

Special Issue

The Applications of Artificial Intelligence and Digital Technology in Geotechnical Engineering

Message from the Guest Editors

Geotechnical engineering faces unprecedented challenges due to increasing infrastructure complexity, climate change impacts, and urbanization demands. Traditional methods often struggle with inherent uncertainties in soil behavior, heterogeneous subsurface conditions, and risk management in mega-projects. The integration of Artificial Intelligence (AI) and Digital Technologies (e.g., IoT, BIM, digital twins, remote sensing) offers transformative potential to revolutionize geotechnical analysis, design, construction, and monitoring. We seek contributions that bridge theoretical innovation with real-world applications, addressing critical gaps in:

- Uncertainty Quantification: AI-driven stochastic modeling of soil properties, spatial variability, and multi-hazard interactions.
- Intelligent Construction: Autonomous monitoring, real-time decision support, and risk mitigation for tunnels, deep excavations, and foundations.
- Intelligent Infrastructure: Digital twins for lifecycle management, predictive maintenance, and climate adaptation.
- Cross-Domain Synergy: Fusion of geotechnical data with geospatial, structural, and environmental informatics.

Guest Editors

Dr. Jinzhang Zhang

Dr. Jiayao Chen

Prof. Dr. Qiujing Pan

Dr. Jingkang Shi

Dr. Zhongkai Huang

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Applied Sciences
Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland
Tel: +41 61 683 77 34
applsci@mdpi.com

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As the world of science becomes ever more specialized, researchers may lose themselves in the deep forest of the ever increasing number of subfields being created. This open access journal *Applied Sciences* has been started to link these subfields, so researchers can cut through the forest and see the surrounding, or quite distant fields and subfields to help develop his/her own research even further with the aid of this multi-dimensional network.

Editor-in-Chief

Prof. Dr. Giulio Nicola Cerullo
Dipartimento di Fisica, Politecnico di Milano, Piazza L. da Vinci 32,
20133 Milano, Italy

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