As cities strive to increase the attractiveness of bicycling for utilitarian and recreational travel, they have identified the need to improve the quality of streets for bicycling by installing dedicated facilities, reducing traffic speeds, or taking other measures to promote cycling safety and efficiency. Approaches for evaluating bicycling quality have become increasingly important for prioritizing such improvements. Mekuria, Furth, and Nixon’s (2012) Level of Traffic Stress (LTS), which requires minimal data inputs and produces a readily digestible output, has emerged as a widely-used framework for identifying “low stress” streets and their connectivity to one another. The LTS framework is based on an intuitive hierarchy of characteristics that are presumed to cause more or less stress for cyclists, largely related to traffic speed and roadway layout. LTS is not, however, validated against actual cyclist responses.
making it difficult to gauge how much better a street classified as LTS 2 is, for example, than a street classified as LTS 3. Alternative LTS frameworks, which use modified classification structures based on fewer or different input variables, have also emerged in response to data limitations in specific geographies, hindering comparison between LTS analyses. Another approach for assessing bicycling quality is to track the routes of actual cyclists and ask them to rate their satisfaction. Mobile apps allow for automated collection of such data on a mass scale. Aggregated ratings from many cyclists along interwoven routes provide satisfaction scores at the level of block-length street segments. Such scores can be used to reveal how perceived quality may vary by cyclist demographics and level of experience.

This project has four objectives, which together evaluate the comparability and usefulness of bicycling quality metrics. The first three apply quantitative approaches to investigate associations between LTS, crowdsourced satisfaction scores, and specific environmental factors. In particular, we aim to identify (1) the degree of similarity between the original LTS framework and alternative frameworks, (2) associations between LTS frameworks and crowdsourced satisfaction scores, and (3) associations between crowdsourced satisfaction and specific environmental factors, such as traffic activity and streetscape design. These analyses will additionally be stratified by cyclist sociodemographics (age, gender, and presumed residence in an area below Portland’s median income based on travel patterns), cycling expertise (based on frequency of cycling, trip length, and cycling speed), and neighborhood-level urban form (based on street network connectivity). Analyses for the first three objectives will focus on the city of Portland, OR, where crowdsourced cycling data are available through a partnership with the makers of the Ride Report app. The fourth objective is to examine how planners utilize crowdsourced cycling data, and the pros and cons they recognize in these measurements. To achieve this, interviews will be conducted with planners at public agencies in variously-sized U.S. cities, providing a geographically broader view of how crowdsourced bicycling data are applied in practice.

Our research will help planners better understand the benefits of improving streets for bicyclists by gauging whether alternative versions of LTS provide robust substitutes for the original LTS framework. Further, it will strengthen objective understanding of how LTS levels relate to crowdsourced satisfaction among actual cyclists, and will clarify the scalar relationships between successive LTS levels, which are currently strictly ordinal. The effects of specific contextual factors on cyclist satisfaction will also be evaluated.
Finally, we will report on how planning practitioners apply crowdsourced cycling data to their work, and what types of bicycling quality data they would find most useful for planning the next generation of cycling infrastructure.

Describe Implementation of Research Outcomes
(or why not implemented)

Place Any Photos Here

Impacts/Benefits of Implementation
(actual, not anticipated)

Web Links
- Reports
- Project website