Gregory S. Macfarlane

Brigham Young University
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430 Engineering Building
Provo, UT 84602

Education

Georgia Institute of Technology

Ph.D., Transportation Systems Engineering — May 2014

M.S., Economics — May 2014

Brigham Young University — December 2009

B.S. with University Honors, Civil Engineering
Minor degrees in Mathematics and Asian Studies

Academic Experience

Brigham Young University
Assistant Professor — November 2018 —
Department of Civil and Construction Engineering, Ira A. Fulton College of Engineering

University of North Carolina, Chapel Hill
Adjunct Lecturer/Teaching Assistant — January 2017 — May 2017

Georgia Institute of Technology
Post-doctoral Researcher — January 2014 — May 2014

Research Interests

Transportation planning and engineering, travel demand modeling, passive transportation data, spatial and social correlation.

Professional Experience

Registered professional engineer in North Carolina, license #044518

Transport Foundry Atlanta, Georgia
Transportation Engineer — April 2017 — October 2018
Developed a data-driven travel demand model from passive data sources.

WSP — **Parsons Brinckerhoff** Raleigh, North Carolina
Technical Principal, Systems Analysis Group — June 2014 — April 2017
Developed advanced travel demand models for public sector clients.

Refereed Journal Articles

†indicates BYU graduate student authors, *indicates BYU undergraduate authors.

20 Gibbons, N.† & **Macfarlane, G.S.** (2025). Evaluating the impacts of parameter uncertainty in a practical transportation demand model. *Future Transportation*, 5 (1), 15. `https://doi.org/10.3390/futuretransp5010015`

19 **Macfarlane, G.S.**, Barnes, M.†, & Gibbons, N.* (2024). A utility-based approach to modeling systemic resilience of highway networks with an application in Utah. *Journal of Transportation Engineering Part A: Systems*. 151 (1). https://ascelibrary.org/doi/10.1061/JTEPBS.TEENG-8534

18 Wang, B.†, Fulda, N., Huang, Z.Y.*, Schultz, G.G., **Macfarlane, G.S.**, Arnesen, J.*, Khayyat, A.* (2024). Predicting directional traffic volume at intersections with automated traffic signal performance measures data using machine learning algorithms. *Transportation Research Record*. https://doi.org/10.1177/03611981241252829

17 **Macfarlane, G.S.**, Riches, G.†, Youngs, E.K.†, Nielsen, J.A. (2024). Classifying location points as daily activities using simultaneously optimized DBSCAN-TE parameters. *Findings*. https://doi.org/10.32866/001c.116197

16 Turley Voulgaris, C., **Macfarlane, G.S.**, Kaylor, J. (2024). Whose miles are these anyway? Estimating site-generated vehicle miles traveled. *Journal of the American Planning Association*. 90(4), 593–609 https://doi.org/10.1080/01944363.2023.2298962

15 Wang, B.†, Schultz, G.G., **Macfarlane, G.S.**, Eggett, D.L., & Davis, M.C.* (2023) A methodology to detect traffic data anomalies in automated traffic signal performance measures. *Future Transportation*. 3(4), 1175-1194. https://doi.org/10.3390/futuretransp3040064

14 Daines, T.J.†, Schultz, G.G., **Macfarlane, G.S.**, & Ward, C.* (2022). Evaluating real time ramp meter queue length estimation. *Future Transportation*, 2(4), 807-827. https://doi.org/10.3390/futuretransp2040045

13 **Macfarlane, G.S.**, Stucki, E.†, Redelfs, A.H., & Spruance, L.A. (2022). Beyond proximity: utility-based access from location-based services data. *International Journal of Environmental Research and Public Health*, 19(19), 12352. https://doi.org/10.3390/ijerph191912352.

