2021 NSF CYBER-PHYSICAL SYSTEMS PRINCIPAL INVESTIGATORS' MEETING

Award #: 2038967, 01/01/2021 - 12/31/2023, Research Team: Shuai Li, Jindong Tan, Qiang He, Nina Fefferman, Mingzhou Jin @ University of Tennessee Knoxville

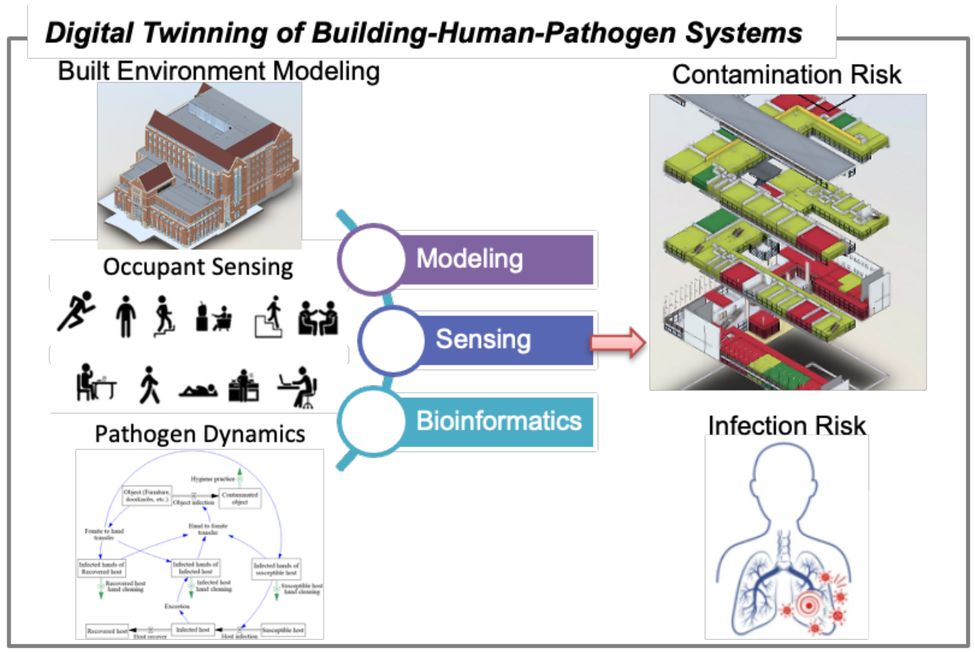
CPS: Medium: Bio-socially Adaptive Control of Robotics-Augmented Building-Human Systems for Infection Prevention by Cybernation of Pathogen Transmission

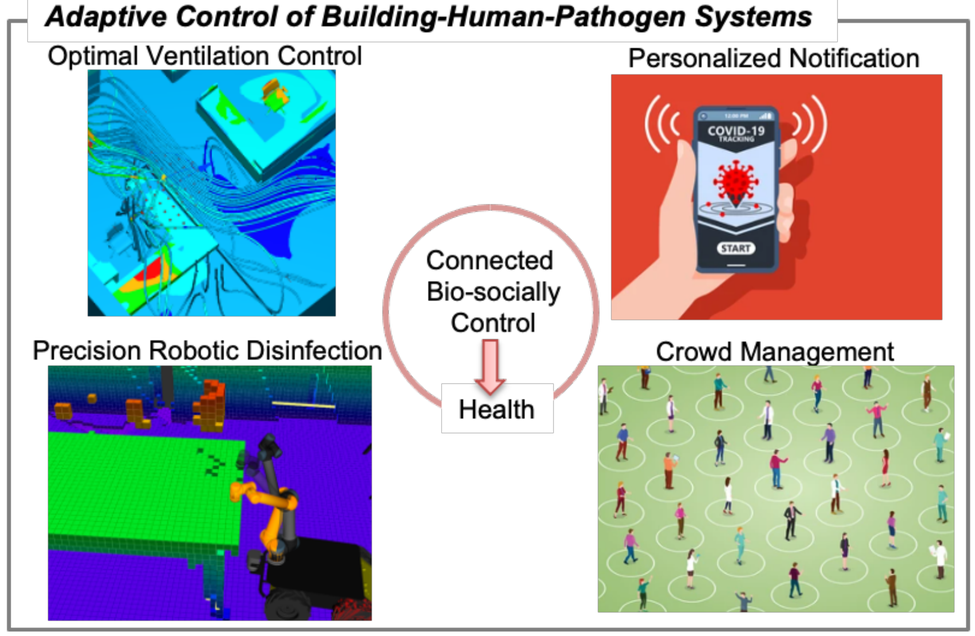
Challenge:

- COVID-19 pandemic
- Pathogen transmission and exposure in built environments
- Contamination area and Infection risk prediction
- Building-human adaptation to reduce exposure and infection.

Solution:

- Develop digital twins for modeling and monitoring building, human, and pathogen interactions to predict contamination areas and infection risks.
- Connect intelligent robots, building automation, and personalized notification for precision disinfection and hygiene practice.





Scientific Impact:

- Model-based and data-driven understanding of physical, biological, and social processes that drive the building-human-pathogen interactions.
- CPS of integrated monitoring, building control, robot adaptation, and contextual recommendation for infection prevention.

Broader Impact:

- Transform the control of built environments to enable protection against infectious diseases, which will have vast public health and economic benefits to the nation.
- Broaden the participation in engineering and computing fields.