

GREGORY S. MACFARLANE

Brigham Young University
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430 Engineering Building
Provo, UT 84602

EDUCATION

GEORGIA INSTITUTE OF TECHNOLOGY Atlanta, Georgia

Ph.D., Transportation Systems Engineering

May 2014

Advisor: Laurie A. Garrow

Dissertation: “Using Big Data to Model Travel Behavior: Applications to Vehicle Ownership and Willingness-to-Pay for Transit Accessibility”

M.S., Economics

BRIGHAM YOUNG UNIVERSITY Provo, Utah

B.S. with University Honors, Civil Engineering

December 2009

Minor degrees in Mathematics and Asian Studies

ACADEMIC EXPERIENCE

BRIGHAM YOUNG UNIVERSITY

Assistant Professor

November 2018 -

Researching the application of passive data sets in transport and land use modeling, including spatial and social effects on travel behavior.

UNIVERSITY OF NORTH CAROLINA, CHAPEL HILL

Adjunct Lecturer/Teaching Assistant PLAN 739 — Travel Demand

January 2017 - May 2017

Lectured on transportation data, discrete choice econometrics, and mode choice models in the graduate travel demand analysis course.

GEORGIA INSTITUTE OF TECHNOLOGY

Post-doctoral Researcher

January 2014 - May 2014

Developed a curriculum to teach sustainable transportation engineering and analysis, in partnership with the National Center for Sustainable Transportation.

JOURNAL ARTICLES

Advising: † indicates BYU graduate student authors, * indicates BYU undergraduate authors

Macfarlane, G.S., Sheffield, M.H.†, Bennet, L.S.†, Schultz, G.G. (2021). The Effect of Transit Signal Priority on Bus Rapid Transit Headway Adherence. *Findings*, June. <https://doi.org/10.32866/001c.24499>.

Macfarlane, G.S., Hunter, C.*, Martinez, A.*, & Smith, E.* (2021). Rider Perceptions of an On-Demand Microtransit Service in Salt Lake County, Utah. *Smart Cities* 4(2): 717-727. <https://doi.org/10.3390/smartcities4020036>

Macfarlane, G.S., Boyd, N., Taylor, J.E., & Watkins, K. (2020) Modeling the impacts of park access on health outcomes: A utility-based accessibility approach. *Environment and Planning B: Urban Analytics and City Science*. <https://doi.org/10.1177/2399808320974027>

Glenn, J., Bluth, M.*, Christianson, M.*, Pressley, J.*, Taylor, A., **Macfarlane, G.S.**, & Chaney, R. A. (2020). Considering the Potential Health Impacts of Electric Scooters: An Analysis of User Reported Behaviors in Provo, Utah. *International Journal of Environmental Research and Public Health*, 17(17), 6344. <https://doi.org/10.3390/ijerph17176344>

Macfarlane, G.S., Garrow, L.A., & Moreno-Cruz, J. (2015). Do Atlanta residents value MARTA? Selecting an autoregressive model to recover willingness to pay. *Transportation Research Part A: Policy and Practice*, 78, 214–230. <https://doi.org/10.1016/j.tra.2015.05.010>

Macfarlane, G.S., Garrow, L.A., & Mokhtarian, P. L. (2015). The influences of past and present residential locations on vehicle ownership decisions. *Transportation Research Part A: Policy and Practice*, 74, 186–200. <https://doi.org/10.1016/j.tra.2015.01.005>

Brakewood, C., **Macfarlane, G.S.**, & Watkins, K.E. (2015). The impact of real-time information on bus ridership in New York City. *Transportation Research Part C: Emerging Technologies*, 53, 59–75. <https://doi.org/10.1016/j.trc.2015.01.021>

Binder, S., **Macfarlane, G.S.**, Garrow, L.A., & Bierlaire, M. (2014). Associations among household characteristics, vehicle characteristics and emissions failures: An application of targeted marketing data. *Transportation Research Part A: Policy and Practice*, 59, 122–133. <https://doi.org/10.1016/j.tra.2013.11.005>

Wall, T.A., **Macfarlane, G.S.**, & Watkins, K.E. (2014). Exploring the use of egocentric online social network data to characterize individual air travel behavior. *Transportation Research Record*, 2400, 78–86. <https://doi.org/10.3141/2400-09>

McBride, J.H., Keach, R. W., Macfarlane, R.T., De Simone, G.F., Scarpati, C., Johnson, D.J., **Macfarlane, G.S.**, & Weight, R.W.R. (2009). Subsurface visualization using ground-penetrating radar for archaeological site preparation on the northern slope of Somma-Vesuvius: a Roman site, Pollena-Trocchia, Italy. *Il Quaternario, Italian Journal of Quaternary Sciences*, 22(1), 39–52. <https://portal.issn.org/resource/ISSN/0394-3356>

PEER- REVIEWED
CONFERENCE
PAPERS

Turley Voulgaris, C., **Macfarlane, G.S.**, Kaylor, J., Su, T., Bauranov, A. (2021). Whose emissions are these anyway? Estimating vehicle miles traveled to account for site-level climate impacts. In *ACSP Annual Conference*. Miami, Florida.

