UNIVERSITY OF BIRMINGHAM

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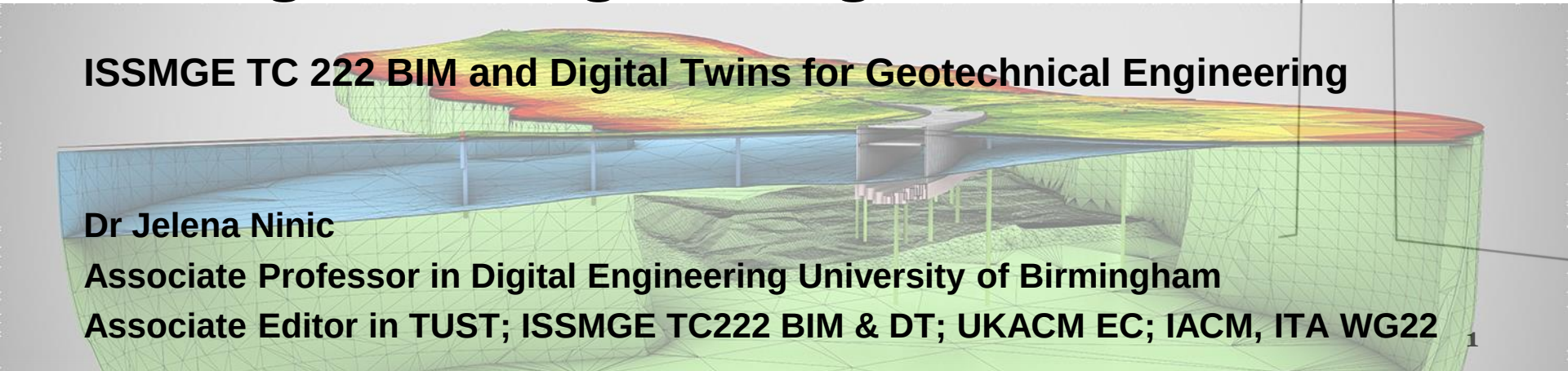
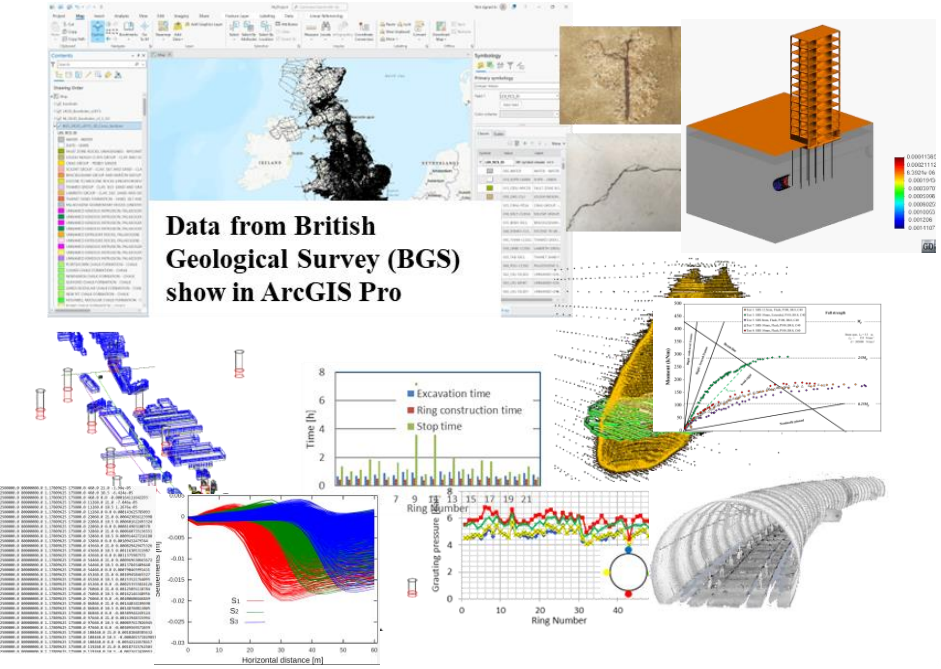
Frontiers in research on digitalisation in geotechnical and underground engineering



