

Aalto University is a community of bold thinkers where science and art meet technology and business. Aalto University has six schools with nearly 20 000 students and 4 700 employees, 390 of which are professors. Our campuses are located in Espoo and Helsinki, Finland.

Aalto University School of Engineering and Department of Civil Engineering invites applications for

Doctoral Candidate position: Modelling of failure and post-failure behaviour of granular slopes with Generalized Interpolation Material Point Method

The geoengineering research group is seeking a highly motivated and creative Doctoral Candidate who would undertake the task of modelling the granular slope failure as well as the resulting landslide with the Generalized Interpolation Material Point Method. The candidate will work in an international group in the Department of Civil Engineering, and under supervision of Assistant Professor Wojciech Sołowski https://people.aalto.fi/en/wojciech_solowski. More information about Aalto University and School of Engineering, please visit at <http://eng.aalto.fi/en/>.

The position will allow the successful candidate to gain knowledge on modern numerical techniques, as well as their application for solving problems in soil mechanics. The research will be concentrated on modelling granular materials slope failures and the resulting landslides. At the end of the four year period the successful applicant should be a first author or co-author of three journal papers as well as several conference publications.

Project description

The project is funded via Professor Sołowski and is linked to Finnish Academy Project dealing with slope stability. The duration of the funding is maximum three years. The objective of the research is to use advanced constitutive models for soils to model all landslide stages. That includes initial slope instability, initial phase of sliding, as well as erosion and prediction of the outreach of a landslide. Also, the landslide triggers (e.g. heavy rainfall) may be taken into account. In detail, the successful candidate is expected to:

- a) introduce hydro-mechanical coupling into Material Point Method code Uintah including partial saturation (possibly in cooperation with other researchers in the group)
- b) introduce constitutive models suitable for modelling granular material (most likely non-local models)
- c) perform number of simulations of slope failure replicating historical landslides

Additionally, number of numerical advancements may be necessary which should improve the stability and accuracy of the Uintah software. The doctoral candidate will mainly work on granular material landslides.

Essential requirements:

- Excellent interpersonal skills
- Excellent ability to work in a team
- Creativity, open mind and willingness to accept new ideas
- Knowledge of continuum mechanics and numerical methods

- Proficiency in English language
- The candidate must fulfil the Aalto University requirements for doctoral studies, see: <https://into.aalto.fi/display/endoctoraleng/Admission+requirements>

Desired qualities:

- Deep understanding of existing constitutive models soils
- Knowledge of unsaturated soil behaviour
- Knowledge of non-local constitutive models for soils
- Knowledge of Cosserat continuum theory
- Experience in numerical methods and simulations of soil behaviour
- Programming skills and knowledge of C++

Contract and salary

The Doctoral Candidate position is a contract-based; one year contract is granted first, followed by a possible extension for a two-year period depending on the achievements during the first contractual period and an admission to do postgraduate studies in the School of Engineering. In total, the duration of the position is three years. A funding for the possible fourth year of doctoral studies is not currently guaranteed.

In a maximum of four years, the doctoral candidate is required to 1) complete the doctoral dissertation, 2) finish relevant courses for 40 ECTS credits and 3) participate in teaching. The applicant must fulfill the requirements for entitlement to do postgraduate studies at Aalto University: <https://into.aalto.fi/display/endoctoraleng/Admission+requirements>

The position is available to the successful candidate immediately. Aalto University applies the salary system of Finnish universities.

For more information

Additional information regarding the job, please contact Assistant Professor Wojciech Sołowski at wojciech.solowski@aalto.fi or tel. +358 505 925 254.

For further information regarding the recruitment process, please contact HR Coordinator Hanna Ropponen. Emails: firstname.lastname@aalto.fi

How to apply

The applications for the Doctoral Candidate position are to be submitted through the eRecruitment system (link 'Apply for this job' below) **in May 10th 2016 at the latest at:** <http://www.aalto.fi/en/about/careers/jobs/view/759/>.

The application for the position should include following attachments in pdf format:

1. Cover letter
2. Motivation letter. We are especially interested in:
 - description of your personal qualities, your 'strong points'
 - your personal views on what is important in research work
 - your view of your future career
 - explanation on why you are interested in the position offered

3. Detailed resume including:
 - a. list of studied subjects & grade transcripts
 - b. list of national/international collaborations, secondments, student exchanges, involvement in EU programs etc. (if present)
 - c. teamwork activities, involvement in associations etc. (if present)
 - d. list of attended extra-curriculum courses
4. A certified copy of master's and bachelor's degree certificate and official transcript of records, and their translations, if the originals are not in Finnish, Swedish or English.
(Minimum average grading requirements:
<https://into.aalto.fi/display/endoctoraleng/Application+instructions>)
5. Proof of proficiency in Finnish, Swedish or English if the applicant is not a native speaker of or educated in any of them. (Language skill proof requirements):
http://www.aalto.fi/en/studies/admissions/tech/masters_degree/language_requirements/
6. Names of two referees with contact details

All the material should be submitted in English. The application materials will not be returned.

Aalto University reserves the right for justified reasons to leave the position open, to extend the application period and to consider candidates who have not submitted applications during the application period. The position may also be closed without recruitment if no suitable candidate is found.

In Espoo, April 11th, 2016