12 **Macfarlane, G.S.**, Turley Voulgaris, C., & Tapia, T. (2022). City parks and slow streets: a utility-based access and equity analysis. *Journal of Transport and Land Use*. 15(1): 587-612. https://doi.org/10.5198/jtlu.2022.2009

11 Wang, B.†, Schultz, G.G., **Macfarlane, G.S.**, & McCuen, S.* (2022). Evaluating signal systems using automated traffic signal performance measures. *Future Transportation*. 2(3): 659-674. https://doi.org/10.3390/futuretransp2030036.

10 **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*. https://doi.org/10.32866/001c.24499.

9 **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

8 **Macfarlane, G.S.**, Boyd, N., Taylor, J.E., & Watkins, K. (2021) Modeling the impacts of park access on health outcomes: A utility-based accessibility approach. *Environment and Planning B: Urban Analytics and City Science*, 48(8), 2289–2306. https://doi.org/10.1177/2399808320974027

7 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

6 **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

5 **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

4 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

3 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

2 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

1 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

Selected Conference Papers and Technical Reports

6 Jarvis, D.L.†, **Macfarlane, G.S.**, Woolley, B.*, Schultz, G.G. (2024). Simulating incident management team response and performance. *Procedia Computer Science*. 238, pp. 91-96. https://doi.org/10.1016/j.procs.2024.06.002

5 Apelu, D.*, **Macfarlane, G.S.**, Guthrie, W.S., Adams, N.*, Mazzeo, B. (2023). Measuring Pavement Smoothness From the Perspective of E-Scooters. *IEEE XPlore*, https://doi.org/10.1109/IETC57902.2023.10152077

4 **Macfarlane, G.S.**, Lant, N.† (2023). How Far Are We From Transportation Equity? Measuring the Effect of Wheelchair Use on Daily Activity Patterns. In: Antoniou, C., Busch, F., Rau, A., Hariharan, M. (eds) Proceedings of the 12th International Scientific Conference on Mobility and Transport. *Lecture Notes in Mobility*. Springer, Singapore. https://doi.org/10.1007/978-981-19-8361-0_10

3 **Macfarlane, G.S.**, Atchley, S.H.†, Mansfield, K.A.*, Baird, T. & Gresham, C. (2024). *Activity-based Model Implementation and Analysis Considerations.* (No. UT-24.16). Utah Dept. of Transportation. Division of Research. https://rosap.ntl.bts.gov/view/dot/77610

2 **Macfarlane, G.S.**, Atchley, S.H.† (2023). *Identifying Microtransit Service Areas through Microsimulation*. (No. UT-23.01). Utah Dept. of Transportation. Division of Research. https://rosap.ntl.bts.gov/view/dot/66312

1 Cruz, J., **Macfarlane, G.S.**, Xu, Y., Rodgers, M.O., & Guensler, R. (2015). *Sustainable Transportation Curricula*. National Center for Sustainable Transportation. https://escholarship.org/uc/item/3c13q43c.

Conferences Organized

1 *Activity-based Modeling Symposium* (2024). Möckel, R. (host), Shaw, A., Bhat, C.R., Erhardt, G.D., **Macfarlane, G.S.**, & Mokhtarian, P.L., scientific committee. Hosted in Raitenhaslach, Germany with funding from the German Research Foundation. `https://www.mos.ed.tum.de/en/tb/workshops/abm2024/`

Selected Presentations

13 **Macfarlane, G.S.** (2024). A multiple modeling sandbox. In *Activity-based models symposium*. Lectern presentation. Raitenhaslach, Germany.

12 Turley Voulgaris, C., Jensen, A.F., **Macfarlane, G.S.** (2024). Children's mode choice and independence for the journey to school. In *17th International Conference on Travel Behavior Research*. Lectern presentation. Vienna, Austria.

11 **Macfarlane, G.S.** Modeling with Big Data. (2023) At *Technische Universität München*, invited lecture in Dr. Rolf Möckel's travel modeling course.

