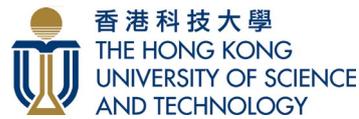


## The Hong Kong University of Science and Technology



### INTRODUCTION OF ORGANISATION

Ranked 27th in the world by QS2021, HKUST is a public research university founded in 1991. HKUST and its BIM Lab have been embracing BIM-related digital innovations and applications in research, education, promotion, and institutional adoption over the past years. HKUST has developed a digital twin for its entire campus to support a smart and sustainable campus. It promotes BIM internally with faculty members, staff, and students. HKUST BIM Lab has conducted cutting-edge academic and applied research in different emerging areas including BIM, IoT, AI / computer vision, robotics, and blockchain. It has organised many events and courses related to BIM and digital construction.

### THREE WINNING FACTS

The HKUST BIM Lab has an outstanding track record in theoretical and applied research. HKUST BIM Lab invests resources in both research and implementation-based projects that develop end-to-end solutions for the digitalisation of the construction industry. The Lab has over 250 published or accepted refereed international journal and conference papers related to BIM and digital construction, such as BIM-based rebar design optimisation and prefab automation, air quality monitoring, low carbon building design and construction using BIM and simulations, CCTV with AI computer vision for safety, and secure information management using blockchain. 13 graduated PhD students, 13 MPhil students, and hundreds of master and undergraduate students have participated in the scientific research projects related to BIM and smart construction.

HKUST has collaborated with the local and international organisations from government, industry, and academia to develop end-to-end solutions to support digitalisation. For example, in the ITF-funded project collaborating with Hong Kong Airport and LSCM entitled “Vibration

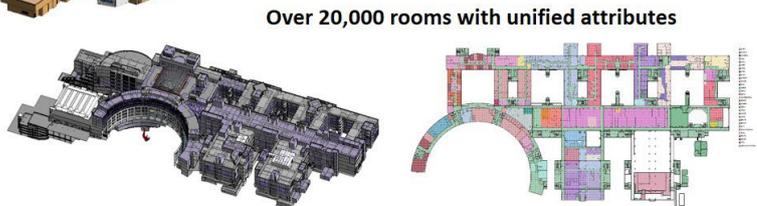
Monitoring of Automated Mover Rail by Wireless Sensors”, technical solutions to detect cracks in the grid poles of APM railways of Hong Kong Airport was designed. To realise this project, advanced technologies such as IoT and power-efficient Bluetooth mesh were deployed. Similarly, the objective behind the digital twin project at HKUST was to build a technical solution for smart and sustainable campus. Technologies such as BIM, BMS, IoT CCTV, indoor positioning and navigation, VR / AR, UAV, and others were deployed to create BIM models for a total of 60+ buildings with a total floor area of around 500,000 m<sup>2</sup> and 20,000+ rooms on the entire HKUST campus. These integrated BIM models serve as the basis to assist campus O&M.

HKUST has trained students and industry practitioners on the latest technologies including but not limited to BIM, UAV, IoT networks, and blockchain for the digitation of the construction industry through courses at HKUST and external seminars / workshops. More than 500 students have been trained under the postgraduate course “BIM and Digital Construction” that covers BIM concepts, BIM standards, BIM software, and BIM case studies since 2010. Revision to the civil engineering program curriculum was conducted in 2018 to add BIM in a mandatory course namely “Industrial and BIM Training”. Since then, every year over 130 undergraduate civil engineering students have been exposed to the latest BIM and digital construction technologies including BIM software operations in Revit (e.g. BIM authoring, drawing generation, walkthrough), in Civil3D (pipe / drainage, road, bridge, tunnel), in Navisworks (clash detection and 4D modeling), and in Dynamo (parametric modeling). BIM related concepts such as BIM standards, LOIN, CDE, ISO19650, openBIM, and BIM case studies are also taught to the students in these courses.

