



UPPSALA
UNIVERSITET

PhD student position in Biomedical Engineering with a focus on additive manufacturing of sustainable, biodegradable alloys

Published: 2023-02-03

Uppsala University is a comprehensive research-intensive university with a strong international standing. Our ultimate goal is to conduct education and research of the highest quality and relevance to make a long-term difference in society. Our most important assets are all the individuals whose curiosity and dedication make Uppsala University one of Sweden's most exciting workplaces. Uppsala University has over 54,000 students, more than 7,500 employees and a turnover of around SEK 8 billion.

Admission to PhD education in the subject Engineering Sciences with specialization in Biomedical Engineering

This position is based at the Division of Biomedical Engineering, Department of Materials Science and Engineering, The Ångström Laboratory (<https://www.materialvetenskap.uu.se/medicinsk-teknik/>). The research at the division is focused on basic mechanisms for the development and evaluation of new materials in interaction with biological systems and it comprises two research groups, the BMS group and the EMBLA group.

The BioMaterial Systems (BMS) group, headed by Prof. Cecilia Persson, focuses on the development of new biomaterials and implants, mainly through additive manufacturing (3D-printing). There are currently approximately 20 people in the research group. More information on the profile of the research group can be found at: <http://www.materialvetenskap.uu.se/bms/>. Prof. Persson is also the Director of VINNOVA Competence Centre AM4Life, which gathers 25 partners from academia,

industry and the public sector to support competence development in additive manufacturing for the life sciences: <https://www.uu.se/en/research/am4life/>.

The present recruitment is connected to the Wallenberg Initiative Materials Science for Sustainability (WISE, wise-materials.org). WISE, funded by the Knut and Alice Wallenberg Foundation, is the largest-ever investment in materials science in Sweden and will encompass major efforts at Sweden's foremost universities over the course of 10 years. The vision is a sustainable future through materials science. Read more: <https://wise-materials.org>

All early-stage researchers recruited into the WISE program will be a part of the WISE Graduate School <https://wise-materials.org/research/graduate-school/> , an ambitious nationwide program of seminars, courses, research visits, and other activities to promote a strong multi-disciplinary and international network between PhD students, postdocs, researchers, and industry.

Project description

In this project, we aim to develop rare-earth-free magnesium metallic glasses with potential applications spanning from the biomedical field to aerospace and the automotive industry. Their microstructure would allow for enhanced strength and corrosion resistance, but large, complex components have previously been impossible to achieve for these materials. Additive manufacturing will be used as an enabler for their development, while also addressing the needs for sustainable production and powder reuse. The project will hence explore new ways of developing enhanced, material- and weight-saving components, while also tackling the need for a reduced use of rare-earth-metals.

The project is conducted in collaboration with the Division of Solid Mechanics at Lund University, at which visits are expected.

Work duties

The main duties of doctoral students are to devote themselves to their research studies which includes participating in research projects and third cycle courses. The work duties can also include teaching and other departmental duties (no more than 20%).

The work duties within this project will include parameter optimization of laser powder bed fusion (L-PBF) processes to develop the alloys. You will use different methods of experimental characterization of the alloys, including but not limited to microscopy, phase composition, corrosion and mechanical property assessment. This may also include synchrotron radiation and neutron scattering experiments. Numerical modelling will be an integral part of the project, including thermodynamic calculations and the use of numerical nucleation and growth models and their implementation in finite element software.

The work also includes spreading the acquired knowledge through scientific articles and presentations at international conferences.

Qualification requirements

MSc or MSc Eng. degree (by agreed starting date) with specialization in materials science, materials engineering, engineering physics with materials science or related fields, with documented knowledge and a strong interest in numerical modelling. We require good knowledge of English, both oral and in writing.

Additional qualifications

Documented experience in one or more of the following will be considered a merit:

- Laser powder bed fusion additive manufacturing
- Reactive alloy development, such as Mg or Zn based alloys
- Thermodynamic modelling
- CNT modelling
- Finite element modelling
- Phase field modelling
- Neutron scattering experiments
- Synchrotron radiation experiments

We are looking for someone with a strong motivation to conduct multidisciplinary research, with good analytical skills, interested in planning and leading own projects and capable of working both independently and in groups. A good communication both internally and externally, oral and in writing, is highly valued.

Admission requirements

To meet the entry requirements for doctoral studies, you must

- hold a Master's (second-cycle) degree, or
- have completed at least 240 credits in higher education, with at least 60 credits at Master's level including an independent project worth at least 15 credits, or
- have acquired substantially equivalent knowledge in some other way.

Rules governing PhD students are set out in the Higher Education Ordinance chapter 5, §§ 1-7 and in [Uppsala University's rules and guidelines](#).

Instructions for application

Your application should include:

- 1) A short letter describing yourself, how your background matches the position and why you want to do a doctorate.
- 2) CV (max. 2 pages)
- 3) A copy of your master's degree and your course transcript (list and grades)
- 4) A copy of your bachelor's degree and your course transcript (list and grades)
- 4) Names and contact details (address, e-mail address and telephone number) of at least two reference persons
- 5) List of relevant publications (including master's thesis)

The application can preferably be written in English.

We may during the application time continuously read the applications and hold interviews.

About the employment

The employment is a temporary position according to the Higher Education Ordinance chapter 5 § 7. Scope of employment 100 %. Starting date as soon as possible *or* as agreed upon. Placement: Uppsala.

For further information about the position, please contact: Prof. Cecilia Persson (cecilia.persson@angstrom.uu.se), Dr Francesco D'Elia: Francesco.delia@angstrom.uu.se, or Alexandra Davydova: alexandra.davydova@angstrom.uu.se

Please submit your application no later than 28th February 2023, UFV-PA 2023/417

[Read more about our benefits and what it is like to work at Uppsala University](#)

Are you considering moving to Sweden to work at Uppsala University? [Find out more about what it's like to work and live in Sweden.](#)

Please do not send offers of recruitment or advertising services.

Submit your application through Uppsala University's recruitment system.

Placement: Department of Materials Science and Engineering

Type of employment: Full time , Temporary position longer than 6 months

Pay: According to local collective agreement for PhD students

Number of positions: 1

Working hours: 100 %

Town: Uppsala

County: Uppsala län

Country: Sweden

Union representative: ST/TCO tco@fackorg.uu.se

Seko Universitetsklubben seko@uadm.uu.se

Saco-rådet sacco@uadm.uu.se

Number of reference: UFV-PA 2023/417

Last application date: 2023-02-28

Apply for position