**Understanding and Guiding Pedestrian and Crowd Motion for Improving Transportation (Driving) Efficiency**

**PI: Ümit Özgüner**

First mile (access to transportation choice) and last mile (from vehicular transportation termination to final destination) can be the weakest links in smart mobility. Many people in the US do not live or work close to a transportation access point, and many people are mobility impaired. Bridging this first mile- last mile gap in the transportation network requires operating in non-traditional environments that might be heavily populated by pedestrians.

We have proposed a solution as a network of on demand automated vehicles and are initiating a program to test and demonstrate a selection of these within the Ohio State University main campus. In our preliminary studies, we have determined that one of the key capabilities required of such a system is the ability to move in pedestrian dense environments- for example sidewalks, pedestrian malls and roads, business or academic campuses, intersections and crosswalks. This includes areas situations in which pedestrians do not always obey the rules or expectations. Therefore, we are proposing a study of pedestrian behavior and motion in an environment where there are both static obstacles (trees, trash cans, lamp posts, fences, etc.) and moving platforms. We will model and simulate both individuals with different characteristics and dense crowds. We plan to also consider the guidance of such crowds, both for general traffic and for individual safety, and other emergent behavior.

Year 1 of the project will involve model development and simulation for pedestrians and crowds. Data will be collected using experimental the platforms to support and validate the models. We will also explore behavior classification and the possibilities for modeling and achieving individual pedestrian and crowd guidance.

Year 2 will involve continued refinement and expansion of the year 1 models, along with simulation and planning for a potential deployment, considering first a route or area selected on the OSU campus.

Year 3 will establish a public data base of slow vehicles passing through pedestrian crowds. The data will be used locally to adjust parameters for crowd motion and in real-time path planning for the automated vehicles.