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The Sustainable Transportation Systems Research (STSR) group aims to achieve *green, safe, efficient, and equitable transportation systems* by studying and modeling transportation externalities, using state of the art statistical, econometric, and economic analysis tools.

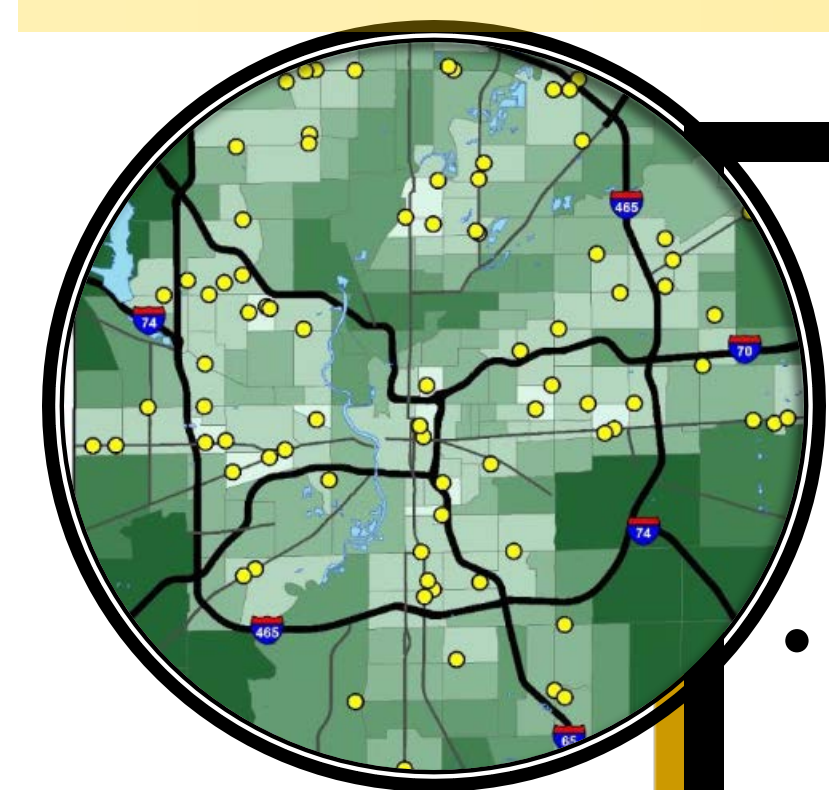
Research areas of emphasis include—among others:

- Reducing energy use and carbon footprint of transportation systems
- Direct and indirect impact assessment of proposed transportation solutions, as:
  - bio-based and other alternative fuels
  - wind power and other alternative energy technologies
  - transportation electrification
  - transportation investments and policies
  - intelligent transportation systems, connected and automated vehicles.