## HKUST Digital Twin

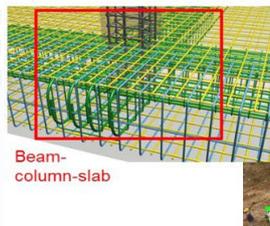


BIM models of over 60 buildings on entire campus

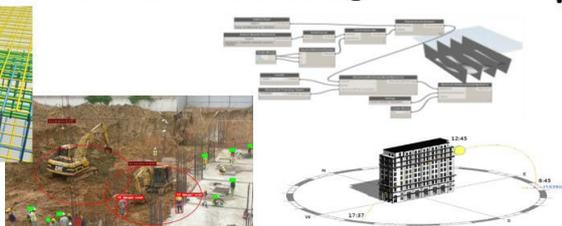


Over 20,000 rooms with unified attributes

## Research and Teaching



Beam-column-slab

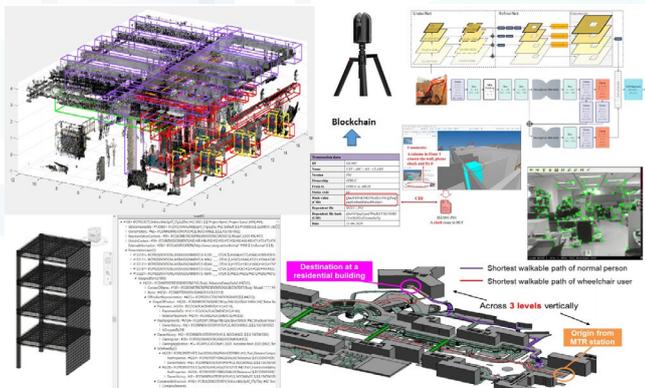


Web and mobile platforms connected with IoT

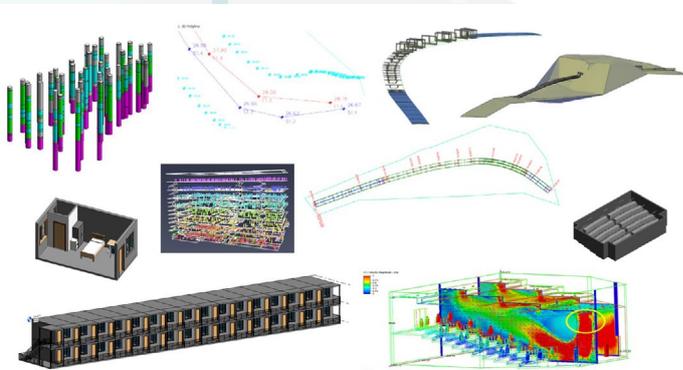


Real-time air quality data

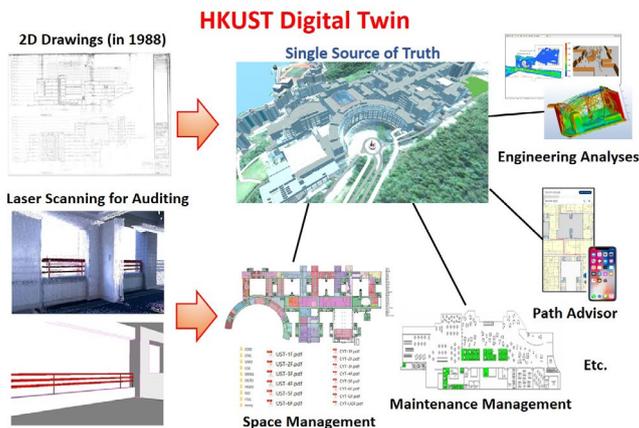
HKUST developed its Digital Twin for a smart sustainable campus, and focuses on research and education of BIM and smart construction



Example HKUST research on BIM and related smart construction technologies



BIM teaching at HKUST



Creation and integration of HKUST Digital Twin models for supporting different needs of the HKUST faculty, staff, students, and visitors