

Project Title: Optimizing the Mobility and Safety of Walk-and-Ride Systems

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Project Summary

In many small United States communities transportation is dominated by a single mode – the motor vehicle. Oftentimes, rural communities lack the infrastructure like sidewalks and the services such as bus transit to support a multi-modal transportation system. This absence of infrastructure and services has a negative impact on underprivileged citizens: Without a reliable vehicle, people must walk along busy streets and highways to work, shop, or otherwise travel.

To help small communities address this common lack of infrastructure and services both efficiently and transparently, this project will develop infrastructure-planning models, which city planners can use to decide where to build sidewalks and bus transit shelters. These models will optimize the usability of the transportation system while ensuring safe travel for all passengers. Because our models, like most infrastructure-planning models, are large-scale and require a large amount of computational resources, this project will also suggest different computational algorithms.

The models will be validated by using Geographic Information Systems (GIS) data from the city of Starkville, MS. The community is an excellent case study because of its growing population and shortage of pedestrian multi-modal transportation infrastructure. A tradeoff analysis of our models will illustrate the relationship between the performance of an optimal infrastructure plan and the total amount spent on infrastructure. Finally, the proposed project will culminate in a web-based planning tool for city planners to perform their own scenario analyses.

The proposed project is a good fit for NCITEC because (1) it explicitly addresses multi-modal transportation and sustainability by integrating bus transit with walking; (2) it explicitly addresses safety by helping planners decide where to build sidewalks given a limited budget; and (3) it will immediately impact decision-makers within the NCITEC region: We will work closely with city planners in Starkville, MS to help them develop safe multi-modal transportation (see letters of support).