

# GREGORY S. MACFARLANE

Brigham Young University  
gregmacfarlane@byu.edu 801.422.8505

430 Engineering Building  
Provo, UT 84602

---

## ACADEMIC EXPERIENCE

BRIGHAM YOUNG UNIVERSITY  
*Assistant Professor*

November 2018 —

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.

---

## EDUCATION

GEORGIA INSTITUTE OF TECHNOLOGY

May 2014

Ph.D., Transportation Systems Engineering

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

December 2009

B.S. with University Honors, Civil Engineering

Minor degrees in Mathematics and Asian Studies

## PROFESSIONAL EXPERIENCE

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.

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.

---

First author or first faculty author on 7 of 18 total journal articles. <sup>†</sup>indicates BYU graduate student authors, \*indicates BYU undergraduate authors. Paper 1 came from my undergraduate work, papers 2 through 6 were from my doctoral research, and papers 7 through 15 represent work completed during my time on the faculty at BYU. Number of citations are from Google Scholar as of December 2021.

- 18 Erhardt, G.D., **Macfarlane, G.S.**, Ven Hentenryck, P., Peeta, S., Watkins, K.E. (2023). Implementation and quantitative evaluation of multi-modal optimization and simulation for transit and ridehail competitive analysis. Working paper.
- 17 Tenenboim, E., Xu, Y., Erhardt, G.D., **Macfarlane, G.S.**, Peeta, S. (2023). A model of ride-hailing driver participation: shift duration, start time, and start location. Working paper.
- 16 Erhardt, G.D., Guan, H.Z. Lee, D., **Macfarlane, G.S.**, Van Hentenryck, P. (2023). Comprehensive studies on on-demand multimodal transit systems with two case studies in San Francisco and Salt Lake City. Working paper.
- 15 Turley Voulgaris, C., **Macfarlane, G.S.**, Kaylor, J. (2022). Whose emissions are these anyway? Estimating vehicle miles traveled to account for site-level climate impacts. Preprint available on SSRN at [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4258174](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4258174). Under initial review at *Transportation Research Part A: Policy and Practice*.
- 14 Daines, T.J.<sup>†</sup>, 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.<sup>†</sup>, 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.<sup>†</sup>, 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.<sup>†</sup>, Bennet, L.S.<sup>†</sup>, & 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>.
- 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> Citations: 1
- 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> Citations: 5
- 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> Citations: 8
- 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> Citations: 40
- 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> Citations: 144
- 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> Citations: 16
- 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> Citations: 9
- 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> Citations: 5

#### VENUE NOTES

- Journal of Transport and Land Use* is the leading international journal that publishes original interdisciplinary papers on the interaction of transport and land use. CiteScore: 4.3; 33/241 in urban studies. 5-year impact factor: 2.713. Publisher: University of Minnesota.
- Transportation Research Part A: Policy and Practice* is a leading international journal with robust peer review focusing on transportation policy analysis and the planning of transportation systems. CiteScore: 8.5; 17/318 in civil engineering. Impact factor: 5.594. Publisher: Elsevier.
- Environment and Planning B: Urban Analytics and City Science* is a leading international journal with robust peer review publishing cutting-edge research in analytical methods for urban planning and design. CiteScore 4.6; 6/138 in architecture. 5-year impact factor: 3.889. Publisher: Sage.
- Transportation Research Part C: Emerging Technologies* is a leading international journal with robust peer review focusing on applications and implications of technology in transportation systems. CiteScore: 14.0; 3/318 in civil engineering. 5-year impact factor: 8.089. Publisher: Elsevier.
- Findings* is an interdisciplinary, independent, community-led, peer-reviewed, open access journal focused on short, clear, and pointed research results. The journal was established in 2019. Publisher: University of Sydney and McGill University.

*International Journal of Environmental Research and Public Health* is an interdisciplinary, peer-reviewed, open access journal. CiteScore: 3.4; 179/526 in public health. 5-year impact factor: 2.789. Publisher: MDPI.

*Smart Cities* is an international, scientific, peer-reviewed, open access journal on the science and technology of smart cities. This journal was established in 2019. Publisher: MDPI.

---

PEER- REVIEWED  
CONFERENCE  
PAPERS

All listed conference publications are full papers and include at least a single-blind review process with multiple expert reviewers for consideration. Papers 1 and 2 resulted from my undergraduate honors thesis, papers 3 through 5 resulted from my doctoral work, and items 6 through 9 represent work completed since joining the faculty at BYU.

