

Sarah Searcy, MA | Bicycle & Pedestrian Program Manager – ITRE at NC State



Sarah Searcy is the Bicycle and Pedestrian Program Manager at the Institute for Transportation Research and Education (ITRE) at North Carolina State University. With a background in statistics and social science, she has expertise in managing large-scale primary data collection, sampling and survey design, statistical testing including methods for complex survey samples, and geospatial analysis and visualization techniques. Sarah manages the North Carolina Non-Motorized Volume Data Program (NC NMVDP) for the North Carolina Department of Transportation (NCDOT). The NC NMVDP began as a research project to test a bicycle and pedestrian count protocol for replication across the state. The program currently includes one of the most extensive statewide networks of continuous bicycle and pedestrian counting sensors and provides data management and reporting support for multiple local agency partners. Sarah also manages and acts as the State Statistician for the North Carolina Observational Survey of Seat Belt Use, an annual seat belt use survey conducted to fulfill the requirements of the National Highway Traffic Safety Administration (NHTSA) for generating a statewide seat belt use rate. She has served in this role from 2017 to 2021. Sarah is research co-chair of the TRB Bicycle and Pedestrian Data Subcommittee.

EDUCATION

- Graduate Certificate in GIS, North Carolina State University
- MA, Sociology, East Carolina University
- BA, Art and Anthropology, East Carolina University

YEARS OF EXPERIENCE

10

AFFILIATIONS

- Transportation Research Board (TRB) ABJ35(2) Bicycle and Pedestrian Data Subcommittee (Member & Research Co-Chair)

FELLOWSHIPS

- Fulbright-Nehru English Teaching Assistantship, USIEF, New Delhi, India

AREAS OF PRACTICE

- Multimodal Data Collection & Analysis
- Sampling & Survey Design
- Bicycle & Pedestrian Count Program Development
- Training & Technical Support

Select Project Experience

North Carolina Non-Motorized Volume Data Program (NC NMVDP); *Principal Investigator & Program Manager*. Manages a statewide non-motorized counting program that includes one of the most extensive statewide networks of continuous bicycle and pedestrian counting sensors and provides data management and reporting support for multiple local agency partners. Developed and implemented the current program structure by transitioning from a linear set of research tasks into a formal program structure based on three coordination areas (Local Agency, Equipment, and Data) encompassed by overall project management. Oversees the maintenance and validation of counting equipment and the development and application of quality control and quality assurance (QA/QC) protocols. Implemented the use of an online dashboard system for quarterly and annual data reporting. Oversees the design and population of a bicycle and pedestrian count database in line with the FHWA's Traffic Monitoring Guide (TMG) formatting conventions. Leads data analyses and the development of summary statistics.

NCDOT Evaluating the Economic Contribution of Shared Use Paths in North Carolina; *Lead Statistical Analyst*. Assisted with the collection, cleaning, and management of survey and count data collected at a sample of shared use paths in North Carolina. Assisted with the coordination of subcontractors on their analysis tasks. Generated and analyzed descriptive statistics, created tools to allow survey data to be visualized using a GIS, and assisted with the development of technical memorandums, final report, and summary brochure.

NCDOT Rail Network Trespass Statewide Severity Assessment and Predictive Modeling; *Co-Principal Investigator & Lead Statistical Analyst*. Builds on the methods and data generated from NCDOT Rail Corridor Trespass Severity Assessment. Developed a sampling plan and data collection schedule for thermal video data collection at six trespassing hot spots along rail corridors in the eastern and western regions of North Carolina. Supervised data coding and the production of a trespassing event dataset reduced from over 365 days of video data. Led the development of models to estimate and forecast trespassing event by location for the rail network in North Carolina. Leads the development of a mapping tool for visualizing the trespassing event data and additional rail-related secondary data sources.

NCDOT Rail Corridor Trespass Severity Assessment; *Co-Principal Investigator & Lead Statistical Analyst*. Developed a sampling plan and data collection schedule for thermal

video data collection at five trespassing hot spots along the Piedmont corridor from Raleigh to Charlotte, North Carolina. Supervised data coding and the production of a trespassing event dataset from over 365 days of video data. Performed preliminary modeling to estimate the severity of pedestrian trespassing along the corridor.

