THE JOHNS HOPKINS UNIVERSITY
DEPARTMENT OF CIVIL
AND SYSTEMS ENGINEERING

2021 RICHARD J. CARROLL MEMORIAL LECTURESHIP

Large-Scale Shared AV Simulations with Geofences, Stop Aggregation, and Parking Restrictions

Kara Kockelman

Dewitt Greer Centennial Professor
of Transportation Engineering

Department of Civil, Architectural
and Environmental Engineering

University of Texas at Austin

Wednesday, March 10, 2021
5 p.m. EST
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With autonomous vehicles (AVs) still in the testing phase, researchers and planners rely on simulation to explore shared AV (SAV) fleet operations and system-design strategies. SAV operations with and without dynamic ride-sharing (DRS) or "pooling" options across five Chicago-area geofences are compared here, along with pickup and drop-off stop (PUDO) aggregation and curb-use restrictions on busy streets across the Bloomington, Illinois, and Minneapolis-St. Paul regions. Results demonstrate how service-area limitations lower SAV response times, lower vehicle-miles traveled across all modes, and ensure rather uniform response times over space.

Bloomington results suggest that greater PUDO spacings and higher SAV-use levels increase SAV occupancies marginally, while lowering vehicle-miles traveled notably, as compared to door-to-door SAV fleet operations without DRS or PUDOs.

Minneapolis-St Paul results suggest the average SAV in this region can serve at most 30 person-trips per day with less than five-minute average wait time, thereby replacing about 10 household vehicles but generating 13% more vehicle-miles traveled.

JOHNS HOPKINS
WHITING SCHOOL of ENGINEERING

Department of Civil and Systems Engineering

410-516-8680 | case@jhu.edu | case.wse.jhu.edu

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of Transportation Engineering
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and Environmental Engineering
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Dewitt Greer Centennial Professor of Transportation Engineering in the Department of Civil, Architectural and Environmental Engineering at the University of Texas at Austin, Kara Kockelman is a registered professional engineer and holds a PhD, MS, and BS in civil engineering, an MS in city and regional planning, and a minor in economics from the University of California at Berkeley. Kockelman has been a professor of transportation engineering at the University of Texas at Austin for 22 years. She is primary and co-author of more than 180 journal articles and two books across a variety of subjects, nearly all of which involve transportation-related data analysis. Her primary research interests include planning for shared and autonomous vehicle systems, the statistical modeling of urban systems (including models of travel behavior, trade, and location choice), energy and climate issues (vis-à-vis transport and land-use decisions), the economic impacts of transport policy, and crash occurrence and consequences. She is recipient of the UC Berkeley Medal, an NSF CAREER Award, ASCE's Bechtel Energy Award, and many others, and was one of MIT Technology Review's "Innovators Under 35." Her CV and paper pre-prints can be found at **caee.utexas.edu/prof/kockelman**.

Richard J. Carroll Memorial Lectureship

The Richard J. Carroll Memorial Lectureship in Civil Engineering was established at Johns Hopkins University to commemorate one of Baltimore's leading structural engineers. The lectureship has been endowed by the many friends and admirers of Richard Carroll, who died in 1982. That endowment contributes to the ongoing guest seminars in the Department of Civil and Systems Engineering and provides for these special lectures.

Richard J. Carroll received his bachelor of civil engineering degree from Villanova University in 1955. He studied advanced structural design at Johns Hopkins University and George Washington University. He was chief structural engineer for the firms of Knoerle, Bender, Stone, and Associates, and Ewell, Bomhardt and Associates, and chief field engineer for the Portland Cement Association. In 1964, he founded his own firm, Carroll Engineering, Inc., which grew to 26 employees under his leadership. Mr. Carroll published several papers dealing with concrete use and design, with emphasis on post-tensioned and pre-stressed concrete. He also taught courses in ultimate strength design and plastic design in steel. He belonged to numerous professional societies. His untimely death at the age of 49 left a legacy of professionalism, integrity, and vigor.

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