

## 团队简介 Team Profile

### 深部土力学特性及与地下工程结构相互作用研究团队



深部土体介质物理力学性质及与地下工程结构的耦合作用问题，是深部地下工程可靠建设与稳定运营的基础和前沿课题。

该团队现有研究成员 80 人，其中“长江学者”特聘教授 1 人，教授 5 人，副教授 10 人，讲师 5 人；在站博士后 6 人，博士研究生 17 人，硕士研究生 36 人。

团队主要研究方向与内容为：深部土体物理性质、成因、矿物成分、微-细-介观结构特征及其宏观力学性质；深

部土体冻结过程、冻胀融沉机理、冰分凝与冻胀理论模型以及冻胀与结构的相互作用机理，冻结壁的精细化设计与稳定理论，多年冻土构筑物基础稳定理论；深部土体介质与工程结构的界面层几何、物理及力学特性，界面层理论模型；深部土体土拱效应及地下工程结构荷载理论；深部岩土传质传热特性及工程热效应；井筒及地下工程结构智能监测方法与技术；特殊土工程特性及其诱发工程病害等。

团队预期研究目标为：掌握深部土、冻土等特殊土体介质的基本物理、热物理、力学性质及与工程耦合作用机理；建立冻土体冻胀理论、介质与结构界面层理论、地下工程结构荷载理论；形成冻土冻胀融沉变形控制、井壁冻结壁可靠设计、地下工程结构智能监测、地下工程可靠性分析等方法与技术。

### Research Team of Deep Soil Mechanical Property and Its Interaction with Underground Engineering Structures

The physical and mechanical properties of deep soil medium and its coupling with underground engineering structures are the fundamental and cutting-edge subject of reliable construction and stable operation of deep underground engineering.

At present, this team has 80 staff, including one specially-appointed professor of "Cheung Kong Scholars Program", 5 professors, 10 associate professors and 5 lecturers. There are 6 staff working as post-doctoral research fellow, 17 doctoral students and 36 master students.

The main research directions of the team are: physical properties, genesis, mineral composition, micro-fine-mesoscopic structure characteristics and macroscopic mechanical properties of deep soil, freezing process of deep soil, mechanism of frost heaving and thaw collapsing, theoretical model of ice condensation and frost heave, interaction mechanism of frost heave and structures, fine design and stability theory of frozen wall, stability theory of ever-frozen structure foundation, the geometric, physical and mechanical characteristics of the interface layer of deep soil medium and engineering structure, the theoretical model of the interface layer, soil arch effect of deep soil mass and the structure load theory of underground engineering, characteristics of mass transfer and heat transfer in deep rock and engineering thermal effect, intelligent monitoring method and technology of shaft and underground engineering structure and special soil engineering characteristics and induced engineering diseases.

The expected research goal of the team is to master the basic physics, thermal physics and mechanical properties of special soil medium such as deep soil and frozen soil, as well as the interaction mechanism with engineering, to establish the frost heave theory of frozen soil mass, the theory of interfacial layer of medium and structure, and the structure load theory of underground engineering, to develop methods and techniques such as the control of frost heave and submerge deformation of frozen soil, reliable design of frozen shaft wall, intelligent monitoring of underground engineering structure, and reliability analysis of underground engineering.

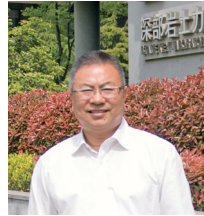
## 深部土力学特性及与地下工程结构相互作用研究团队 Research Team of Deep Soil Mechanical Property and Its Interaction with Underground Engineering Structures



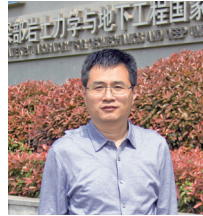
周国庆 教授



余海岁 特聘教授



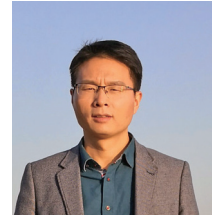
马金荣 教授



刘志强 教授



赵光思 教授



卢萌盟 教授



梁恒昌 副教授



商翔宇 副教授



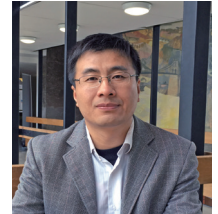
王建州 副研究员



赵晓东 副研究员



朱启银 副研究员



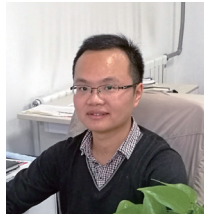
王义江 副教授



周扬 副教授



莫品强 副研究员



王涛 副教授



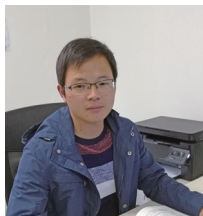
王博 副教授



刘明 讲师



况联飞 讲师



陈拓 讲师



李瑞林 讲师

### 团队最新研究进展及应用方向： Latest Research Progress and Application Direction of the Team:

1. 深部岩（冻）土（热）物理及力学特性  
(Thermal) Physical and mechanical properties of deep rock (frozen) soil
2. 冻土冻胀理论模型与冻胀控制机理  
Theoretical model for frost heaving and frost heaving control mechanism
3. 月壤模拟及小重力真空环境力学特性  
Simulation of lunar soil and its mechanical characteristics in low-gravity vacuum environment
4. 深大立井井筒建设关键理论与技术  
Key theories and technologies for shaft construction in deep vertical shaft
5. 地下工程结构变形智能感知技术  
Intelligent perception technology of structural deformation of underground engineering