2017-2021 North Carolina Observational Survey of Seat Belt Use, NC GHSP; Project Manager & State Statistician. Updated sampling frame data and reselected observation sites in compliance with the Uniform Criteria for State Observational Surveys of Seat Belt Use. Developed a data collection schedule with observation times, observation procedures, and data collection quality control. Created data collection training materials and trained data collection staff. Generated the statewide seat belt use rate, standard error, and nonresponse rate in compliance with NHTSA annual reporting requirements.

NCDOT Public Opinions of Roadway Assets Using Roadway Reviews and Focus Groups; Lead Statistical Analyst. Assisted with the collection, entry, cleaning, and management of survey and focus group data collected at a sample of locations across North Carolina. Generated and analyzed descriptive statistics, created summary visuals, and assisted with writing the final technical report.

Impact of Development Density on K-Factors; Principal Investigator & Lead Statistical Analyst. Developed a modeling approach incorporating longitudinal continuous count and roadway network data for North Carolina to estimate K-factor change based on facility attributes and socioeconomic factors including variations in area type.

Research and Technical Support for NCDOT Strategic Prioritization; Co-Principal Investigator & Lead Statistical Analyst. Developed and applied a procedure for generating peak average daily traffic (PADT) factors for use in NCDOT strategic prioritization efforts. Estimated segment-specific PADT factors from available continuous and seasonal count data, developed default PADT factors for primary and secondary routes, produced a GIS-enabled roadway map to display PADT factor results, developed a data collection specification for generating future PADT factors, and developed coverage count sampling plans for the interstate network and for NC counties with limited data for producing PADT factors.

NCHRP 3-78b: Guideline for the Application of Crossing Solutions at Roundabouts and Channelized Turn Lanes to Assist Pedestrians with Vision Disabilities; Lead Statistical Analyst. Assisted with the collection, entry, and management of wayfinding data collected at a sample of roundabout and channelized turn lane crosswalks located in the United States. Generated and analyzed descriptive statistics, conducted a correlation analysis, and tested for statistical differences to determine whether roundabout and channelized turn lane site characteristics are significantly associated with wayfinding errors. Assisted with writing the final technical report.

TOPR #34 – Accelerating Roundabout Implementation in the United States; Lead Statistical Analyst. Conducted a multivariable regression analysis of yielding behavior in relation to geometric factors at a sample of roundabout crosswalks located in the United States. Developed a model to determine whether significant relationships exist between geometric factors and yielding rates at the trial roundabout crosswalks and to predict driver yielding rates as a function of geometric factors. Assisted with writing the final technical report.

Additional Analysis of the National Child Restraint Use Special Study (NCRUSS); Co-Principal Investigator & Statistician. Developed SAS programs and conducted statistical

analyses in accordance with research questions related to child restraint use and misuse in passenger vehicles.

Defining Contextual Variables Related to Seat Belt Use in Fatal Crashes; Co-Principal Investigator & Statistician. Developed an analysis approach that paired FARS data with United States Census and business location data to examine the determinants of seat belt use among those fatally injured in passenger vehicle crashes. Investigated the effect of local build environment features by exploring the relationship between unrestrained fatalities in the United States over the five year period from 2012-2016 and densities of alcohol drinking places, alcohol outlets, and combined social/recreational/tourist destinations through logistic regression modeling.

Research Projects

Long Term Data Quality Assurance, Reporting, and Storage for the North Carolina Non-Motorized Volume Data Program (NC NMVDP) (PI)
Dec. 2018 – Nov. 2023, NCDOT

Bicycle and Pedestrian Data Collection (North Carolina Non-Motorized Volume Data Program – NC NMVDP) (PI)
Nov. 2013 – Oct. 2020, NCDOT

2021 North Carolina Observational Survey of Seat Belt Use (Co-PI)
Oct. 2020 – Sept. 2021, GHSP

2020 North Carolina Observational Survey of Seat Belt Use (Co-PI)
Oct. 2019 – Sept. 2020, GHSP

Assessment of Separated Bike Lane (SBL) Applications in North Carolina
Aug. 2019 – July 2021, NCDOT

