Bridging Social and Engineering Systems to Improve the Provision of Critical Infrastructure Services

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Abstract: Infrastructure systems exist within a complex operating environment, influenced by social, natural, and regulatory systems. Acknowledging the built environment as a sociotechnical system, this talk explores ways to improve infrastructure management to create more sustainable, resilient, and equitable services for communities. Questions explored in this talk include: How can we improve the level of infrastructure services in rural Alaska despite the extreme and changing climate? How do cities ensure the continuous provision of infrastructure services during dynamic population changes? By capturing community perspectives, how can agencies better response to industrial disasters? To answer these questions, this talk will explore how systems thinking can be used to abstract uncertain contexts and identify leverage points that can spark change in the built environment. Such leverage points include practical policy recommendations, engineering solutions, and managerial adaptations.

Bio: Lauryn Spearing, PhD is an Assistant Professor in the Civil and Environmental Engineering Department at Tufts University. She received her PhD from the University of Texas at Austin. Dr. Spearing uses a systems thinking approach, involving both qualitative and quantitative methods, to understand complex problems at the intersection of technical, social, and natural systems. Her research focuses on three broad areas: 1) infrastructure management during uncertain contexts; 2) understanding public perceptions towards the built environment; and 3) sustainable water technology adoption. She has worked on various complex engineering problems, collaborating closely with communities, water utilities in the US, and federal policymakers. Her research is sponsored by the National Science Foundation, the National Alliance for Water Innovation, and the National Academies Gulf Research Program Early-Career Research Fellowship. Dr. Spearing is an actively involved member of the ASCE Construction Research Congress and her work has been recognized within the construction community—she has won a best paper award and served as a technical co-chair for multiple conferences.