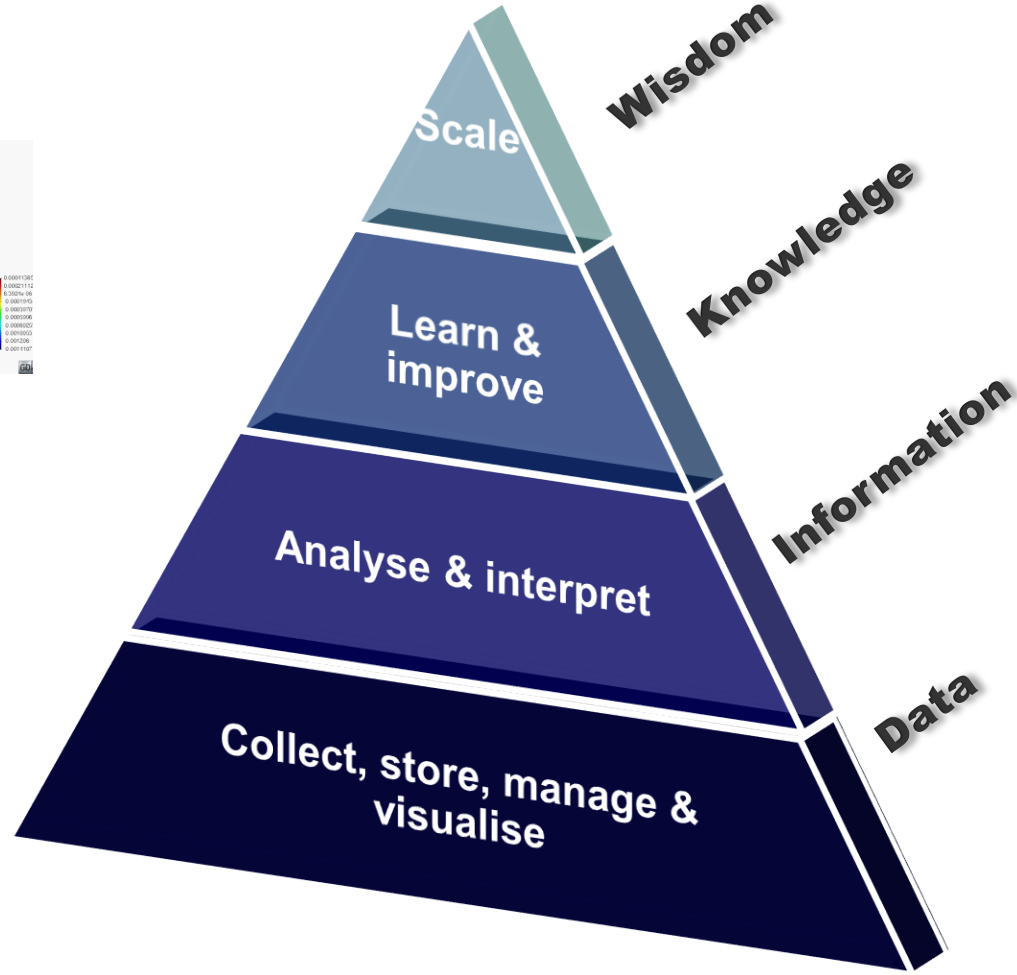
ISSMGE TC 222 BIM and Digital Twins for Geotechnical Engineering

Dr Jelena Ninic
Associate Professor in Digital Engineering University of Birmingham
Associate Editor in TUST; ISSMGE TC222 BIM & DT; UKACM EC; IACM, ITA WG22