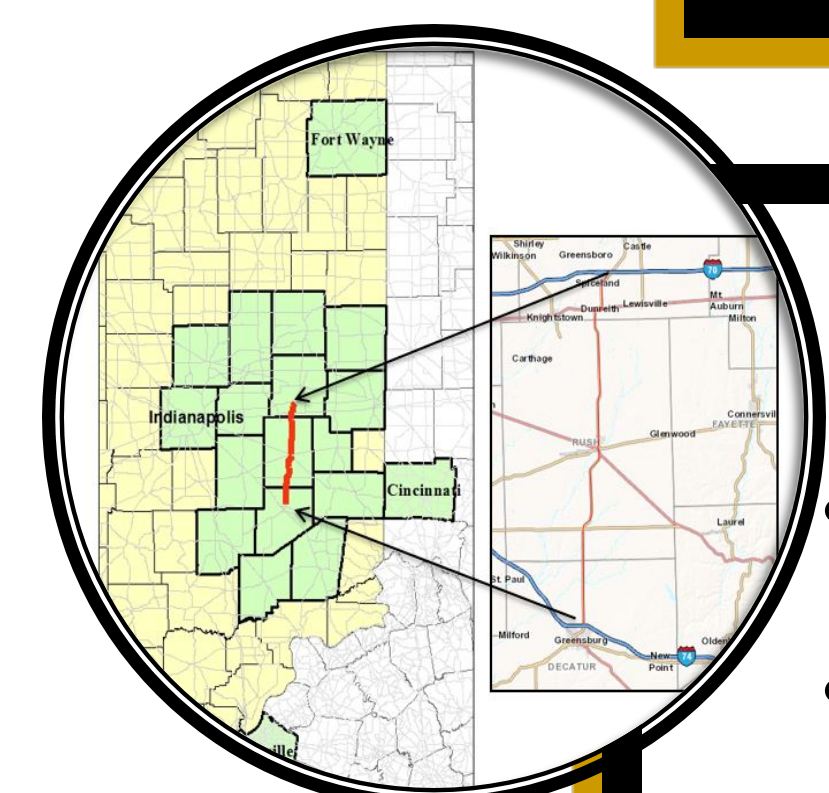
## Completed Research

## Ongoing and Future Research



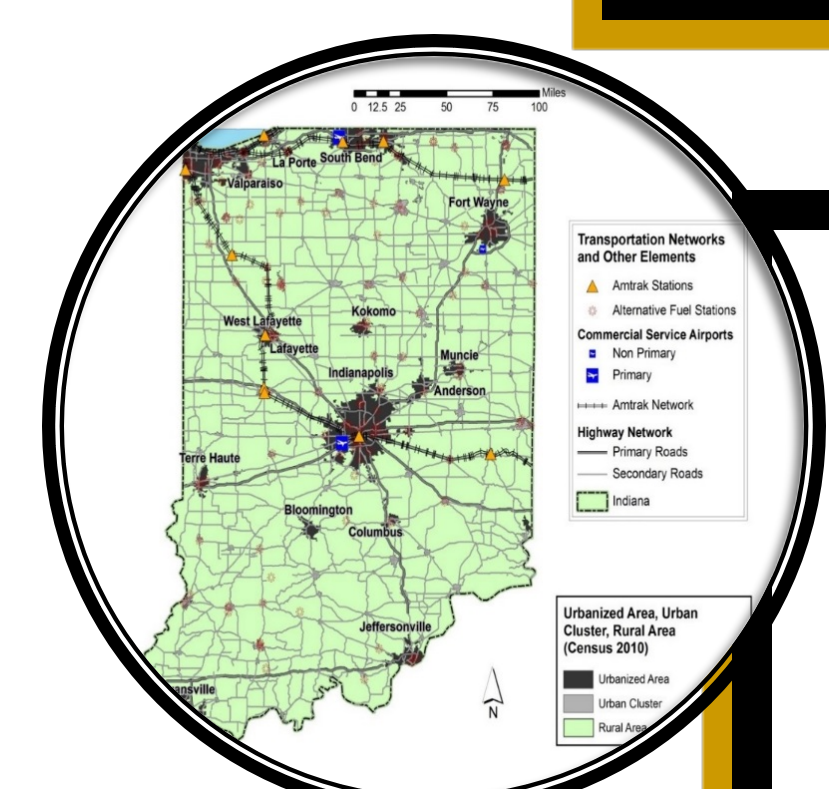
### Low Income, Supermarket Accessibility and the Transportation Network

- USDA estimates that 23.5 mil. people live in food deserts - over half are low-income residents.
- Aimed to determine the average travel cost to the nearest supermarket for each mode in Indianapolis using spatial analysis techniques.
- Areas of disadvantage by mode were compared to the USDA-defined food deserts.
- Some areas had a different level of disadvantage than defined by the USDA. The transit related results were quite different from the walking and driving related results.



### Wider Economic Impacts of Transportation Projects

- Aims to evaluate the non-traditional economic impacts of transportation improvement projects.
- Using the AASHTO EconWorks Wider Economic Benefits tools, three case studies of highway corridor improvements were conducted in Indiana.



### A Comprehensive Assessment of Public Transportation in U.S. Rural and Small Urban Areas

- Developed an accessibility-based, multi-objective, multimodal, and people-oriented systems evaluation.
- **Spring/Summer 2016 CE Best Dissertation Award.**



### Energy Consumption and Emissions due to Public Transportation: A Comparison between Colombia and the United States

- What are the appropriate indicators for measuring the impact of passenger transportation on energy consumption and emissions in Colombia and United States?
- Which strategies for reducing energy consumption and greenhouse gas emissions that have been implemented successfully in the United States can be replicated in Colombia, and vice versa?



