

# Digital Twin Smart Construction (SC)

## Chair



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Session on  
**Digital Twin  
 Smart Construction  
 (SC)**

**Tuesday, October 15<sup>th</sup> 2024**

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<https://meeting.tencent.com/dm/pNV2X673DQCZ>

Milan Time	Beijing Time	Agendas
14:00	20:00	<b>SC-1</b> Enhancing Nuclear Power Production with Digital Twin and Artificial Intelligence Kefu LV
14:30	20:30	<b>SC-2</b> Digital Twins Supporting Decommissioning of Heavy Water Research Reactor Yu ZHANG
15:00	21:00	<b>SC-3</b> Solution of Digital Twin Application in Supply Chain of Manufacturing Enterprises Shen ZHANG
15:30	21:30	<b>SC-4</b> Leveraging Artificial Intelligence for Predictive Analysis of Pavement Condition and Maintenance Costs in the Context of Natural Hazards Yanyu WANG
16:00	22:00	<b>SC-5</b> The Application of Digital Twins in Infrastructure Weiwei CHEN
16:30	22:30	<b>SC-6</b> Building of A Digital Platform for Intelligent Construction of Civil Engineering Structures Fengjuan CHEN
17:00	23:00	<b>SC-7</b> Solution of Digital Twin Application in Supply Chain of Manufacturing Enterprises Jiaqi LI



# Digital Twin Smart Construction (SC-1)



## Kefu LV

*Engineer,  
China National Nuclear Corporation (China)*

### **Title:**

### **Enhancing Nuclear Power Production with Digital Twin and Artificial Intelligence**

### **Abstract**

Integrating artificial intelligence (AI) with digital twin technology offers transformative potential for enhancing nuclear power production. Digital twins create precise virtual models of physical assets, while AI enhances these models with real-time data analysis, predictive maintenance, and process optimization. This combination boosts operational efficiency, safety, and reliability in nuclear power plants. AI-driven insights, supported by digital twins, can streamline maintenance, optimize energy output, and improve overall plant management. As advancements continue, particularly in explainable AI, the synergy of these technologies is poised to revolutionize nuclear energy, driving innovation and regulatory developments in the industry.

# Digital Twin Smart Construction (SC-2)



## Yu ZHANG

*Senior Engineer,  
China Institute of Atomic Energy (China)*

### Title:

**Digital Twins Supporting Decommissioning of Heavy Water Research Reactor**

### Abstract

Heavy Water Research Reactor (HWRR) is the first reactor in China. According to the plan of China Institute of Atomic Energy (CIAE), immediate dismantling is selected as the strategy of HWRR decommissioning. Nuclear reactor decommissioning is a complex engineering. Digital Twins of nuclear facilities recreate a facility's technology and structures and support effective design, operation, and maintenance. This research puts forward digital twins technology application in HWRR decommissioning, supporting the characterization, dismantling, and radioactive waste management.



# Digital Twin Smart Construction (SC-3)



## Shen ZHANG

*Chairman, Zhongda Digital Company*

*Digital Director, Central South Architectural Design Institute (China)*

### Title:

**Solution of Digital Twin Application in Supply Chain of Manufacturing Enterprises**

### Abstract

An intelligent construction platform is built with industrial software as the core to revolutionize the traditional project management, break down data silos, realize the whole process collaboration, and "one model to the end, construction with no drawing, and full-process transparency". According to practices, the platform effectively improves the construction period, costs and project quality to lead the construction industry to digital transformation, and drive deep integration of the industrial chain.

# Digital Twin Smart Construction (SC-4)



## Yanyu WANG

*Assistant Professor,  
Louisiana State University (US)*

### Title:

**Leveraging Artificial Intelligence for Predictive Analysis of Pavement Condition and Maintenance Costs in the Context of Natural Hazards**

### Abstract

Natural hazards significantly impact pavement integrity and maintenance costs, posing challenges to infrastructure management. This research integrates artificial intelligence (AI) to analyze a dataset of 100 records on natural hazards, pavement conditions, and maintenance costs. By utilizing machine learning models, the study aims to predict pavement deterioration and estimate future maintenance expenses, enabling proactive planning. The AI-driven models will consider factors like hazard type, pavement materials, traffic load, and maintenance history. The findings will provide infrastructure managers with insights to optimize maintenance strategies, reduce costs, and improve pavement resilience, advancing the role of AI in civil infrastructure management.



# Digital Twin Smart Construction (SC-5)



## Weiwei CHEN

*Assistant Professor,  
University College London (UK)*

### **Title:**

**The Application of Digital Twins in Infrastructure**

### **Abstract**

The construction industry is currently grappling with issues such as low productivity, labour shortages, and frequent safety incidents. In this context, the applications of intelligent construction and digital twins have garnered widespread attention from both academia and industry. Digital twin technology, as one of the primary core technologies of intelligent construction, combined with sensing technology, AI and machine learning, holds promise in effectively addressing challenges such as 3D reconstruction, real-time monitoring, predictive maintenance and net zero carbon. This report primarily explores the application of digital twin technology in infrastructures, especially for construction and maintenance. Through real-world case studies, this report showcases the value and impact of digital twins in the realm of intelligent and sustainable construction.

# Digital Twin Smart Construction (SC-6)



## Fengjuan CHEN

*Associate Professor,  
Beijing University of Technology (China)*

### Title:

**Building of A Digital Platform for Intelligent Construction of Civil Engineering Structures**

### Abstract

Construction of a digital platform for intelligent construction of civil engineering structures relies on physical models and mathematical algorithms. Utilizing BIM modeling, multidimensional digital modeling, and advanced simulation technologies, the built digital platform integrates big data and intelligent decision support systems. Notable applications include the design and case analysis of the Beijing Daxing International Airport, the Beijing Winter Olympics venues, and digital simulations for nuclear reactor decommissioning projects, demonstrating comprehensive capabilities in enhancing construction efficiency and safety through advanced digitalization.



# Digital Twin Smart Construction (SC-7)



## Jiaqi LI

*Product Manager*  
*Huaru Technology (China)*

### **Title:**

**Solution of Digital Twin Application in Supply Chain of Manufacturing Enterprises**

### **Abstract**

The digital upgrading of the supply chain is a megatrend and direction for enterprise development. This talk will present the current status and pain points of manufacturing enterprise supply chains, and combine a digital twin construction method to introduce the solution and technical route of "simulation+intelligent decision-making" empowering the digital transformation of enterprise supply chain.