

*Aalto University is a new university with over a century of experience. Created from a high-profile merger between three leading universities in Finland – the Helsinki School of Economics, Helsinki University of Technology and the University of Art and Design Helsinki – Aalto University opens up new possibilities for strong multidisciplinary education and research. The university has 20 000 students and a staff of 5 000 including 350 professors.*

Aalto University School of Engineering, Department of Civil and Environmental Engineering invites applications for:

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

The Geoengineering research and teaching group is seeking a highly motivated and creative doctoral candidate who would undertake the task of modelling the slope failure as well as the resulting landslide with the Generalized Interpolation Material Point Method.

The individual will work in an international group at Aalto University in Espoo, Finland under supervision of Assistant Professor Wojciech Sołowski and will be co-supervised by Prof. Minna Karstunen from Chalmers University of Technology, Sweden. The successful applicant will be visiting Chalmers regularly. Additionally, cooperation with other international and national institutions may be possible; in particular cooperation with Prof. Rebecca Brannon from Utah University, US may be encouraged.

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 slope failures and the resulting landslides / mud avalanches and similar. It is expected that the successful candidate will gain some international recognition due to participation in workshops (in e.g. Alert network) and high quality scientific conferences. At the end of the four year period the successful applicant should be a first author or co-author of four journal papers as well as several conference publications.

**Research Group**

The above mentioned position is located in the Geoengineering research and teaching group in the Department of Civil and Environmental Engineering, see <http://civil.aalto.fi/en/research/geoengineering/>. The Geoengineering group conducts research related to Soil Mechanics and Foundation Engineering, Rock Engineering and Engineering Geology, Applied Geophysics and Highway Engineering. The group currently consists of five professors, lecturers, teaching researcher, doctoral students, research assistants and technical staff, total staff being around 40. The group has research facilities for the experimental research. For more general information of the research and teaching of the Department, go to <http://civil.aalto.fi/en/>.

**Detailed project description**

The project is funded via Finnish Academy. 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.

The project will develop and implement into open source Uintah software (<http://www.uintah.utah.edu/>) an innovative model for granular and mud flow, establish the validity of the model and use it for simulation of the 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, though he/she is also welcome to work on modelling and slides in cohesive fine soils. In any case, the modelling will take into account the influence of soil anisotropy and soil unsaturation.

#### **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 satisfy the Aalto University requirements for a PhD student, see: <https://into.aalto.fi/display/endoctoraleng/Admission+requirements>

#### **Desired qualities:**

- Deep understanding of existing constitutive models soils
- Knowledge of unsaturated soil behaviour
- Experience in numerical methods and simulations of soil behaviour
- Programming skills
- Knowledge of C++

#### **Duration and salary**

Aalto University applies the salary system of Finnish universities. The intended initial salary for this position is 2375€ per month. The successful candidate should start on the 1<sup>st</sup> of September 2015 or as soon afterwards as possible. The position is contract-based. The doctoral candidate will be granted one year (a two-year) contract first, followed by an extension for a three-year (a two-year) period depending on the achievements during the first contractual period. The total duration of the position is four years.

#### **For more information**

Additional information regarding the post may be obtained from Wojciech Sołowski, e-mail: [wojciech.solowski@aalto.fi](mailto:wojciech.solowski@aalto.fi) (in urgent matters please call or text at +358 50 5925 254). The interested applicants may find some more background information at the group webpage <http://civil.aalto.fi/en/research/geoengineering/soil/> and on the Wojciech Sołowski's profile [https://people.aalto.fi/en/wojciech\\_solowski](https://people.aalto.fi/en/wojciech_solowski)

#### **How to apply**

The applications for the doctoral candidate position are to be submitted through the eRecruitment system **no later than on the 15<sup>th</sup> of July, 2015**: <http://www.aalto.fi/en/about/careers/jobs/view/535/>.

The evaluation of applications will begin immediately afterwards. After the review, some candidates will be interviewed over Skype.

The application for the position should be made as a single pdf file which contain:

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

There is no need to follow these points in shown order, nor the letter need not to be limited to these points. However, touching on the above subjects would be appreciated.

- Detailed resume which should include:
  - o list of studied subjects & grade transcripts
  - o list of national/international collaborations, secondments, student exchanges, involvement in EU programs etc. (if present)
  - o teamwork activities, involvement in associations etc. (if present)
  - o list of attended extra-curriculum courses
  - o evidence / statement of English language proficiency
- Names of two referees who will provide references
- A certified copy of the Master diploma (or a letter from the university stating your eligibility for getting the degree during the nearest graduation ceremony) (the document is not required at the application stage)

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.

In Espoo, 16th of June, 2015