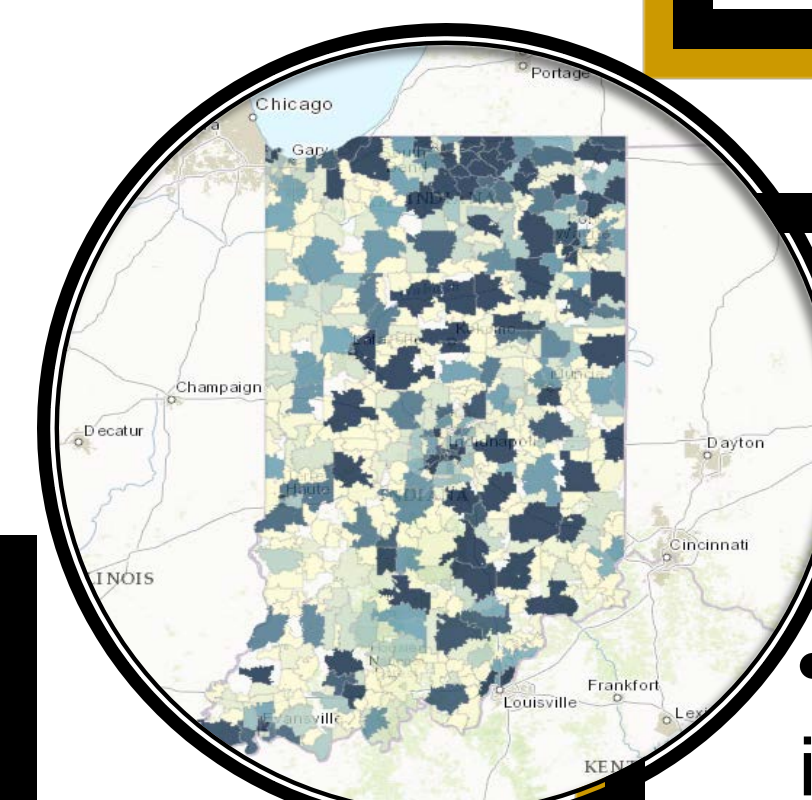
### Economic Impact Assessment of Transportation System Management & Operations (TSM&O) Strategies

- TSM&Os often implemented to mitigate traffic congestion or improve safety.
- Proposes a practical framework and develops tools to evaluate the impact of TSM&O strategies on regional economic development.
- Strategies under study include: arterial signal coordination, traffic incident management, work zone management and access management/road diets.



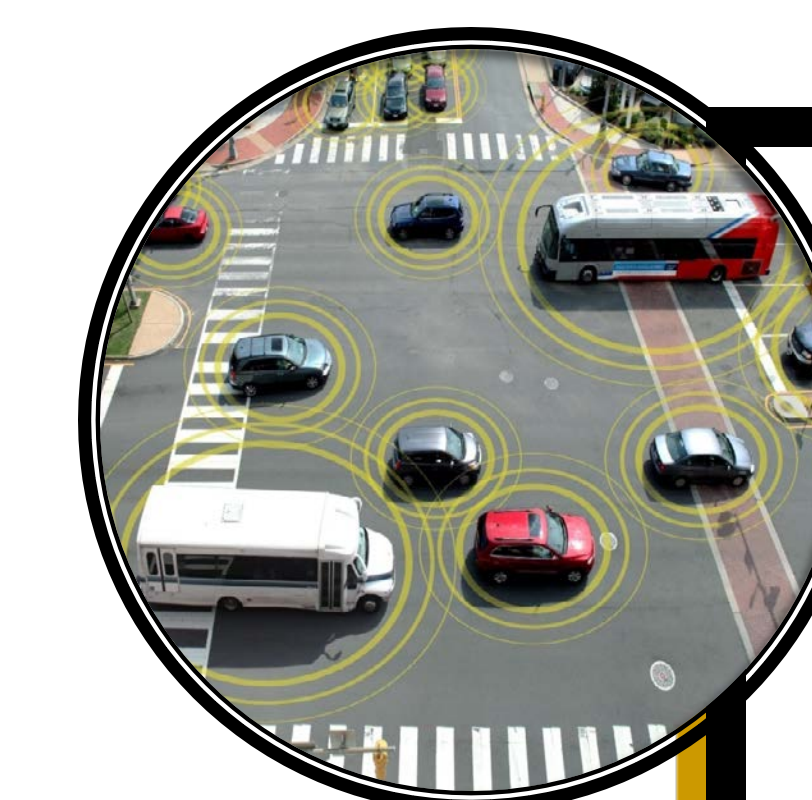
### Evaluating Opportunities to Enhance the Hoosier State Train ridership through a Survey of Riders' Opinions and an Assessment of Access to the Line

- Support decisions that affect mobility, quality, safety and can generate benefits and cost savings to INDOT.
- Monitor the changes in rider's opinions of the Hoosier State train since the 2015 survey;
- Evaluate the effectiveness of the services improvements;
- Evaluate the potential impact on ridership if improvements were made to the service.