State of the Art Approaches to Bicycle & Pedestrian Counters (Co-PI)
Aug. 2019 – Oct. 2020, NCDOT

Bicycle Volume: Counting Machine Validation & Correction, Estimating & Forecasting, and Analysis of Injury Risk (Co-PI)
Aug. 2019 – July 2021, NCDOT

2019 North Carolina Observational Survey of Seat Belt Use
Oct. 2018 – Sept. 2019, GHSP

Compare NCDOT-MSTA's School Traffic Trip Generation Calculator Estimates to Existing Conditions (co-PI)
Aug. 2018 – July 2020, NCDOT

Rail Network Trespass Statewide Severity Assessment and Predictive Modeling (PI)
Aug. 2018 – July 2020, NCDOT

Yielding Compliance at High Visibility Crosswalks
Aug. 2018 – May 2021, NCDOT

Defining Contextual Variables Related to Seat Belt Use in Fatal Crashes
Oct. 2017 – Sept. 2019, NHTSA

2018 North Carolina Observational Survey of Seat Belt Use
Oct. 2017 – Sept. 2018, GHSP

Investigation of Short Duration Count (SDC) Requirements for Estimating Annual Average Daily Pedestrians (AADP) (PI)
Sept. 2017 – Dec. 2017, NCDOT

Middle Fork Greenway Study
Aug. 2017 – Dec. 2017, Blue Ridge Conservancy

Peak Spreading Tool Implementation (PI)
Aug. 2017 – July 2018, NCDOT

Investigation of Short Duration Count (SDC) Requirements for Estimating Annual Average Daily Bicyclists (AADB) (PI)
Feb. 2017 – May 2017, NCDOT

High Point Greenway Study
Oct. 2016 – Dec. 2016, Southwest Renewal Foundation (SRF)

Additional Analysis of National Child Restraint Use Special Study (NCRUSS)
Oct. 2016 – Mar. 2018, NHTSA

2017 North Carolina Observational Survey of Seat Belt Use
Oct. 2016 – Sept. 2017, GHSP

Impact of Development Density on K-Factors (PI)
Aug. 2016 – July 2017, NCDOT

Rail Corridor Trespass Severity Assessment (co-PI)
Aug. 2016 – July 2018, NCDOT

Targeted Pedestrian Yielding Enforcement
Oct. 2015 – Sept. 2016, GHSP

Public Opinions of Roadway Assets Using Roadway Reviews and Focus Groups
Aug. 2015 – July 2016, NCDOT

Research and Technical Support for NCDOT Strategic Prioritization (co-PI)
April 2015 – July 2017, NCDOT

Evaluating the Economic Contribution of Shared Use Paths in North Carolina
March 2015 – Feb. 2018, NCDOT

NCDOT Customer Service Survey
Aug. 2014 – July 2015, NCDOT

Assessment of Automated Sign Retroreflectivity Measurement
Feb. 2014 – Aug. 2015, NCDOT

Reduction in Railroad Right-of-Way Trespassing Incidents
Sept. 2014 – Aug. 2016, NCDOT

American Tobacco Trail Study

May 2013 – Aug. 2014, NCDOT, BCBSNC, East Coast Greenway Alliance, Helen & William Mazer Foundation

NCHRP 3-78b - Guidelines for the Application of Crossing Solutions at Roundabouts and Channelized Turn Lanes to Assist Pedestrians with Vision Disabilities

May 2013 – Aug. 2015, NCHRP

Trip Making Patterns of North Carolina's University Students

Aug. 2012 – July 2014, NCDOT

TOPR #34 - Accelerating Roundabout Implementation in the United States

Sept. 2011 – Feb. 2014, FHWA

Professional Experience

Research Associate, ITRE, Raleigh, NC (7/2016-8/2018)

Served as co-investigator or principal investigator on small to moderate sized research projects; supported research activities for multiple research projects; worked independently to collect data and analyze research results; contributed to publications, reports, and draft manuscripts; participated in writing grant proposals; supervised student research assistants.

