



M.Sc. and Ph.D. Positions in Geotechnical Engineering

Dr. F. Albert Liu (<https://apps.ualberta.ca/directory/person/fa6>) invites applications for four fully funded positions, including **one M.Sc. and three Ph.D. positions** in the broad interdisciplinary areas of soil-robot interactions, tailings geomechanics, unsaturated soil mechanics, and data analytics. Successful candidates will work in the Geotechnical Centre (ualbertageotech.ca) at the University of Alberta starting in **Fall 2024**. These positions will combine teaching and Research Assistant responsibilities.

M.Sc. position – Physics-guided ML in geotechnics:

The research will focus on machine learning applications and data analysis in geotechnics (including vision-based, contextual, and numeric). Python skill with experience in general applications of AI, neural network, and/or image processing is required. Prior training or a degree in computer science or engineering is strongly desired.

Ph.D. position 1 – Soil-robot interactions:

The research aims to improve soil-robot interactions, focusing on the interplay between soil and the locomotion of quadruped robotic systems. The research will develop and test modifications to the design of robotic dogs to enhance their performance in various soil conditions, including exploring advanced sensor systems and innovative locomotion techniques. A strong understanding of soil mechanics is required and prior experience in robotics and/or Computer Science or a related field is recommended.

Ph.D. position 2 – Tailings geomechanics:

The research will focus on an extensive laboratory testing program and constitutive modelling of static liquefaction of tailings materials under the general framework of Critical State Soil Mechanics, with particular interest in soil structure evolution and the initiation of flow-like landslides. Coding skills in Python with experience in triaxial testing and *NorSand* modelling are required. Experience in seismic/EM wave measurements is helpful.

Ph.D. position 3 – Unsaturated soil mechanics and bio-cementation

The research will focus on the applications of bio-mediated soil treatment techniques under the framework of unsaturated soil mechanics. Experience in conducting MICP or EICP treatments and/or large-strain consolidation tests is desired. Understanding of unsaturated soil mechanics and experience with SWCC testing is required; the successful applicant is also expected to work with Prof. Delwyn Fredlund to further advance the applications of unsaturated soil mechanics.

Enquiries and applications (CV, transcripts, and personal/research statement) can be sent to Dr. F. Albert Liu (fa6@ualberta.ca). The review of applications and filling of positions will begin immediately.