Macfarlane, G.S., & Tapia, T. (2020). Developing a Park Activity Location Choice Model from Passive Origin-Destination Data Tables. In *Transportation Research Board Annual Meeting*. Washington, D.C.

Zhang, B., **Macfarlane, G.S.**, Wall, T.A., & Watkins, K.E. (2014). Friendship Influences on Air Travel: A Social Autoregressive Analysis. In *North American Regional Science Conference*. Washington, D.C.: Regional Science Association International.

Macfarlane, G.S., Moreno-Cruz, J., & Garrow, L. A. (2013). Does Atlanta value MARTA? Selecting an autoregressive model to recover willingness-to-pay. In *North American Regional Science Conference*. Atlanta, Georgia.

Macfarlane, G.S., Saito, M., & Schultz, G.G. (2011). Delay underestimation at free right-turn channelized intersections. In *6th International Symposium on Highway Capacity and Quality of Service* (Vol. 16, pp. 560–567). <https://doi.org/10.1016/j.sbspro.2011.04.476>

Macfarlane, G.S., Saito, M., & Schultz, G.G. (2011). Driver perceptions at free right-turn channelized intersections. In *T&DI Congress 2011: Integrated Transportation and Development for a Better Tomorrow* (Vol. 398, pp. 108–108). ASCE. [https://doi.org/10.1061/41167\(398\)108](https://doi.org/10.1061/41167(398)108)

UNDER REVIEW

Macfarlane, G.S., & Lant, N.[†] (2021). Identifying Segmentation Strategies in a Daily Activity Pattern Model for Wheelchair Users.

Macfarlane, G.S., Turley Voulgaris, C., & Tapia, T. (2021). If you build it who will come? Equity analysis of park system changes during COVID-19 using passive origin-destination data.

Turley Voulgaris, C., **Macfarlane, G.S.**, Kaylor, J., Su, T., Bauranov, A. (2021). Whose emissions are these anyway? Estimating vehicle miles traveled to account for site-level climate impacts.

REPORTS

Macfarlane, G.S., Lant, N.J.[†], (2021). Estimation and Simulation of Daily Activity Patterns for Individuals Using Wheelchairs (No. UT-21.10). Utah Dept. of Transportation. Division of Research. https://rosap.ntl.bts.gov/view/dot/54639/dot_54639_DS1.pdf

Schultz, G. G., **Macfarlane, G.S.**, Wang, B.[†], & McCuen, S.* (2020). Evaluating the Quality of Signal Operations Using Signal Performance Measures (No. UT-20.08). Utah Dept. of Transportation. Division of Research. https://rosap.ntl.bts.gov/view/dot/54639/dot_54639_DS1.pdf

Macfarlane, G.S. & Copley, M.J.* (2020). *A Synthesis of Passive Third-Party Data sets used for Transportation Planning*. (No. UT-20.20). Utah Dept. of Transportation. Division of Research. https://rosap.ntl.bts.gov/view/dot/54890/dot_54890_DS1.pdf

Zalewski, A., Sonenklar, D., Cohen, A., Kressner, J., & **Macfarlane, G.S.** (2019). *Public Transit Rider Origin–Destination Survey Methods and Technologies*. TCRP Synthesis of Transit Practice 138. Transportation Research Board. <http://www.trb.org/Main/Blurbs/179008.aspx>

Miller, H., O’Kelly, M., Jaegal, Y., Bachman, W., Huntsinger, L., & **Macfarlane, G.S.** (2017) Estimating External Travel Using Purchased Third-Party Data. Research Report 134877, the Ohio Department of Transportation, Office of Statewide Planning & Research.

Cruz, J., **Macfarlane, G.S.**, Xu, Y., Rodgers, M.O., & Guensler, R. (2015). Sustainable Transportation Curricula. National Center for Sustainable Transportation.

PRESENTATIONS

Macfarlane, G.S., Boyd, N., Taylor, J.E., & Watkins, K.E. (2019). Modeling the impacts of park access on health outcomes: a choice-based accessibility approach. In *Greater and Greener 2019*. Denver, Colorado.

Bernardin, V., Gallup, A., Lee, B., Johnson, C., **Macfarlane, G.S.**, Elgar, I., Wertman, R. (2019). How to be a Good Big Data Consumer. In *Transportation Planning Applications Conference*. Portland, Oregon.

Macfarlane, G.S., & Kressner, J.D. (2018). Comparing the Daily Schedules in the NHTS from 2009 and 2017. In *National Household Travel Survey (NHTS) Data for Transportation Applications Workshop*. Washington, D.C.

