Special Session Proposal

- **Title:**
  Emerging methods for modeling and managing transportation systems in the flexible work era

- **Modality:**
  Half-day (e.g., 3 hours plus breaks)

- **Scope (no longer than 4 pages), including the following sections:**

  **Motivation and general scope**

  The rapid rise in remote work in the wake of the COVID-19 pandemic has created challenges in estimating travel patterns due to lack of data and a limited understanding of the factors affecting choices around when, where, and how to work. This session, inspired by the explosion of interest in connections between the future of work and mobility, is intended to highlight innovative new methods and comprehensive data sources for understanding emergent travel behavior. From fusion of big data sources, to development of new travel demand and optimization models, the results and insights into remote work dynamics can then be incorporated in the downstream planning, design, and intelligent management of modern transportation systems.

  **Relevance to the ITS community**

  This topic is relevant to the ITS community because of the unique methodological role ITS plays in detecting, responding to, and enabling the future of transportation systems and smart cities. The tremendous increase in remote work will affect the types of data collected, the hardware used to collect such data, and the insights generated from such data. Understanding the remote work trend could provide insights to ITS communities about how future mobility systems can better adapt to the future of work. The session is intended to provide researchers and practitioners with an overview of ongoing research and future research directions at the intersection of ITS and remote work.

  Managing transportation systems under widespread remote work is relevant to the ITS community along three dimensions:

  1. Data providers and data sources: data providers could share various data sources related to the remote work and understand what types of data is needed to understand the future demand pattern.
2. Researchers and practitioners: resources and methodologies used to understand and model demand under remote work will be discussed and shared throughout the special session. Researchers and practitioners could utilize these shared knowledge into their own research projects and the special session can facilitate collaborations between researchers and practitioners.

3. Governments and end-users: governments could gain insights on the trend of travel patterns under remote work and make policies accordingly to either incentivize or disincentivize such remote work trend. End-users could understand how the current remote work patterns look like at a high level and adjust their own remote work plans.

**Topics of interest for the special session**

The topics of interest for this special session fall under three major categories:

1. **Innovative methods for understanding emerging travel patterns**
   - Novel data collection, processing and fusion approaches for quantifying travel under remote/hybrid work conditions, including from data sources such as:
     - Location-Based Services Data
     - Survey data and/or survey proxies
     - Traffic volume and public transit ridership data
     - Employer policy and office occupancy data
     - Social media and internet traces
     - Fusion with socio-economic, macroeconomic, land use/urban form, or real estate market data
   - Evaluating the impacts of aggregate remote work travel patterns on employment, real estate markets, urban economies and public policy.
   - Modeling climate consequences of remote work and future travel demand

2. **Modeling and forecasting future travel behavior**
   - New travel behavior models for remote work destination, mode and route choice
   - Introducing remote work-related factors into travel behavior models
   - Capturing interactions between employer remote work policies and travel behavior
   - Machine learning applications in travel behavior modeling for remote work
   - Evolution of demand for related services such as on-demand deliveries, ride-sharing, and micro mobility

3. **Adapting transportation systems to remote work**
   - Best practices in transportation system adaptation for the 'new normal' of travel demand
   - Prediction and optimization methods for managing workforce shortages in the transit industry
   - Effects of new policies and service changes inspired by post-pandemic travel
   - Optimal design and operation of modern transportation systems considering remote work
• Envisioning the collective future of transportation systems under remote work
• Connections between the future of work and smart urban development and policy

• **Organizers (names, affiliations, emails, and short bio):**

This session will be organized by a team from the MIT Mobility Initiative and Northeastern University.

• **Jinhua Zhao** ([jinhua@mit.edu](mailto:jinhua@mit.edu)) is the Edward and Joyce Linde Associate Professor of City and Transportation Planning at the Massachusetts Institute of Technology (MIT). Prof. Zhao directs the JTL Urban Mobility Lab and the Transit Lab at MIT and leads long-term research collaborations between MIT and major transportation authorities and operators worldwide including London, Chicago, and Hong Kong. Prof. Zhao has founded and directs the MIT Mobility Initiative.

• **Haris Koutsopoulos** ([h.koutsopoulos@northeastern.edu](mailto:h.koutsopoulos@northeastern.edu)) is a Professor with the Department of Civil and Environmental Engineering at Northeastern University. His current research focuses on the use of data from opportunistic and dedicated sensors to improve planning, operations, monitoring, and control of urban transportation systems, including public transportation.

• **Bhuvan Alturi** ([bhuvan@mit.edu](mailto:bhuvan@mit.edu)) is currently the Program Manager at the MIT Mobility Initiative. Bhuvan is a mobility & automotive enthusiast who is extremely passionate about solving the problems mobility faces today, and has interests across EV’s, Autonomous Tech/Deep Learning, and Urban Mobility. He has over 11 years of product, marketing and business development experience starting from early days as a brand manager at Unilever to most recently founding & heading the B2B e-commerce subsidiary of NCML.

• **Xiaotong Guo** ([xtguo@mit.edu](mailto:xtguo@mit.edu)) is a PhD Candidate working with the MIT Urban Mobility Lab and MIT Transit Lab. His dissertation research is focused on building an integrated and robust urban mobility system, with a specific focus on ride-sharing and public transit systems.

• **Michael Leong** ([mleong1@mit.edu](mailto:mleong1@mit.edu)) is an MST student working with the MIT Urban Mobility Lab and MIT Transit Lab. He researches the impacts of post-pandemic travel patterns on transportation systems, urban form, and the climate.

• **Joseph Rodriguez** ([rodriguez.josep@northeastern.edu](mailto:rodriguez.josep@northeastern.edu)) is a PhD candidate at Northeastern University, working with Haris Koutsopoulos. His research is focused on transit simulation modelling and implementable machine learning methods for real-time control of fixed and flexible transit systems.

• **Yunhan Zheng** ([yunhan@mit.edu](mailto:yunhan@mit.edu)) is a PhD student at the MIT Urban Mobility Lab. Her research interests lie in assessing and designing transport policies and algorithms for sustainable mobility.

• **Nicholas Caros** ([caros@mit.edu](mailto:caros@mit.edu)) is a PhD Candidate working with the MIT Urban Mobility Lab and MIT Transit Lab. His dissertation research is focused on adapting urban transportation systems for the unique challenges of widespread remote work.
• Intended audience and expected attendance of the special session:

Intended audience:

a) Researchers and practitioners involved in forecasting, planning, changing, or innovating transportation service delivery models under different remote work scenarios.

b) Data providers interested in contributing to prediction and planning of transportation demand for the future of work.

c) Transportation operators and third-party service providers seeking to understand how travel patterns are changing and how data can be leveraged for short- and medium-term travel demand forecasting under significant societal shifts.

d) Public sector attendees interested in the policy implications of emerging remote work travel patterns.

The MIT Mobility Initiative will certainly join the special session and present up to 3 relevant research projects. The MIT Mobility Initiative will invite our collaborators and the remote work research groups identified above to give a presentation of their research on the topics of interest. We expect strong interest in this broad and timely topic and are confident in our ability to fill a half-day session with engaging and diverse presentations.

• Materials and equipment needed for the special session:

Audiovisual equipment for powerpoint presentations.

• Contact details of the proposers (email, postal address, etc):

The primary points of contact for the organizers will be:

Jinhua Zhao (jinhua@mit.edu)
Xiaotong Guo (xtguo@mit.edu)
Nicholas Caros (caros@mit.edu)

Any mail correspondence can be directed to:

MIT Mobility Initiative
C/O: Professor Jinhua Zhao
77 Massachusetts Avenue
Cambridge, MA 02142
United States of America