

Dear ALL

We are pleased to announce the upcoming **NTU-CEE Distinguished Seminar Series** lecture.

Speaker : **Professor Shui-Long SHEN [Shantou University, China]**
Topic : Intelligence Shield Tunnelling: Multi-source Data Fusion and Physics-based Data
Condensation
Date/Time : 03 July 2025 (Thu) / 03:30 pm to 04:30 pm (SG)
Venue : LT-15 (NS1-04-07)
Host : **Prof CHU Jian**
Registration closes on 03 July 2025 (11:00 am)

The School encourages all faculty members to recommend distinguished speakers to the seminar committee.

Registration Link: <https://forms.office.com/pages/responsepage.aspx?id=SJPOFSq-K0aPwOF2WpsgStJgapi9rgxOr14vwNCKapxUM0xHUIpGMEoxQ09HQ0VBTUhPME1QTEhTVy4u&route=s horturl>

You may wish to scan the QR code for registration:



Thank you.

Regards,
CEE.Seminar.Committee

CEE Seminar Committee Members:
Asst Prof She Qianhong (Chairman)
Assoc Prof Wu Wei
Asst Prof Fu Yuguang
Asst Prof Shi Chao
Asst Prof Yan Ran



Intelligence Shield Tunnelling: Multi-source Data Fusion and Physics-based Data Condensation



Speaker: Professor Shui-Long Shen

Shantou University, China

Host: Prof. CHU Jian

Date: 03 JULY 2025

Time: 3:30 pm – 4:30 pm (GMT+8)

Venue: LT-15 (NS1-04-07)

Scan/Click HERE
for Registration



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About the Seminar

Artificial intelligence (AI) has three essential components: data, algorithms, and computational power. Application of artificial intelligence in shield tunnelling requires many data. Shield tunnelling produces large volume data in operation. However, complex data environments characterize by imbalance of data: dense and sparse. There are many data of operational parameters, coming from sensors, however, there are very sparse data of geological information and geotechnical properties due limited borehole and laboratory test. This work addresses a critical challenge in application of AI: core focus then shifts to the pervasive issue of data imbalance, exploring how uneven data distributions—whether overly dense in certain regions or critically sparse in others—severely degrade model performance, generalization, and fairness. Then, data condensation techniques based on physical analysis are introduced. These methods are introduced based on mechanical analysis to make data smaller, highly informative representative datasets from large, raw data pools, e.g., CLI (Zhang et al., 2023), GFII (Yan et al., 2023), KCII (Wang et al., 2025). These relationships are summarized using simple index to reduce the dimensionality of data volume. AI algorithms are applied to predict the stratum characteristics, cutter wear shield behaviors etc. Finally, mobile APP for field management is developed to benefit the tunnelling management

About the Speaker

Professor Shui-long Shen is the current Dean of the College of Engineering, Shantou University and is a Distinguished Professor, Guangdong Province, China. He was a Professor and Department Head at Shanghai Jiao Tong University during 2003-2019. He also holds an adjunct position at RMIT University in China since 2019. Prof Shen was elected a Fellow of the European Academy of Sciences and Fellow of European Academy of Sciences and Arts both in 2024. His research interest spans artificial intelligence in shield tunnelling, smart maintenance of urban underground infrastructural system, smart techniques on disaster preventions for urban underground space. He published/edited six books and published more than 460 technical papers in Journals. Prof Shen is listed in World's Top 0.05% by ScholarGPS (<https://scholargps.com/>) within recent 5 years. Prof. Shen, who is the Founding Editor and Editor-in-chief of Smart Construction and Sustainable Cities.