- 9 **Macfarlane, G.S.**, Lant, N.<sup>†</sup> (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](https://doi.org/10.1007/978-981-19-8361-0_10)
- 8 Turley Voulgaris, C., **Macfarlane, G.S.**, Kaylor, J., Su, T., Bauranov, A. (2022). Whose emissions are these anyway? Estimating vehicle miles traveled to account for site-level climate impacts. In *Transportation Research Board Annual Meeting*. Washington, D.C.
- 7 **Macfarlane, G.S.**, Stucki, E.<sup>†</sup>, & Copley, M.\*. (2021). Utility-Based Accessibility to Community Resources: An Application of Location-Based Services Data. In *North American Regional Science Conference*. Denver, Colorado.
- 6 **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.
- 5 **Macfarlane, G.S.**, & Moreno-Cruz, J. (2015). The Association Between Public Transportation Infrastructure and Home Price Growth and Stability. *North American Regional Science Conference*. Portland, Oregon.
- 4 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.
- 3 **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.
- 2 **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> Citations: 6
- 1 **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) Citations: 3

---

## REPORTS

These are technical reports completed under contract for the sponsoring agency; each report was reviewed by a technical advisory committee prior to publication. Item 1 resulted from postdoctoral activities at Georgia Tech, items 2 and 3 from my consulting practice, and items 4 through 9 from my work since joining BYU.

- 9 **Macfarlane, G.S.**, Atchley, S.H.<sup>†</sup> (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>
- 8 Schultz, G.G. **Macfarlane, G.S.**, Wang, B.<sup>†</sup>, & Davis, M.C.\* (2022). *Detecting Traffic Data Anomalies in Longitudinal Signal Performance Measures*. (No. UT-22.21). Utah Dept. of Transportation. Division of Research. <https://rosap.ntl.bts.gov/view/dot/65833>
- 7 Schultz, G. G., **Macfarlane, G.S.**, Daines, T.J.<sup>†</sup>, Ward, C.K.\*, Umphress, J.\* (2022). *Evaluating Ramp Meter Wait Time in Utah*. (No. UT-21.06). Utah Dept. of Transportation. Division of Research. <https://rosap.ntl.bts.gov/view/dot/61507>
- 6 **Macfarlane, G.S.**, Lant, N.J.<sup>†</sup>, (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](https://rosap.ntl.bts.gov/view/dot/54639/dot_54639_DS1.pdf)
- 5 Schultz, G. G., **Macfarlane, G.S.**, Wang, B.<sup>†</sup>, & 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](https://rosap.ntl.bts.gov/view/dot/54639/dot_54639_DS1.pdf)
- 4 **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](https://rosap.ntl.bts.gov/view/dot/54890/dot_54890_DS1.pdf)
- 3 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> Citations: 1
- 2 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. Citations: 1
- 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>.

---

## PRESENTATIONS

This includes invited presentations to academic and non-academic audiences, as well as presentations resulting from abstract-only submission. Includes both lectern sessions and posters. Item 1 came from my undergraduate honors thesis, items 2 through 4 from doctoral research, items 5 through 10 from my work as a consultant, and items 11 through 25 represent work completed during my time at BYU.