Research Assistant, ITRE, Raleigh, NC (8/2014-7/2016)

Provided technical research assistance on a range of motorized and non-motorized transportation research projects.

FARS Analyst, North Carolina Division of Motor Vehicles, Raleigh, NC (3/2014-8/2014)

Implemented the Fatality Analysis Reporting System (FARS) for the National Highway Traffic Safety Administration (NHTSA) in the state of North Carolina.

Bicycle and Pedestrian Program Intern, ITRE, Raleigh, NC (8/2013-3/2014)

Cleaned and analyzed survey and count data for a project examining behavioral impacts on the American Tobacco Trail in Durham, NC before and after the completion of a major pedestrian overpass.

Geocoder, UNC-HSRC, Chapel Hill, NC (12/2012-4/2013)

Geocoded motor vehicle-pedacyclist collisions that occurred in North Carolina from 2007-2011 for a NCDOT-funded project and generated reports on the geocoded data; proofed and edited assessment and policy documents and helped compile case studies for the NCDOT Complete Streets program.

Research Assistant, East Carolina University, Greenville, NC (8/2010-6/2012)

Produced twenty-nine maps for an undergraduate sociology textbook (Jacobs, AJ. 2012. The World's Cities: Contrasting Regional, National, and Global Perspectives. Routledge: New York.).

Survey Researcher, Center for Survey Research, East Carolina University, Greenville, NC (12/2010-3/2011)

Administered telephone surveys for a North Carolina Coastal Communities Survey that investigated attitudes towards coastal environmental issues, including severe weather impacts and global warming.

Educational and Curatorial Intern, Smithsonian Center for Folklife and Cultural Heritage, Washington, DC (5/2008-8/2008)

Evaluated the 2008 Smithsonian Folklife Festival as an experiential learning environment, focusing on the “Bhutan: Land of the Thunder Dragon” program; resulted in a detailed report on effective and ineffective presentation methods in the program and a proposal for educating local high school and university students to be presenters at subsequent Folklife Festivals; performed curatorial research for an African Arts of Adornment exhibition.

Select Publications

- Searcy, Sarah, Daniel Findley, Joseph Huegy, Mei Ingram, Bing Mei, Joyendu Bhadury, Chao Wang. “Effect of residential proximity on university student trip frequency by mode.” *Travel Behaviour and Society*, January 2018.
- Jackson, Kristy, Sarah O’Brien, Sarah Searcy, and Shannon Warchol. “Quality Assurance and Quality Control Processes for a Large Scale Bicycle and Pedestrian Volume Data Program.” In *Transportation Research Record: Journal of the Transportation Research Board*, No. 2644, Transportation Research Board of the National Academies, Washington, D.C. 2017.
- National Academies of Sciences, Engineering, and Medicine. 2017. *Crossing Solutions at Roundabouts and Channelized Turn Lanes for Pedestrians with Vision Disabilities: A Guidebook*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/24678>.
- Davis, Joy, Chris Cunningham, Daniel Findley, Sarah Searcy, James Martin, and Lonnie Watkins. “Relating Public Opinions of Roadway Assets to Field Data Using Surveys and Focus Groups.” In *Transportation Research Record: Journal of the Transportation Research Board*, No. 2613, Transportation Research Board of the National Academies, Washington, D.C. 2017.
- Yeom, Chunho, Sarah Searcy, Daniel Findley, Bastian Schroeder. “A New Method to Account for Seasonal Peak Traffic Volumes in Project Prioritization.” *ITE Journal*, August 2017.
- National Academies of Sciences, Engineering, and Medicine. 2016. *Guidelines for the Application of Crossing Solutions at Roundabouts and Channelized Turn Lanes for Pedestrians with Vision Disabilities*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/24675>.
- Cook, Thomas, Sarah O’Brien, Kristy Jackson, Daniel Findley, and Sarah Searcy. “Behavioral Effects of Completing a Critical Link in the American Tobacco Trail.” In *Transportation Research Record: Journal of the Transportation Research Board*, No. 2598, Transportation Research Board of the National Academies, Washington, D.C., 2016, pp. 19-26.