**Shared Micromobility as a Last-Mile Complement to Public Transit**

**Recipient/Grant (Contract) Number:** University of New Orleans; University of Florida/69A3552348337

**Center Name:** Center for Equitable Transit Oriented Communities (CETOC)

**Research Priority:** Preserving the Environment

**Principal Investigator(s):**
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**Project Partners:** N/A

**Research Project Funding:** $150,000 (USDOT) + $75,000 (Matching funds) = $225,000

**Project Start and End Date:** 10/01/2023 to 09/30/2024

**Project Description:** Shared micromobility services, especially dockless e-scooters and e-bikes, have experienced explosive growth across cities in recent years. As this trend continues, it becomes increasingly important for transit agencies to understand and respond to the impacts of micromobility on transit ridership and operations; given that shared micromobility is best used for short trips, a strategic response is to promote shared micromobility as a last-mile complement to public transit. Integrating micromobility with transit can not only enhance customer experience but also promote transit ridership. Despite a growing research interest in this topic, several major knowledge gaps remain. First, we lack knowledge of the spatiotemporal patterns of integrated transit and shared micromobility. Second, little work has examined the equity aspects of transit-micromobility integration. Since public transit disproportionately serves low-income communities and minority populations in the U.S., enhancing the integration between transit and shared micromobility may deliver significant equity benefits. The availability of high-resolution micromobility data (e.g., GBFS data) and transit data (e.g., GTFS static and real-time data) provides a great potential to fill in these research gaps and generate important insights to inform planning and policy decisions in both private and public sectors. The overall objective of this project is to explore strategies that can maximize the potential of leveraging shared micromobility to complement public transit. We will work with transportation agencies (e.g., District Department of Transportation and Washington Metropolitan Area Transit Authority) and industry partners (e.g., Spin, Lime, and Lyft) to examine: 1) Where are first-mile/last-mile transit-connecting shared e-scooters trips happening and what factors shape this use? 2) To what extent does transit-micromobility integration benefit traditionally marginalized communities and advance equity? To address these questions, we will leverage existing datasets such as GPS data and survey data and obtain high-resolution trip-level data from our collaborators from industry and local governments. UF has previously collaborated with Spin/Ford Mobility to explore bundled pricing strategies to promote shared e-scooters and transit integration. The PI has previously conducted a behavioral survey to analyze who are shared micromobility riders, who are using shared micromobility to connect with transit as well as what factors shape the frequency of this use. Our team has also obtained a unique and novel dataset from micromobility

operator, Spin, that indicates the time and location of Spin shared e-scooter trips as well as whether the trip was a transit-connecting trip. The two datasets are complementary to each other as the former can shed light on who and why people are using shared micromobility to connect with transit and the latter can shed light on spatiotemporal patterns of transit-integrated shared micromobility trips. We will analyze the survey data with univariate analysis and cross-tabulation analysis. We will also conduct geospatial analyses of the transit-connecting shared micromobility trip patterns, focusing on how they differ across neighborhoods of distinct sociodemographic characteristics. For example, we will examine if transit-connecting shared micromobility trips disproportionately happen in advantageous neighborhoods compared to traditionally underserved neighborhoods. We expect to build two sets of statistical models. One is a set of travel behavior models that analyze which population groups are more inclined to adopt shared micromobility as a first-mile/last-mile transit solution and the factors that shape usage frequency. The other is a regression model (e.g., Poisson or negative binomial) that examines which geospatial factors are associated with the frequency of transit-connecting shared micromobility trips. Results will be summarized into a final report which we expect to include actionable insights and policy recommendations for public agencies (DOTs, transit agencies) and private vendors regarding promoting transit-micromoblity integration. We plan to develop two journal manuscripts based on the proposed work.

**USDOT Priorities:** This research addresses a wide range of USDOT strategic goals and research priorities. *Equity and Accessibility Assessment* is central to the research, which will investigate the roles these emerging technologies play in issues of transit accessibility and spatial equity. These emerging micromobility technologies and their ability to serve as a complement for transit usage also present a key opportunity in terms of promoting USDOT *Climate and Sustainability* objectives. The research aims to promote transit system *Transformation* through *Data-Driven Insights* into these *New and Novel Technologies.*

**Outputs:** 1) A new analytical framework to extract actional insights on transit-mobility integration from novel, complementary datasets (i.e., high-resolution mobility data and behavioral survey data) as well as new datasets to be released in an open data repository upon receiving agreement from the data owners; 2) a new statistical model to predict transit-micromobility multimodal trips; 3) a final technical report to outline our findings and provide practical insights for transit authorities and micromobility vendors; 4) 1 - 2 manuscript(s) for publication and presentation; and 5) a webinar to be held at the end of the project to present research findings and to introduce the research products to the broader transportation community.

**Outcomes/Impacts:** 1) Promotion of transit-micromobility integration and collaboration between public and private sectors; 2) improvement of mobility equity for vulnerable communities; 3) inspiration for more applications of high-resolution data mining techniques in transportation; and 4) engagement of key stakeholders including transit agencies, micromobility operators, and local DOTs throughout the project period to promote the adoption of research findings.

**Final Research Report:** (Link to be provided after project completion).