



CIVIL & ENVIRONMENTAL ENGINEERING SEMINAR SERIES

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Integrating Augmented Reality, Haptic Technologies, and Computational Intelligence for Smart Inclusive Design and Accessible Building Practices

In recent years it has become more widely recognized that the elderly and disabled population should be included in any design process affecting their quality of life. With the current and projected future growth in elderly people and those with disabilities in the built environment, there has been considerable need for inclusive and accessible design practices. Inclusive design has the potential to help address the challenges of a diverse and aging society in a sustainable way. Hence, projects and facilities should be designed inclusively to equalize accessibility, privacy, security, safety and usability of those spaces. However, the creation of an environment that meets both the needs and preferences of diverse people is a great challenge for designers since it requires a detailed and insightful approach and must take into account the common types of disabilities like motor, auditory, visual and mental ones. Thus, this project aims to pave the way for transforming traditional design approaches into smart inclusive design and accessible building practices by proposing a novel solution that integrates haptics technologies and computational/machine learning with AR to help engineers and designers determine the best design features that are accessible to, and usable by, as many people as reasonably possible without the need for special adaptation.

Rayan H. Assaad is an Assistant Professor at the Department of Civil and Environmental Engineering and the Director of the Smart Construction and Intelligent Infrastructure Systems (SCIIS) lab at NJIT. Dr. Assaad's research interests include infrastructure asset management of above and underground systems; sustainability, resilience, and environmental impacts of infrastructure facilities; applied machine learning; and modeling, simulation, and optimization of infrastructure and construction operations. Dr. Assaad previously worked as a project manager, and he has authored and co-authored two book chapters and more than 36 peer-reviewed journal and conference papers. At NJIT, his research lab focuses on smart cities and intelligent infrastructure systems; innovative facility maintenance, repair, and rehabilitation; and next-generation technologies.

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