Value of data

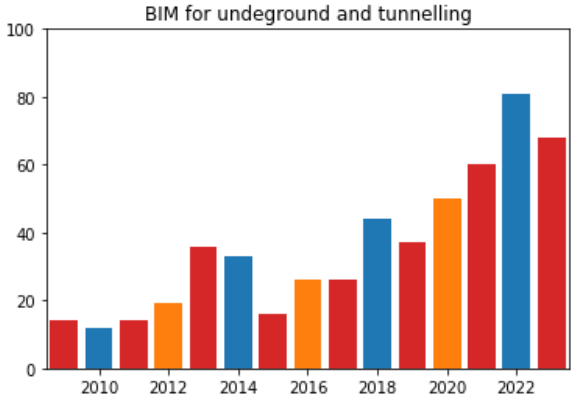


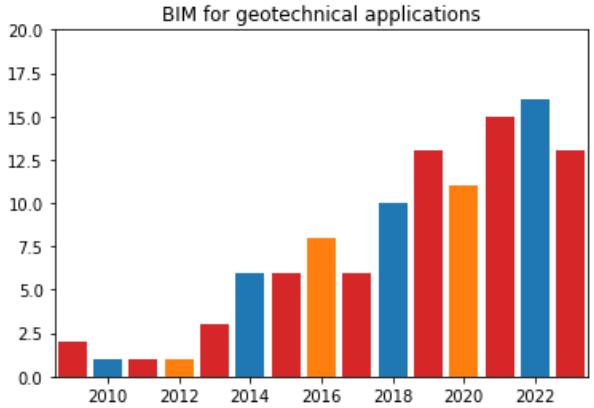
Large volume of data in multiple formats and dimensions

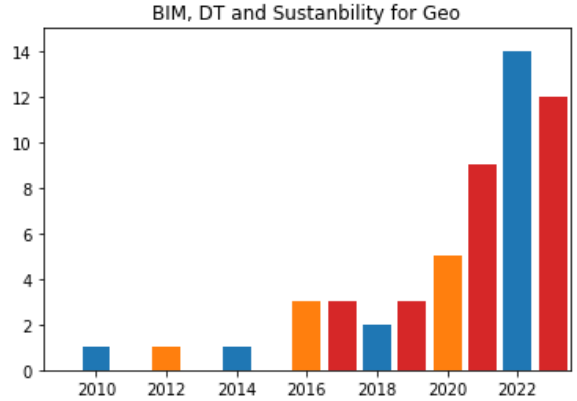


Research trends

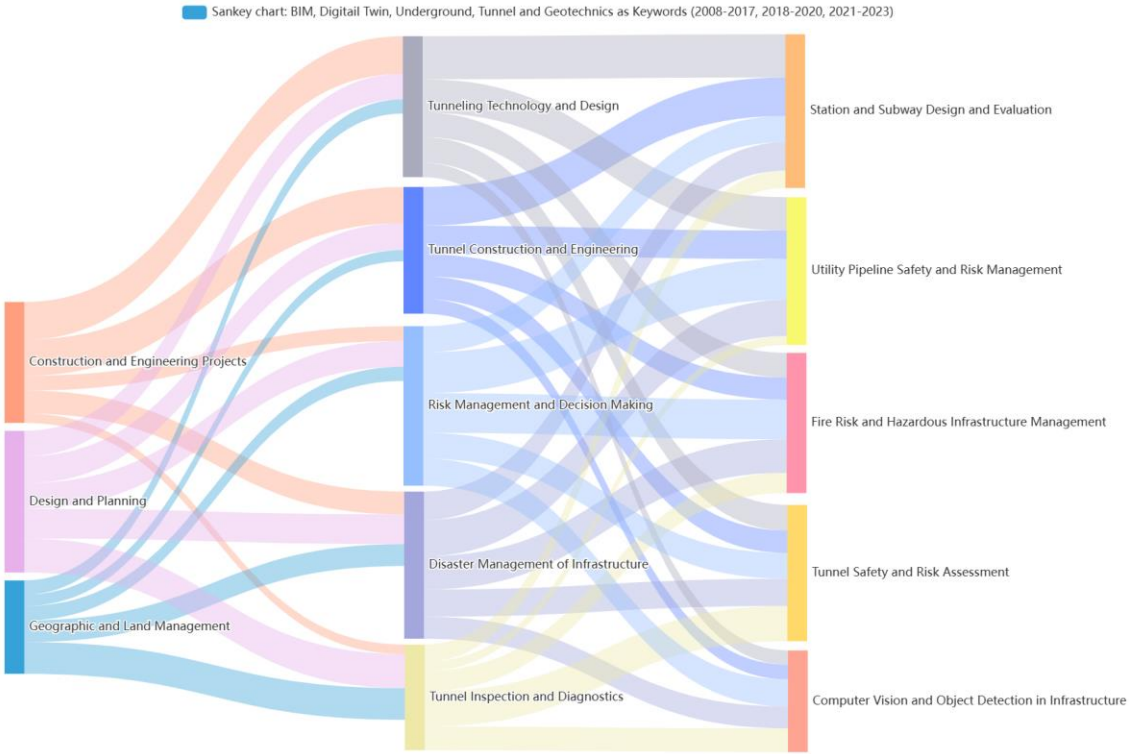
- Publication frequency from 2008 to 2023 (data accessed on Scopus on 16 Dec 2023)
- Exponential increase in number of publications in related areas of BIM, Digital Twins and Sustainability for geotechnics and tunnelling







