

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 STUDENT POSITION or POSTDOCTORAL RESEARCHER POSITION in Material Point Method in Geotechnical Engineering

The Geoengineering research and teaching group is seeking a highly motivated and creative doctoral student or a postdoctoral researcher who would undertake the task of developing the Material Point Method for application in geotechnical engineering. The individual will work in an international group at Aalto University in Espoo, Finland under supervision of Assistant Professor Wojciech Sołowski. The successful applicant will have possibility to cooperate with international researchers, as well as to attend scientific conferences.

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 researchers, doctoral students and technical staff, total staff being around 30. 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

Material Point Method is a new numerical method particularly well suited for solution of problems involving very large deformation. It has been recently applied in geotechnical engineering. The group at Aalto University is seeking to expand the applicability of the method for wider ranges of geotechnical problems. Ultimately, it is intended to use the material point method for very advanced geotechnical problems, including these connected to nuclear waste storage.

The first deliverable of the project is to extend the existing material point method implementation by introducing hydro-mechanical coupling. The existing code is based on the open source code Uintah (<http://www.uintah.utah.edu/>), which has been extended by adding constitutive models specific to geomechanics.

Further deliverables may include (among others):

- Solution of number of hydro-mechanical geotechnical problems
- Further extensions of the material point method code by including thermo- and/or chemo-coupling

- Improvements in the material point method algorithms
- Incorporation of advanced constitutive models into material point method

The ultimate scope of the project will depend on the experience of the recruited doctoral student / postdoctoral researcher.

Requirements:

- Good working knowledge of C++
- General knowledge of numerical methods used in engineering
- Some knowledge of geotechnical engineering
- Ability to work in a team
- Willingness to learn
- Master degree - preferably in Civil or Geotechnical Engineering, though candidates with different background are encouraged to apply (PhD degree for candidates applying for a postdoctoral researcher position)
- Very good knowledge of English

It is desirable that the applicant has experience in C++ coding. Further on, any familiarity with the material point method and/or Uintah software would be a plus. The applicant for doctoral studies must satisfy the admission requirements of Aalto University:

<https://into.aalto.fi/display/endoctoraleng/Admission+requirements>.

Duration and salary

Aalto University applies the salary system of Finnish universities. Currently, the starting salary for the doctoral student is equal to 2375€ whereas the starting salary for a postdoctoral researcher is above 3000€ (usual starting salary is 3100€). The position is contract-based. The doctoral student will be granted a two-year (or one year) contract first, followed by an extension for another two-year (three-year) period depending on the achievements during the first contractual period. The expected total duration for the postdoctoral researcher is three years. First contract will be for a period of one year, and the extension to three years is subject to meeting the performance criteria.

For more information

Additional information regarding the post may be obtained from Dr Wojciech Sołowski, e-mail:

wojciech.solowski@aalto.fi (in urgent matters please call or text at +358 50 5925 254). The

interested applicants are also advised to visit group webpage

<http://civil.aalto.fi/en/research/geoengineering/soil/> and Dr Wojciech Sołowski profile

https://people.aalto.fi/en/wojciech_solowski where additional information on the current

capabilities of the material point method code as well as some computed examples and published results are given.

How to apply

The applications for the doctoral student or postdoctoral researcher position are to be submitted through the eRecruitment system **no later than on Friday, the 10th of October, 2014:**

<http://www.aalto.fi/en/about/careers/jobs/view/241/>. The evaluation of applications will begin

immediately afterwards. After the review, some candidates will be interviewed over Skype. It is expected that the successful candidate will commence work at Aalto University after no more than few months after application.

The application for the position should contain:

- Detailed resume
- Names of two referees who will provide references
- Grades transcription (in the original language and in English)
- Certified copy of the master's diploma (at the application stage certification is not required; note that the diploma in its original language must be accompanied by its English translation)
- In case of application for postdoctoral researcher position, a certified copy of the PhD diploma (or a letter from the university stating your eligibility for getting the doctoral degree at next graduation ceremony) is required instead (document is not required at the application stage)

All 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, 26th of August, 2014