**Grantee:** Northwestern University

**Center Name:** Tier I University Transportation Center on Telemobility

**Research Priority:** Improving Mobility of People and Goods

**Research Project Funding:** $150,000

**Project End Date:** March 31, 2022

**Project Description:**
Communications technologies and e-commerce have a profound effects on travel, on the delivery of goods and services, and consequently, on the use of transportation infrastructure. Experiences acquired as a result of travel restrictions or health concerns, e.g., working remotely, are likely to accelerate some of these trends. Furthermore, widespread deployment of (innovative) services as a result of Covid-19, e.g., telehealth, may, fundamentally, alter travel patterns of many population segments. Changing travel behaviors may have significant long-term implications on the tens of billions of dollars that are invested each year to keep highways, rail lines, ports, airports, public transit systems, and other infrastructure in a state of good repair. For example, as e-commerce accelerates, streets in residential neighborhoods support increasing loads associated with delivery vehicles, and, in turn, deteriorate more quickly and require additional investments to provide the same level of service. Perhaps more importantly, as we are redesigning physical and virtual supply chains for delivery of goods and services, there are tremendous opportunities to guide investments in transportation infrastructure that are going to have effects on travel behavior with both immediate and lasting positive economic, social, and environmental consequences. Examples of significant short-term effects of infrastructure investments include increasing employment. Long-term effects include opportunities to improve the efficiency, level-of-service, reliability, resilience of these supply chains. The project objectives are, therefore, to develop a framework to evaluate the regional life-cycle and supply-chain consequences of investments in design, construction, and management of transportation infrastructure, and to validate it by considering a variety of scenarios.

**Outputs:**
This research consists of developing a framework to predict short and long term regional (and local) economic, social, and environmental impacts of telemobility. To validate the framework, we will consider scenarios related to the possible effects of telemobility on personal travel and transportation of goods within and through the Chicago Metropolitan Area. Importantly, the framework will support evaluation of how the scenarios may impact infrastructure investment plans, and, in turn, how these plans can support the development of socially and environmentally desirable outcomes afforded by telemobility.

**Outcomes/Impacts:**
Motivated by the large-scale adoption of telemobility taking place as a result of Covid-19, and understanding that it is likely to permanently alter personal travel, and transportation of goods, the research aims to understand the implications on infrastructure investments aimed at improving the performance and efficiency of physical and virtual supply chains. Long-term the objective is to guide these investments to obtain socially, economically, and environmentally desirable outcomes.
Telemobility impacts on infrastructure investments

- Direct Impacts Examples
  - Journey to Work Trips
  - Local Delivery Operations

- Behavioral Impacts
  - Media Shifting
  - Changes in Resident Location
  - More frequent online shopping
  - More Service and Improving Quality of Service

- Infrastructure Impacts
  - Change of Frequency of Public Transportation
  - Changes in Congestion Levels
  - More Frequent Heavy Loads
  - Additional Truck Fees
  - Requirement of New Distribution Centers

- Investment plans
  - New investment plan of congestion based on new taxes
  - Invest in more durable roads
  - Invest in supporting infrastructure