Macfarlane, G.S., Bettinardi, A.O., & Donnelly, R. (2017). SWIMR: Visualizing complex longitudinal indicators for a statewide integrated land use and transport model in Oregon. In *Transportation Planning Applications Conference*. Raleigh, North Carolina.

Boyd, N., **Macfarlane, G.S.**, Watkins, K.E., & Ederer, D. (2017). Accessibility to urban parks and health outcomes on the neighborhood level. In *American Public Health Association Annual Meeting*. Atlanta, Georgia.

Macfarlane, G.S., & Kressner, J.D. (2017). Modeling automated vehicles with a passive data model. In *Transportation Planning Applications Conference*. Raleigh, North Carolina.

Kressner, J.D., **Macfarlane, G.S.**, Donnelly, R., & Huntsinger, L.F. (2016). Using passive data

to build an agile tour-based model: A case study in Asheville. In *Innovations in Travel Modeling Conference*. Denver, Colorado.

Macfarlane, G.S., & Kressner, J. D. (2016). Fusing Passive Data for Transportation Planning. In *Transportation Research Board Annual Meeting*. Washington, D.C.

Macfarlane, G.S., & Moreno-Cruz, J. (2015). The association between public transportation infrastructure and home price growth and stability. In *Transportation Research Board Annual Meeting*. Washington, D.C.

Macfarlane, G.S., & Garrow, L. A. (2012). Estimating a vehicle ownership model from targeted marketing data. In *Travel Surveys: Moving from Tradition to Practical Innovation*. Dallas, Texas.

Kressner, J.D., & **Macfarlane, G.S.** (2012). Evaluating household credit reports as a replacement for episodic travel surveys. In *Transportation Research Board Annual Meeting*. Washington, D.C.

Macfarlane, G.S., Saito, M., & Schultz, G.G. (2011). Are free right-turn channelized intersections performing as they should? In *Institute of Transportation Engineers Annual Meeting and Exhibit 2011*.

FUNDED RESEARCH

As Principal Investigator, totalling \$330,000:

- **Macfarlane, G.S.**, Schultz, G.G. 2021. *Optimizing Traffic Incident Management Deployment in Utah*. \$70,000, Utah Department of Transportation.
- **Macfarlane, G.S.**, Redelfs, A.H., Spruance, L.A. 2021. *Equitable Access to Nutrition in Utah*. \$70,000, Utah Department of Transportation.
- **Macfarlane, G.S.**, Guthrie, W.S., Mazzeo, B. 2021. *Measuring pavement smoothness from the perspective of e-scooters*. \$25,000, Mentored Research Grant, Brigham Young University.
- **Macfarlane, G.S.** 2020. *Identifying Microtransit Service Areas through Microsimulation*. \$20,000, Utah Department of Transportation
- **Macfarlane, G.S.** 2019. *A synthesis of passive third-party datasets used for transportation planning*. \$25,000, Utah Department of Transportation
- **Macfarlane, G.S.** 2019. *Modeling the demand and operating characteristics for wheelchair-accessible, on-demand mobility services*. \$60,000, Utah Department of Transportation
- **Macfarlane, G.S.** 2019. *Evaluating the Systemic Redundancy of Critical Highway Facilities*. \$60,000, Utah Department of Transportation

As Co-Principal Investigator, totalling \$1.13 million:

- Watkins, K.E. (PI), Hunter, M.S., Van Hentenryck, P., Peeta, S., Brakewood, C., Erhardt, G.D., **Macfarlane, G.S.** 2020. *T-SCORE: Transit Serving Communities Optimally, Responsibly, and Efficiently*. \$1,000,000, United States Department of Transportation.
- Schultz, G.G. (PI), **Macfarlane, G.S.** 2020. *Evaluating Signal Performance Measures: a Longitudinal Analysis*. \$70,000, Utah Department of Transportation
- Schultz, G.G. (PI), **Macfarlane, G.S.** 2019. *Evaluating ramp meter delay in Utah*. \$65,000, Utah Department of Transportation

Unfunded Proposals

- **Macfarlane, G.S.**, Hooley, C., Redelfs, A., South, M. 2020 *Using Mobile Device Data to Measure Isolation and Mental Health*. \$40,000, Brigham Young University Interdisciplinary Research Grant.

COURSES

CCE 201: SUSTAINABLE INFRASTRUCTURE Fall 2020
The inter-related aspects of the different civil engineering disciplines of environmental, geotechnical, structural, transportation, and water resources and how they come together to develop an infrastructure system. Time value of money and application to the infrastructure investment alternatives.

CE 361: INTRODUCTION TO TRANSPORTATION ENGINEERING Winter 2020
Transportation systems characteristics, traffic engineering and operations, transportation planning, geometric design, pavement design, transportation safety, freight, public transport, sustainable transportation.