10 Guan, H.Z., Van Hentenryck, P., Erhardt, G.D., **Macfarlane, G.S.**, & Watkins, K.E. (2023). Lessons from the design of on-demand multimodal transit systems in two cities. In *Innovations in Transportation Analysis and Planning Conference*. Lectern presentation. Indianapolis, Indiana. *Winner, best presentation by a student author.*

9 Ducuara, A. Holtrop-Kohl, L., Begay, S., Spruance, L., Redelfs, A., **Macfarlane, G.S.** (2023). Hungry for change: how cutting-edge research is helping to reduce food deserts in Utah. In *Move Utah Summit*. Moderated panel discussion. Salt Lake City, Utah.

8 Singh, G., Young, S., **Macfarlane, G.S.**, Katsikides, N., Granato, S. (2023). Travel Data Users Forum: Innovative Usage of GPS Trajectory Data: Present and Future. In *Transportation Research Board Annual Meeting*. Invited panel discussion. Washington, D.C.

7 Antoniou, C., Möckel, R., **Macfarlane, G.S.**, Kotsopoulous, H., Llorca-Garcia, C., Erhardt, G.D., Mahajan, V., Schmöcker, J.D., & Pereira, F. (2022). Transport Modeling using Publicly Available Data. Invited participants to a workshop hosted by Technische Universität München and the German Research Foundation.

6 **Macfarlane, G.S.**, & Lant, N.J.† (2022). How far are we from transportation equity? Measuring the effect of wheelchair use on daily activity patterns. In *mobil.TUM 2022 – 12th International Scientific Conference on Mobility and Transport*. Lectern presentation. Singapore.

5 **Macfarlane, G.S.**, & Atchley, S.H.*, Day, C.S.†, Erhardt, G., & Needell, Z. (2022). Simulating and prioritizing service areas for regionally exclusive microtransit operations. In *mobil.TUM 2022 – 12th International Scientific Conference on Mobility and Transport*. Lectern presentation. Singapore.

4 **Macfarlane, G.S.**, Stucki, E.†, & Copley, M.*. (2021). Utility-Based Accessibility to Community Resources: An Application of Location-Based Services Data. In *North American Regional Science Conference*. Denver, Colorado.

3 **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*. Poster. Washington, D.C.

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

1 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*. Lectern presentation. Denver, Colorado.

Awards and Honors

Most Influential Faculty Given to the faculty member in the Civil Engineering program whom graduating seniors name as the most influential on their undergraduate education. Awarded by 2022 graduating class.

TUM Global Visiting Professor Selected to enrich the vibrant research culture at the Technische Universität München by virtue of innovative approaches and to explore new, cutting-edge research fields. Awarded in 2023.

ASCE ExCEEd Teaching Fellow Participated in week-long intensive teacher development program. Class of 2022.

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.

External Citizenship

Panel Member, NCHRP 08-184, *Framework for Assessing Induced Demand Effects of Various Roadway Investments*. (2023 -)

Member, Provo City Transportation and Mobility Advisory Commission

Transportation Research Board of the National Academies of Science:

- AEP50: Travel Demand Forecasting Member of the committee (2019 —) on travel demand forecasting. Chair of the travel forecasting resources subcommittee (2020— 2024) and editor of `tfresource.org`.
- AMS20: Economics and Land Development Member of the committee (2014 — 2022). formerly standing committee on transportation and land use.
- Young Members Council (2019 — 2021). Planning and Environment subcommittee chair.

Member of the following professional organizations:

- American Society of Civil Engineers (2022 -)
- Zephyr Foundation (2020 - 2022).
- Institute of Transportation Engineers (2009-2013, 2018-2020)
- Tau Beta Pi (Utah β '09).

Internal Citizenship

Department undergraduate committee Chair (2023 —), Member (2021 —). Leading curriculum revisions for civil engineering program, and oversee ABET continuous improvement processes.

Department honors coordinator (2019 —). Encourage students to participate in the honors program, and participate on honors thesis committees in the department.

Department faculty development and capital improvement committee (2018 — 2021).