

## INVITED SESSION SUMMARY

**Title of Session:**

AI and Digital Methods for Smart and Resilient Urban Systems

**Name, Title and Affiliation of Chair:****V. Prof. Dr.-Ing. Ayse Glass**

Chair, AI and Digital Methods  
HafenCity University Hamburg, Germany

**Details of Session (including aim and scope):**

This invited session explores the integration of Artificial Intelligence (AI) and smart systems in planning, design, and construction of the built environment and urban infrastructure. It focuses on robust, human-centered, and trustworthy AI systems in complex, real-world contexts.

Algorithmic, computational, and data-driven methods such as machine learning, multi-agent systems, simulations, and hybrid intelligent systems are used for modeling, monitoring, and decision support in engineering, architecture, and urban systems. Knowledge-based systems, smart cities, semantic modeling, and cyber-resilience are central for integrating heterogeneous data sources, expert knowledge, and real-time sensor information.

A central theme is the use of agentic and multi-sensor information systems to support urban intelligence, including planning, optimization, prediction, and control of spatially and temporally distributed systems. Cybersecurity and cyber-resilience in urban infrastructures, focusing on fault diagnosis, system robustness, risk-aware design, and resilience-by-design in smart buildings, smart cities, and interconnected infrastructure networks, are emphasized.

Encouraging collaboration across engineering, computer science, architecture, social sciences, industry, and public institutions, the session aims to advance deployable intelligent applications with measurable real-world impact, contributing to scalable, resilient, and livable urban systems.

The following are the main topics of interest for the session:

- Artificial Intelligence and Simulation-Based Modeling of Urban Systems
- Multi-Agent Systems, Agentic Information Systems, and Distributed Intelligence
- Digital Twins, Semantic Modeling, and Knowledge Representation
- Machine Learning, Bayesian Networks, and Data Mining for Built Environments
- Computational Design, Optimization, and Computational Acoustics
- Intelligent Robotics for Construction and Urban Applications
- Cybersecurity, Fault Diagnosis, and Cyber-Resilient Intelligent Systems
- Smart Buildings, Smart Cities, and Multi-Sensor Monitoring Systems
- Data-Driven Mobility Modeling and Intelligent Transportation Systems
- Human & AI Collaboration and Knowledge-Based Design Systems
- Intelligent Project Planning, Monitoring, and Control
- BIM-Based Intelligent Networks and Interoperable Data Frameworks

**Main Contributing Researchers / Research Centres (tentative, if known at this stage):**

**V. Prof. Dr. -Ing. Ayse Glass, HafenCity University Hamburg, Chair, AI and Digital Methods**

**Dr. Siphesihle Sithungu, University of Johannesburg, Academy of Computer Science and Software Engineering**

**Prof. Dr.-Ing. Jörg Rainer Noennig, HafenCity University Hamburg, Digital City Science**

**Prof. Dr. Jörg Müller-Lietzkow, HafenCity University Hamburg, Economy and Digitalization**

**Website URL of Call for Papers (if any):**

<https://www.hcu-hamburg.de>

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