

FORM FOR EMPLOYERS

INSTITUTION: AGH University of Krakow

DEPARTMENT: Faculty of Mechanical Engineering and Robotics, Department of Robotics and Mechatronics

CITY: KRAKOW

POSITION: assistant professor in a group of research workers at the Department of Robotics and Mechatronics

DISCIPLINE: mechanical engineering, chemical engineering, environmental engineering, mining and energy

EXPIRES: 15.08.2024

WEBSITE: <https://www.agh.edu.pl/o-agh/praca-w-agh>

KEY WORDS: mechanical engineering, chemical engineering, environmental engineering, mining and energy

DESCRIPTION (field, expectations, comments, requirements):

The research is conducted within the framework of a Polish National project that aims to study the effect of gravity in the Lunar soil excavation process. The Lunar surface consists of a layer of regolith, which can vary from a few meters to tens of meters. As such the regolith is the most accessible in-situ material to exploit on the Moon and its collection process is a key factor in future missions aiming at the utilization of the Lunar resources. The regolith is a soil with peculiar mechanical properties and its extraction is to be carried out under conditions different from those on the Earth. In particular, the reduced gravity presents its own set of problems that make the design of excavation tools challenging. In this context, DEM (discrete element method) models represent a viable tool to simulate the regolith excavation process. Nonetheless, this modelling approach, although potentially powerful to predict the mechanical behavior of the regolith in conditions of reduced gravity, require an important validation step, which is challenging for two main reasons: Firstly, DEM models feature several parameters that require correct tuning; Secondly, DEM simulations are time-consuming when compared with other mesh-based modelling approaches.

The research activity of the candidate will deal with the validation of DEM models by leveraging to a large set of already available experimental tests of the regolith, such as repose angle tests, shear tests, tri-axial tests, blade cutting tests. Experiments in conditions of micro gravity are also planned within the project by carrying out repeated parabolic flight tests. DEM model validation activity will mainly involve the preparation of different DEM models with different model parameters configurations. Run extended simulation programs using simulation parallelization, Preparing a numerical simulation framework that permits to efficiently tune the model parameters and validate the models under different operational conditions. In these phases optimization methods and machine learning techniques can be used to make the process more efficient.

REQUIREMENTS:

- 1) doctoral degree in technical sciences in the fields of mechanical engineering, chemical engineering or environmental engineering, mining and energy obtained no later than 4 years,
- 2) documented scientific achievements, particularly publications in renowned international journals, conference proceedings from leading conferences, and previous involvement in the implementation of national and international research projects,
- 3) Hirsh Candidate Index at a minimum level of 4,
- 4) good experience in the field of numerical modelling by using FEM or DEM
- 5) good programming skills in Matlab/Python and knowledge of Linux OS is preferable,
- 6) documented knowledge of English at B2 level or higher,
- 7) good knowledge in the fields of machine learning and optimization,
- 8) active participation in scientific conferences and symposia.

DOCUMENTS REQUIRED:

- 1) cover letter,
- 2) CV,
- 3) personal questionnaire,
- 4) full list of scientific and organizational achievements,
- 5) document confirming knowledge of English at level B2 or higher,
- 6) additional certifications.

DOCUMENTS MUST BE SUBMITTED AT:

Candidates must send documents in electronic form to the e-mail addresses alberto.gallina@agh.edu.pl (Alberto Gallina - project manager from AGH).

The AGH University of Krakow will be the candidate's main place of employment.

The AGH University of Krakow does not require you to provide any information or data other than those resulting from the applicable law (name/names, surname, date of birth, contact details, education, professional qualifications, and employment history). However, if you choose to include your photograph or any other information, please fill in and attach this statement of consent to the processing of personal data, which constitutes an attachment to this information.

The controller of your personal data processed in order to carry out the recruitment process for the above-mentioned position is the AGH University of Krakow, al. A. Mickiewicza 30, 30-059 Krakow. You can read all information concerning the processing of your personal data on the website of the AGH University of Krakow after going to the "Personal data protection" tab (<https://www.agh.edu.pl/en/personal-data-protection>).

The University reserves the right not to settle the competition without providing any reason or justification. Winning the competition is not tantamount to ensuring the candidate's employment. The result of the competition serves solely as a recommendation to the Rector in this regard. The final decision concerning the employment will be made by the Rector.

Cracow, on

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name and surname

CONSENT TO PERSONAL DATA PROCESSING
(recruitment - employee)

Pursuant to Article 6(1)(a) of the Regulation (EU) 2016/679 of the European Parliament and of the Council of April 27, 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data and repealing Directive 95/46/EC (General Data Protection Regulation), [OJ EU . L. 2016.119.1, May 4, 2016] hereinafter referred to as "GDPR", **I consent to the processing of my personal data other** than the data mentioned in Article 22¹ § 1 of the Labour Code and contained in my CV and other application documents, and to the reproduction of my physical likeness **for the purposes of recruitment and selection for the position of** (contest notice no.).

In addition, I declare that the request for consent has been presented in a clear and understandable manner and that I have been informed about a possibility of withdrawing my consent at any time as well as about consent accountability. The withdrawal of consent to have personal data processed shall not affect the legality of the processing, which is carried out on the basis of such consent prior to its withdrawal; The consent may be withdrawn by submitting a written representation on consent withdrawal at a place that was indicated in the contest notice as the place for submitting documents.

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Date and signature