CE 565: URBAN TRANSPORTATION PLANNING Fall 2020
Characteristics of urban transportation planning and decision making, intermodal transportation, land-use transportation interrelationships, transportation demand modeling, site impact analysis, sustainable transportation, and livable cities.

CE 662: TRANSPORT SIMULATION AND ANALYSIS Winter 2020
An advanced graduate course in traffic flow theory and simulation. Topics include shock wave analysis, discrete event simulation of queues and daily activity pattern choices, car following models, and traffic simulation. Laboratory assignments use MATSim and PTV Vissim simulation softwares.

PROFESSIONAL EXPERIENCE

TRANSPORT FOUNDRY Atlanta, Georgia

Transportation Engineer

April 2017 — October 2018

Developed a data-driven travel demand model from big data sources including household credit listings, cellular device traces, and GPS networks.

WSP | PARSONS BRINCKERHOFF Raleigh, North Carolina

Technical Principal, Systems Analysis Group

June 2014 — April 2017

Major projects include: model development and testing of a statewide integrated activity-based transport and land use model for the Oregon Department of Transportation; recalibration and redesign of an activity-based model for Reno, Nevada; development of a series of trip-based models for the Virginia Department of Transportation; a microsimulation of national truck trips based on Freight Analysis Framework commodity flow forecasts.

UTAH TRANSIT AUTHORITY Salt Lake City, Utah

Strategic Planning Intern

May 2009 - June 2010

Developed transit operating scenarios for the Wasatch Front long-range transportation plan and for UTA's internal scenario planning and programming purposes.

HALES ENGINEERING Lehi, Utah

Engineering Intern

July 2008 - May 2009

Prepared traffic impact analyses for commercial and residential developments.

SINGAPORE MISSION OF THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS

Missionary

June 2004 - June 2006

Served as volunteer cleric in Singapore, Malaysia, and Sri Lanka.

AWARDS AND
HONORS

Dwight David Eisenhower Graduate Fellowship Full doctoral funding from the Federal Highways Administration 2011-2013, one of five awards nationally. Awarded supplemental grant in 2013.

Eno Center for Transportation Leadership Development Conference Participated in the 2012 program; nominated by the Ivan Allen, Jr. College of Liberal Arts at Georgia Tech.

Parsons Brinckerhoff - Jim Lammie Engineering Scholarship Awarded to the top engineer in the 2011 American Public Transportation Foundation (APTF) competition. Sponsored by Mike Allegra, general manager of the Utah Transit Authority. Renewed in 2012.

Gordon W. Schultz Graduate Fellowship Given to the Georgia Tech student in travel demand modeling who exhibits innovation, problem-solving, and practical application.

National Science Foundation Graduate Fellowship Program Honorable Mention in 2011 and 2012, as a first- and second-year graduate student.

Office of Research and Creative Activities (ORCA) Grant Competitive research grant to survey Chinese transportation planning practices, one of several undergraduate research awards from Brigham Young University.

Freeman-Asia Award Grant to study Chinese finance and globalized engineering at Nanjing University in the People's Republic of China from the Institute for International Education.

EXTERNAL
CITIZENSHIP

Transportation Research Board — Young Members Council (2019 -). YMC Planning and Environment Subcommittee Co-chair (2019 -). Chair, AEP50(5): Travel Forecasting Resources subcommittee. Member, AEP50: Standing Committee on Travel Forecasting Resources (2019 -), formerly ADB40. Member, AMS20: Standing Committee on Economics and Land Development (2016 -), formerly ADD30.

Reviewed for the following Journals — Transportation Research Record, Transportation Research Part A: Policy and Practice, Environment and Planning B: Urban Analytics and City Science, International Journal of Sustainable Transport, Journal of Public Transportation.

Professional Organizations — Member, Zephyr Foundation (2020 -). Institute of Transportation Engineers (2009-2013, 2018-2020); webmaster and service coordinator of the Georgia Tech ITE student chapter (2010 - 2013); vice-president and service coordinator of the BYU ITE student chapter (2007 - 2009). Tau Beta Pi (Utah β '09). Young Professionals in Transportation (2013-2018); organizing co-chair of Triangle NC chapter. American Public Transportation Association scholar task force (2011 - 2013).

INTERNAL
CITIZENSHIP

Faculty Committees — Department Honors Coordinator (2019 -). Member, Department Faculty Development and Capital Improvement Committee (2018 -). Member, Transportation discipline group (2018 -).

LICENSURE

Professional Engineer, North Carolina #044518

SKILLS

Significant computer software and programming ability, including expert skills in R, \LaTeX , and git. Also experienced with Java, QGIS, C, Python, Cube/Voyager, GISDK, Matlab, PTV Vissim / Visum, TransCAD, and Microsoft Office.