Editorial

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As the world population is rapidly growing and climate change has become a reality, building a sustainable society is a major, necessary and urgent challenge. Rising to that challenge involves making the transition to a secure, clean and efficient energy supply, developing adaptation strategies for climate resilient infrastructures, and reducing and managing waste. The subsurface represents an enormous potential for the development of a safe and sustainable society, and geotechnical and geo-environmental engineers have a key responsibility and role to play.

This issue of *Environmental Geotechnics* comprises of six papers, spanning a range of topics and applications that reflects the broad impact of our field.

Demographic pressure and climate changes have increasingly compelled our societies to build on, in, under and with soils that were considered unsuitable before. In this context, soil stabilisation techniques are required to improve the soil engineering properties either temporarily or permanently. In this issue, Rusati *et al.* (2020) investigate the mechanical properties of sand–cement–inorganic binder mixtures, which can be used for soil reinforcement applications. The authors use a combination of electrical resistivity, free–free resonant column tests and unconfined compression tests to assess the time-dependent performance of the mixtures. In particular, Rusati *et al.* (2020) suggest that the unconfined compressive strength of binder mixtures can be estimated in the field with adequate non-destructive testing methods.

Tsen-Tieng *et al.* (2020) and Nguyen *et al.* (2020) contribute to the understanding of soil–root interaction and the beneficial contribution of vegetation to the stability of geotechnical structures. In particular, Tsen-Tieng *et al.* (2020) focuses on the anchorage and resistance to uprooting of tree root–soil plates. The authors propose a close-form model, using results from destructive pull tests performed on trees, to estimate the resistance of a soil–root plate to uprooting. On the other hand, Nguyen *et al.* (2020) investigates the problem of soil–root interaction at a larger scale and assesses numerically the stability of vegetated slopes, in particular during and after rainfall events. The authors show that, by increasing the soil cohesion, vegetation contributes positively to the stability of slopes.

The vadose zone is a complex system, where flow and transport processes are strongly affected by the soil, climate and

vegetation. While the relevance of unsaturated soil mechanics is well established, major challenges, notably associated with the determination of parameters for unsaturated soil models, still exist. In this issue, Dong *et al.* (2020) propose a heuristic procedure, based on the random finite element method, to quickly estimate the hydraulic conductivity and water retention curve of unsaturated soils from their properties at fully saturated and dry states. Yet, in the vadose zone, these water retention properties and hydraulic conductivity of soils in that zone might be affected by surfactant concentrations. By comparing surfactant flow and transport to the flow of pure water and transport of a conservative tracer, Bashir *et al.* (2020) clearly highlights the importance of coupling between flow and transport problems for engineering practice.

Many activities in the subsurface relies on boreholes, which need be kept stable. The final paper of this issue (Hu *et al.*, 2020) investigates the influence of stress field anisotropy on drilling-induced tensile fractures. In particular, the authors emphasize the role of stress field anisotropy on the time-dependent development of shear bands and borehole instabilities.

I sincerely hope readers will find the papers published in this issue of *Environmental Geotechnics* stimulating and inspiring.

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