Research trends



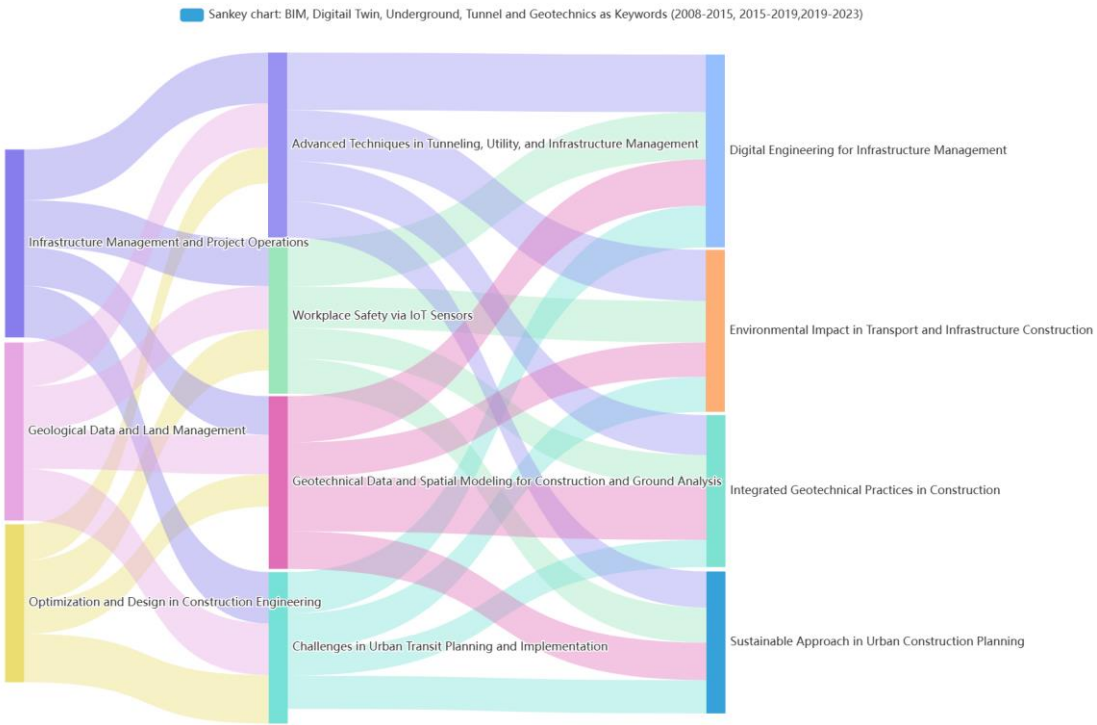
- BIM, Digital Twin, Underground, Geotechnics and Tunnel*
- LDA (Latent Dirichlet Allocation) topic modelling
- Technology based on CV and defect detection for infrastructure arises as new topic

