

UNIVERSITY OF MACAU
FACULTY OF SCIENCE AND TECHNOLOGY
DEPARTMENT of
CIVIL AND ENVIRONMENTAL ENGINEERING

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**"Monitoring Soil Deformation Using Distributed
Fiber Optic Sensing Technology"**

by

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Abstract

Since the invention of the first fiber optic sensor (FOS) in the late 1970s, various quasi- and fully-distributed monitoring technologies have emerged to date. Compared with conventional sensors, distributed FOSs have some inherent advantages such as immunity to electromagnetic interference, insensitivity to corrosion, high precision and tiny size. Recently, these sensors have been adopted to monitor strains or displacements of a variety of geotechnical structures, such as foundations, slopes, tunnels, and dams. These pilot case studies have greatly extended the real-world applications of these sensors, and have preliminarily verified their capability in monitoring soil deformation. In this presentation, the working principle of the distributed FOS technologies will be presented briefly. The recent advances and applications of distributed FOSs in soil deformation monitoring will be introduced. Finally, some key research topics, such as in-depth analysis of real-time monitoring data, performance evaluation of soil-embedded distributed FOSs, and field implementation of distributed FOS systems, will be discussed in detail.

Biography

Hong-Hu Zhu is an associate professor of engineering geology and geotechnics at Nanjing University, China, and the associate director of Suzhou Key Laboratory of Distributed Sensing & Monitoring Technology of Civil Infrastructures. He got the BEng degree in civil engineering from Zhejiang University in 2002 and MSc in engineering mechanics from Jinan University in 2005. In 2009, he graduated from The Hong Kong Polytechnic University and obtained his PhD degree in geotechnical engineering under the supervision of Prof. Jian-Hua Yin. From 2008 to 2010, he worked as research assistant, research associate, and post-doctoral fellow in The Hong Kong Polytechnic University. He has been a visiting scholar in the Department of Engineering, University of Cambridge, during 2014 to 2015. He is a member of IAEG, ISHMII, ISSMGE, and IALCCE. His areas of expertise include the development and application of smart monitoring systems for geo-structures, field instrumentation and evaluation of slope stability and related geo-hazards, and modelling of time-dependent behaviour of geo-materials. He is the author or co-author of 1 book, 5 patents, and more than 80 scientific papers. He serves as the invited reviewer of 22 international journals and the guest editor of 3 journal special issues.

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