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Profs. Shekhar and Ramaswami Awarded an NSF Grant for their project "Sustainable Urban Infrastructure Systems Framework to advance Access and Wellbeing in Communities"

Award No. (FAIN): 1737633

A multi-disciplinary team of researchers led by computer science professor Shashi Shekhar and public affairs professor Anu Ramaswami, at the University of Minnesota, has been awarded a $2.5 million grant from the National Science Foundation (NSF) for their project titled "S&CC-IRG Track 1:Sustainable Urban Infrastructure Systems Framework to Advance Access and Wellbeing in Communities" under the NSF's Smart & Connected Communities (S&CC) initiative. This initiative aims to advance understanding of our cities and communities to improve their functioning and quality of life through innovations in computing, engineering, information and physical sciences, social science, and, citizen science and education.

This project will apply a smart urban infrastructure systems framework to advance access and wellbeing in cities. With transformative new infrastructures coming on the horizon—such as autonomous vehicles, smart and distributed energy systems, novel green infrastructure, and urban farms—the physical fabric of our future cities will be very different from what exists today. This research will provide new insights on how the future spatial deployment of these new infrastructures in cities will shape access, wellbeing, health, and environmental sustainability in different neighborhoods of cities. The research will be conducted by an interdisciplinary team of researchers from the University of Minnesota, Florida State University, the University of Washington, and Purdue University, in partnership with the cities of Saint Paul, Minneapolis, and Tallahassee.

The research team will engage K-12 students, university researchers, and citizen scientists to develop the first comprehensive fine-scale public database on infrastructure, environment, health, and wellbeing at the neighborhood scale in cities. Innovations include crowdsourcing campaigns using low-cost sensors to characterize air pollution and flooding risks; K-12 engagement in mapping well-being and infrastructure satisfaction at the neighborhood level; and the development of related cyber-infrastructure. Then, the rich database will be analyzed to identify novel, interesting, and useful spatial patterns and to develop urban models. Researchers will work with city partners to help better plan future cities considering emerging smart grid, smart mobility, and smart food system transitions.

This work serves national goals of prosperity by laying the groundwork for a smart urban infrastructure systems framework for advancing access and wellbeing in cities. The project advances basic and applied research in multiple disciplines, including environmental and civil engineering, computer science, urban planning, STEM education, and public policy. The project's

educational activities will connect graduate students from the fields of engineering, urban planning, policy, and sustainability with K-12 teachers and students, with particular attention to underserved populations. Research insights will be broadly disseminated to US cities through partnerships with ICLEI-USA, the National League of Cities, and the MetroLab Network, a city-university collaborative, and through the Sustainable Healthy Cities Network.

U Minnesota's Shekhar and Ramaswami lead the project, with co-principal investigators professors Rick Feiock of Florida State University, Julian Marshall of the University of Washington, and Venkatesh Merwade of Purdue University. Additional collaborators at the University of Minnesota include professor Julie Brown of the College of Education and Human Development, Diana Dalbotten of the St. Anthony Falls Laboratory, Len Kne of U-Spatial, along with professor Jason Cao and senior fellows Frank Douma and Robert Johns of the Humphrey School of Public Affairs.