jukka Niskanen,
[[url=mailto:jukka.niskanen@aalto.fi](mailto:jukka.niskanen@aalto.fi)])jukka.niskanen@aalto.fi

POSITION 8:

Nonlocal Metasurfaces for Advanced Ultracompact Optical Devices (Position code: SHEVCHENKO AND KAIVOLA)

We are looking for an outstanding doctoral student to join the Optics and Photonics group for theoretical and experimental research in the field of nanophotonics. The research will be focused on the development of nonlocal metasurfaces, which are flat nanostructures that couple light to propagating surface waves. These structures are expected to be able to replace even large and complex optical systems, such as spatial light modulators, pulse chirp filters, spectro-angular light deflectors, and whole optical imaging systems, turning them in ultracompact multilayered devices. This can revolutionize optical technology as we know it now. The research involves collaboration with several research groups in Finland, Germany, and USA. Preference will be given to candidates with good understanding of basic optics and photonics, experience in numerical calculations, and ability to design and conduct optical experiments.

For more information, please contact Prof. Andriy Shevchenko,

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[url=mailto:andriy.shevchenko@aalto.fi]andriy.shevchenko@aalto.fi or Prof. Matti Kaivola
[url=mailto:matti.kaivola@aalto.fi]matti.kaivola@aalto.fi.

POSITION 9:

Perovskite solar cells (Position code: VAPAAVUORI)

This doctoral project builds on the joint PREIN project called PINT - Perovskite-inspired indoor photovoltaics for sustainable Internet-of-Things. Until now, we have demonstrated biomimetic surface coatings for perovskite solar cells that are capable of embedding both anisotropic superhydrophobicity and light management, in order to ensure power conversion efficiency enhancement. In this project, the focus will be on improving the solar cell lifetime and barrier properties through design of different solar cell substrates and encapsulation strategies. The target will be improving the lifetime of lead-free perovskite inspired solar cells, as well as rendering them closer to wearable and indoors energy harvesting. The successful candidate will join the dynamic Multifunctional Materials Design group (<https://www.aalto.fi/en/mmd>) that supports green transition through holistic and interdisciplinary methods. Solid team working skills are essential for success of the project. We are looking for a candidate with MSc degree in materials chemistry, materials physics, energy sciences or other related field.

For more information, please contact Prof. Jaana Vapaavuori,

[url=mailto:jaana.vapaavuori@aalto.fi]jaana.vapaavuori@aalto.fi

POSITION 10:

2D material photonics and optoelectronics (Position code: SUN)

Join our Photonics Research Group as a PhD student and explore the physical properties of innovative nanomaterials, including III-V semiconductors and 2D materials, crucial for advances in quantum photonics, such as lasers, modulators, and detectors. In our world-class environment, you'll conduct impactful research, engage in project management, and mentor MSc students, enhancing both your scientific and leadership skills. If you're passionate about pioneering in photonics and nanotechnology, this opportunity is your gateway to a significant scientific career. Join us to shape the future of quantum technologies. The group research publication can be found via

[url=https://scholar.google.com/citations?user=zyAEB5kAAAAJ&hl=en]Google scholar.

For more information, please contact Prof. Zhipei Sun,

[url=mailto:zhipei.sun@aalto.fi]zhipei.sun@aalto.fi

POSITION 11:

Light to sound conversion at nanostructured interfaces (Position code: TITTONEN)

The interaction of light with mechanical vibrations offers a unique link between the two different physical domains. Exciting nanostructures with ultrashort light pulses allow one to create a tuneable source of sound in the gigahertz frequency range. In this project, you will study optoacoustic

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transducers that combine local field enhancement with piezoelectric effect and implement all-optical tuning of acoustic beam propagation.

Your role will be in designing (analytics & modelling) and fabricating the samples, conducting the optical pump-probe measurements, and processing the experimental data. Prior knowledge of nanofabrication techniques, optics, or solid-state physics is considered an advantage. Project results can be extended towards creating structured acoustic beams and towards gigahertz acoustic endoscopy.

For more information, please contact Prof. Ilkka Tittonen,
[url=mailto:ilkka.tittonen@aalto.fi]ilkka.tittonen@aalto.fi

Any questions?

For additional information, kindly contact the Professors mentioned in the position descriptions. Aalto University reserves the right to leave the positions open, extend the application period, reopen the application process, and consider candidates who have not submitted applications during the application period.

In any recruitment process related questions, please contact HR Partner Karoliina Walldén ([url=mailto:karoliina.wallden@aalto.fi]karoliina.wallden@aalto.fi) or HR Partner Hanna Koli ([url=mailto:hanna.koli@aalto.fi]hanna.koli@aalto.fi).

Want to know more about us and your future colleagues?

You can watch these videos: [url=https://www.youtube.com/watch?v=5k_og_6zUJQ]Aalto University - Towards a better world, [url=https://www.youtube.com/watch?v=dUfEGVM-ZP8&feature=youtu.be]Aalto People, and [url=https://www.youtube.com/watch?v=ZK6pDWm1_CE]Shaping a Sustainable Future.

Contact Information

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

Contact

Finland