### Evaluating the Effect of Transportation Infrastructure on Manufacturing Employment in Indiana

- The urban and economic structure of cities are highly influenced by the provision of transportation systems.
- Indiana is ranked first nationwide in terms of the shares of Manufacturing with respect to its Gross Regional Product.
- This project aims to understand the distribution of manufacturing industry in Indiana using spatial models and a set of variables related to market structure, labor, and transportation connectivity.



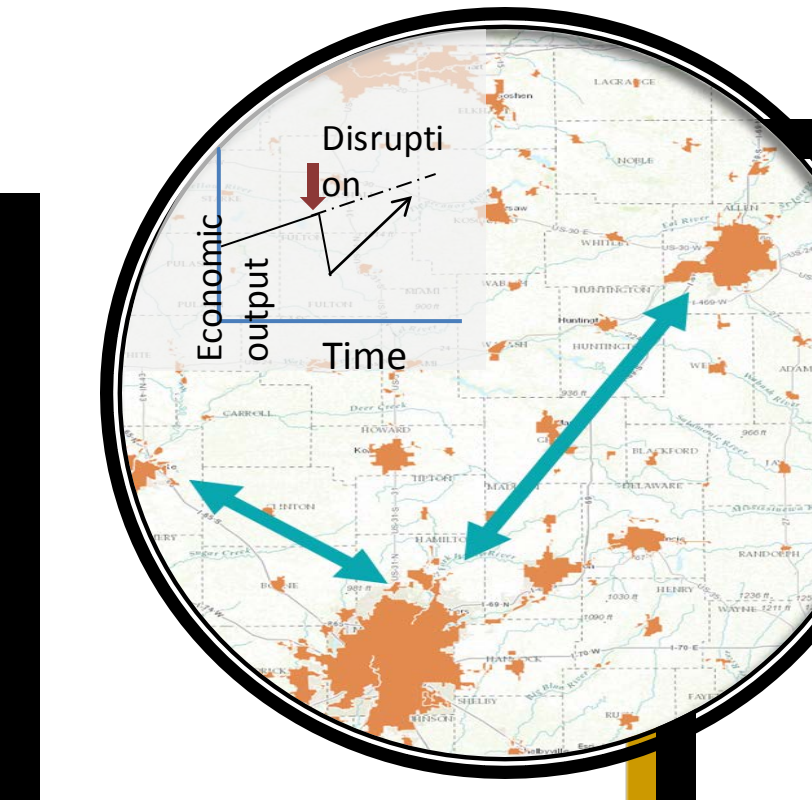
### Travel Behavioral Changes and Impacts of Automated Vehicles (AVs) and Shared AVs

- Investigate the causal relationship between traveler's demographic and socioeconomic profiles, travel characteristics/behaviors and attitudinal variables, to identify distinct market segments for AVs fleet.
- Identify the factors affecting mode shift decisions to AVs and shared AVs.
- Identify the attributes affecting the decision to postpone potential purchases of personal vehicles due to the emergence of AV fleet.
- Assess the impacts of AVs and shared AVs in different urban areas using simulation models.



### Distributional Effects of a Per-mile Congestion Fee: 4+ scenarios

- Using state household travel surveys and GIS tools four per-mile congestion fee programs are developed and assessed: low privacy - static peak hour trips, low privacy - time-shifted trips, high privacy - static peak hour trips, and high privacy - time-shifted trips
- Congestion fee regressivity is assessed using a Suits index to examine distribution of tax burden on household and average individual incomes for each scenario and compared to current congestion toll regimes in the US as well as alternative congestion reduction schemes from around the world.



### The Role of Transportation on Building Robust Economies

- Economic resilience is determined by the ability of a region to maintain certain economic output after a disturbance occurs and by the speed in which the economy is reverted back to an equilibrium state.
- Transportation is a critical component of economic resilience because it provides accessibility to markets and opportunities. However, there is no formal methodology to date to assess this relationship.
- The objective of this research is to develop a framework where the role of transportation-related parameters on building economic resilience can be evaluated using both empirical data and conceptual models.