- 25 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.
- 24 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.
- 23 **Macfarlane, G.S.**, Barnes, M.<sup>†</sup>, & Gray, N.<sup>†</sup>. (2022). Evaluating systemic resiliency in Utah. In *Utah Dept. of Transportation Annual Conference*. LECTERN presentation. Sandy, Utah.
- 22 **Macfarlane, G.S.**, Day, C.S.<sup>†</sup>, & Atchley, S.H.<sup>†</sup>. (2022). Modeling novel transport modes. In *Utah Dept. of Transportation Annual Conference*. LECTERN presentation. Sandy, Utah.
- 21 Antoniou, C., Möckel, R., **Macfarlane, G.S.**, Kotsopoulos, 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.
- 20 **Macfarlane, G.S.**, & Lant, N.J.<sup>†</sup> (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.
- 19 **Macfarlane, G.S.**, & Atchley, S.H.\* , Day, C.S.<sup>†</sup>, 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.
- 18 Anderson, S.\* , **Macfarlane, G.S.**, & Schultz, G.G. (2022). Developing a New Method to Analyze Speed and Braking Data Using V2X Technology. In *Utah Conference of Undergraduate Research*. Poster. St. George, Utah.
- 17 **Macfarlane, G.S.** (2022). Using Big Data to Evaluate Equitable Access to Community Resources. In *Transportation Research Board Annual Meeting*. Invited LECTERN presentation. Washington, D.C.
- 16 **Macfarlane, G.S.**, Stucki, E.<sup>†</sup>, & Copley, M.\* . (2021). Utility-Based Accessibility to Community Resources: An Application of Location-Based Services Data. In *North American Regional Science Conference*. Denver, Colorado.
- 15 **Macfarlane, G.S.**, Lant, N.J.<sup>†</sup>, (2021). Estimation and Simulation of Daily Activity Patterns for Individuals Using Wheelchairs. In *Utah Dept. of Transportation Annual Conference*. LECTERN presentation. Sandy, Utah.
- 14 **Macfarlane, G.S.** & Copley, M.J.\* (2020). A Synthesis of Passive Third-Party Data sets used for Transportation Planning. In *Utah Dept. of Transportation Annual Conference*. Poster. Sandy, Utah.
- 13 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 *Association of Collegiate Schools of Planning Annual Conference*. LECTERN presentation. Miami, Florida.

- 12 **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*. Workshop presentation. Denver, Colorado.
- 11 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*. Panel discussion. Portland, Oregon.
- 10 **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.
- 9 **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*. Lectern presentation. Raleigh, North Carolina.
- 8 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*. Poster. Atlanta, Georgia.
- 7 **Macfarlane, G.S.**, & Kressner, J.D. (2017). Modeling automated vehicles with a passive data model. In *Transportation Planning Applications Conference*. Poster. Raleigh, North Carolina.
- 6 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. Citations: 7
- 5 **Macfarlane, G.S.**, & Kressner, J. D. (2016). Fusing Passive Data for Transportation Planning. In *Transportation Research Board Annual Meeting*. Poster. Washington, D.C.
- 4 **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.
- 3 **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*. Poster. Dallas, Texas.
- 2 Kressner, J.D., & **Macfarlane, G.S.** (2012). Evaluating household credit reports as a replacement for episodic travel surveys. In *Transportation Research Board Annual Meeting*. Committee presentation. Washington, D.C.
- 1 **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*.

EXTERNAL  
FUNDING

As Principal Investigator, totalling \$375,000:

- 7 **Macfarlane, G.S.** & Brown, N.M. 2022. *Activity-based Model Implementation and Analysis Considerations*. \$70,000, Utah Department of Transportation.
- 6 **Macfarlane, G.S.** & Schultz, G.G. 2021. *Optimizing Traffic Incident Management Deployment in Utah*. \$70,000, Utah Department of Transportation.
- 5 **Macfarlane, G.S.**, Redelfs, A.H., & Spruance, L.A. 2021. *Equitable Access to Nutrition in Utah*. \$70,000, Utah Department of Transportation.
- 4 **Macfarlane, G.S.** 2020. *Identifying Microtransit Service Areas through Microsimulation*. \$20,000, Utah Department of Transportation
- 3 **Macfarlane, G.S.** 2019. *A synthesis of passive third-party datasets used for transportation planning*. \$25,000, Utah Department of Transportation
- 2 **Macfarlane, G.S.** 2019. *Modeling the demand and operating characteristics for wheelchair-accessible, on-demand mobility services*. \$60,000, Utah Department of Transportation
- 1 **Macfarlane, G.S.** 2019. *Evaluating the Systemic Redundancy of Critical Highway Facilities*. \$60,000, Utah Department of Transportation

As Co-Principal Investigator, totalling \$1.16 million (\$235,000 to BYU):

- 4 Schultz, G.G. & **Macfarlane, G.S.** 2021. *Analysis of performance measures of UDOT's traffic incident management program: Phase III*. \$30,000. Utah Department of Transportation.
- 3 Watkins, K.E. (PI), Hunter, M.S., Van Hentenryck, P., Peeta, S., Brakewood, C., Cherry, 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.
- 2 Schultz, G.G. (PI), **Macfarlane, G.S.** 2020. *Evaluating Signal Performance Measures: a Longitudinal Analysis*. \$70,000, Utah Department of Transportation
- 1 Schultz, G.G. (PI), **Macfarlane, G.S.** 2019. *Evaluating ramp meter delay in Utah*. \$65,000, Utah Department of Transportation

