PURDUE UNIVERSITY | Lyles School of Civil Engineering

CE/CEM Candidate for Faculty Position

Advancing Healthy and Resilient Building Infrastructure Through a Computational Modeling Enterprise

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RHPH 172

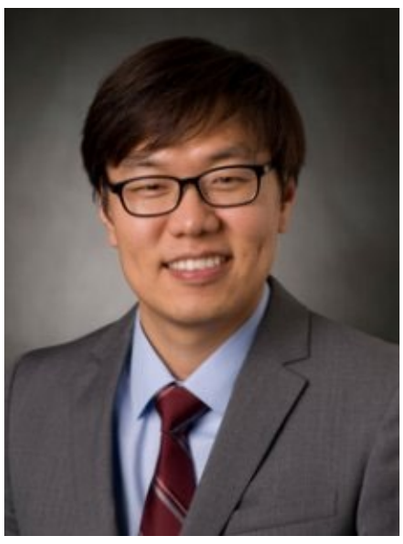
Abstract

As urbanization rapidly escalates, with over 4.4 billion people currently residing in cities and expected to double by 2050, the imperative to address sustainable building infrastructure becomes paramount. Urban dwellers spend nearly 90% of their time indoors, highlighting the need for resilient building infrastructure that safeguards human health and safety while mitigating greenhouse gas emissions.

In this presentation, Dr. Rim will share his current research on developing a computational modeling framework to advance healthy and resilient building infrastructure. Drawing upon both fundamental scientific research and applied studies, he will discuss topics such as indoor atmospheric chemistry, airborne infection control, and mass and heat transfer around humans. Through these efforts, the time-scale and length-scale of environmental phenomena in built environments are meticulously characterized.

Furthermore, the presentation explores potential collaborations and outlines a vision for future research endeavors at Purdue University, emphasizing the critical role of computational modeling in shaping the future of building infrastructure. Join us to discover the forefront of research aimed at enhancing human health and safety while fostering sustainability in urban environments.

Biographical Sketch



Dr. Donghyun Rim is the James L. Henderson Jr. Memorial Associate Professor at Pennsylvania State University. Previously, he served as a postdoctoral researcher at University of California, Berkeley and as a guest researcher at the National Institute of Standards and Technology. Dr. Rim earned his M.S. and Ph.D. in Civil Engineering from the University of Texas at Austin, after completing a B.S. in Civil and Environmental Engineering from Hanyang University, Korea. His research focuses on the intersection of health and energy implications of building infrastructure, with expertise in computational modeling and experimental validation of mass transfer in occupied spaces. Dr. Rim's research garnered him an NSF CAREER award, during which he established a fundamental modeling approach to assess the relative impacts of aerosol processes on human exposure to airborne particles in building infrastructure. He has also played an active role in the "Modelling Consortium for Chemistry of Indoor Environments (MOCCIE)," a nationwide research consortium supported by the Alfred P. Sloan Foundation. He has pioneered a Computational Fluid Dynamics (CFD) modeling framework to explore indoor chemical processes involving reactive gases and radicals around humans. Overall, his work contributes to reshaping how we design and manage indoor environments to bolster human health and safety while concurrently addressing the challenges of climate change, thereby fostering resilient building infrastructure.