

Master's thesis worker, development of high-strength
(loncell)-fibers from pulp and textile waste as
reinforcements for structural composites
Aalto University

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Posted Mar. 6, 2024, set to expire Dec. 30, 2024

Job Title Master's thesis worker, development of high-strength
(loncell)-fibers from pulp and textile waste as
reinforcements for structural composites

Department T107 Bioproducts and Biosystems

Institution Aalto University
, , Finland

Date Posted Mar. 6, 2024

Application Deadline Open until filled

Position Start Date Available immediately

Job Categories Graduate Student

Academic Field(s) Chemical/Petroleum

Job Website https://aalto.wd3.myworkdayjobs.com/aalto/job/Otaniemi-Espoo-Finland/Master-s-thesis-worker--development-of-high-strength--loncell-fibers-from-pulp-and-textile-waste-as-reinforcements-for-structural-composites_R38974-4

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 more than 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.

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The School of Chemical Engineering is one of the six schools of Aalto University. It combines natural sciences and engineering in a unique way.

We are now looking for a

Master's thesis student on the development of high-strength (loncell)-fibers from pulp and textile waste as reinforcements for structural composites.

Background

The loncell® process belongs to the category of Lyocell spinning technology, which is characterized by the use of a direct cellulose solvent and an air gap spinning process. The direct cellulose solvent is a protic ionic liquid in which the cation consists of a superbase. loncell®'s current spinning know-how is related to laboratory scale and includes both the fiber line and the recovery of the cellulose solvent.

To demonstrate the versatility of the loncell® process and to broaden its application portfolio the offered master thesis study will focus on the development of loncell® fibers for composite materials.

Scientific environment

[\[url=https://www.aalto.fi/en/departments/bioproducts-and-biosystems\]](https://www.aalto.fi/en/departments/bioproducts-and-biosystems)The Department of Bioproducts and Biosystems (BIO2), one of three departments in the School of Chemical Engineering at Aalto University, has an internationally leading reputation in basic and applied research for the development of advanced materials from natural resources. It is one of Europe's leading research and higher education institutions in the field of sustainable chemistry and engineering based on the utilization of renewable resources.

BIO2 aims to contribute to the development of novel solutions to move towards sustainable primary production and processing systems that can produce materials with fewer inputs, less environmental impact, and reduced greenhouse gas emissions. Within bioscience, the department has research in bioprocess technology, molecular biotechnology, enzyme technology, metabolic engineering, synthetic biology, biomolecular, and biohybrid materials. Other strengths of the department include sustainable materials and products based on lignocellulose, ranging from nanomaterials to novel cellulose-based textiles.

Your role and goals

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The main part of the investigations concerns the preparation of composite specimens and systematic testing to answer the following research questions: *

Is it possible to replace fiberglass with an equivalent loncell® reinforcement when using recycled materials (e.g., textile waste) as raw material? *

Can cotton or textile waste in general serve as a raw material in the production of high-quality reinforcement filaments? *

Is it possible to improve the reinforcement-matrix interaction using suitable hydrophobic agents or compatibilizers during the fiber spinning process?

Tasks

- * Preparation of unidirectionally (UD) reinforced composite specimens
- * (Possibly preparation of (in situ) treated loncell® filaments for enhanced matrix adhesion)
- * Testing the specimens:
 - * Tensile strength
 - * Bonding analyses
 - * Structural characterization (light microscope, SEM)

Your experience and ambitions

We offer a multidisciplinary working environment related to sustainable textiles and fashion. We would like the candidate to have:

- * Good experimental know-how and skills in laboratory work
- * Very good study record
- * Good written and oral English language skills
- * Good teamworking skills

Ready to apply?

Please submit your application through our online recruitment system no later than 25.03.2024 by using the link on Aalto University's webpage ("Apply now"). If you are an Aalto employee or visitor, please apply via the Workday system (internal jobs). To apply, please include the following documents in English and in PDF format:

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- * CV
- * Motivation letter (max 1 page)
- * Study transcripts

The employment contract for a M.Sc. thesis worker will be for five months at full-time capacity. The position can be filled immediately.

If you want to know more about the position, you can reach out to Michael Hummel
([url=mailto:firstname.lastname@aalto.fi]firstname.lastname@aalto.fi).

Contact Information

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

Contact

Finland