Period 1: 2008-2017

Period 2: 2018-2020

Period 3: 2021-2023

Research trends

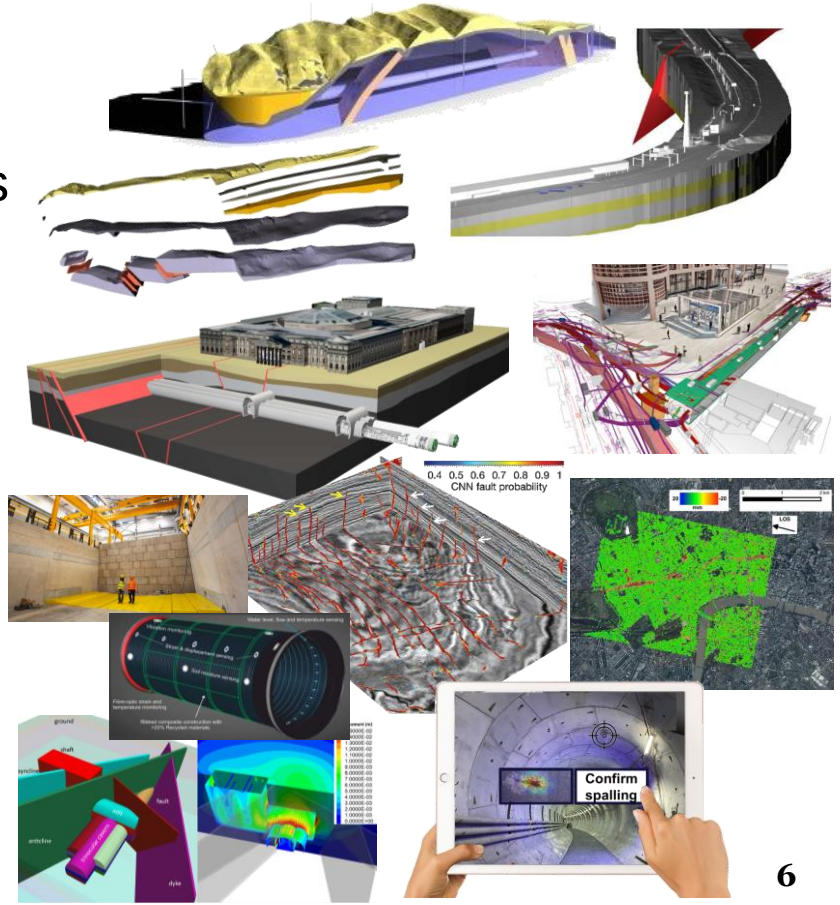


Period 1: 2008-2015 Period 2: 2015-2019 Period 3: 2020-2023

- BIM, DT and sustainability and ground engineering
- In period 2, many new topic emerged related to data, sensing and IoT.
- In period 3, emerging topics address integrated geotechnical practices, digital modelling and assessments of impact on the environment.

Challenges and trends for Geo applications

- Ground modelling
- Modelling of underground structures
- BIM-GIS integration
- Sensing and monitoring
- Analysis and condition assessment
- Process steering
- Sustainability
- Interoperability
- IoT



Addressing emerging topics for BIM & DT in Geo

Prof Qianbing Zhang Monash University Melbourne Australia

A framework for integrating embodied carbon assessment and construction feasibility in prefabricated stations

Richard Ho Geo Hong Kong

3D geotechnical Information Infrastructure

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Developing scalable and generalisable data structures for BIM ground models: chances and challenges

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