Unfunded Proposals:

- 2 Erhardt, G.D. (PI), Watkins, K.E., Brakewood, C., Pike, S.C., **Macfarlane, G.S.**, Chavis, C., Tal, G., Hunter, M., Van Hentenryck, P., McDonald, N. (2022). *T-SCORE 2.0: Transit – Sustainable, Competitive, Responsive, and Equitable Center*. \$2,000,000. United States Department of Transportation.
- 1 Turley Voulgaris, C. (PI), Forsyth, A., Pandey, V., Park, H., Handy, S., **Macfarlane, G.S.**, Pande, A., Braun, L.M., Noland, R.B. (2023). *Chester: Consortium for Healthy, Equitable, and Sustainable Transportation Systems for Environmental Resilience*. \$2,000,000, United States Department of Transportation

INTERNAL  
COMPETITIVE  
FUNDING

Funded research:

- **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.

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

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.

Semester	Enrolled	Student Rating (Historical)	Average GPA
Fall 2020	33	4.1 - 4.7 (4.1)	3.41
Fall 2021	64	4.1 - 4.5 (4.3)	3.25
Fall 2022	60	3.6 - 4.2 (4.3)	3.26

Selected student comments:

- Early in the course, Dr. Macfarlane made it clear, without really ever having to say so, that he cares about his students, wants us to think critically and ask questions, that he's really approachable and welcomes feedback. Overall shows high respect and high but reasonable expectations for students.
- Professor Macfarlane was always very respectful to students in the class. He was always willing to answer students questions or spend some time to further explain a concept. He was always very patient and came to class every day with a positive attitude and excited for class.
- thought he always did a good job explaining concepts in class and I thought it was very helpful to have the class notes website because it made reviewing a lot easier.
- I see the world a lot differently now. Different facets of sustainability are so intertwined and there's so much to consider. I feel so much more capable of making important decisions, but also more inclined to look for more perspectives.
- He was super open to questions, very responsive to emails, and if you asked a question and he thought of something more to add later, he'd make sure to reach out to discuss your question further. He's probably my favorite teacher this semester simply because he makes it very obvious in his actions that he wants us to succeed.

### CE 361: INTRODUCTION TO TRANSPORTATION ENGINEERING

Transportation systems characteristics, traffic engineering and operations, transportation planning, geometric design, pavement design, transportation safety, freight, public transport, sustainable transportation.

Semester	Enrolled	Student Rating (Historical)	Average GPA
Winter 2020	42	4.4 - 4.8 (4.4)	3.13
Winter 2021	38	4.1 - 4.7 (4.4)	3.21
Winter 2022	42	3.9 - 4.5 (4.5)	3.42

Selected student comments:

- I appreciated that he changed up the class significantly in response to midterm ratings. it would have been very easy to keep going with the material he was given, but he really made it his own and made the class so much better as a result.
- Just like the best BYU professors are. Respectful and caring about his students.

- He has by far been my best teacher in this whole transition to online classes situation.
- This class reinforced to me that I want to end up in the public sector of transportation engineering/planning/public works. I want to work in and with local governments to solve problems for people around me.
- He would take extra care to make sure that we understood the material that we were learning. Dr. Macfarlane cares a lot about his students and wants to help them in any way that he can so he takes time in lecture to answer questions.
- Dr. Macfarlane always seemed to have a really good understanding of the bigger picture and shared it with us, about how different facets of systems work together to make our infrastructure work great to serve people, or sometimes the opposite.

#### CE 565: URBAN TRANSPORTATION PLANNING

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.

Semester	Enrolled	Student Rating (Historical)	Average GPA
Fall 2019	12	3.9 - 4.9 (4.4)	3.41
Fall 2020	19	4.1 - 4.7 (4.4)	3.46
Fall 2021	19	3.9 - 4.9 (4.4)	3.63

Selected student comments:

- I'm still amazed at his quickness in responding to Slack messages, no matter the time of day! Dr. Macfarlane is one of the most kind professors I've had, he's extremely willing to work with you until you understand the concept that he's teaching you.
- The class was organized to teach us theory by allowing us to see it in action through models, which I think helped solidify those concepts.
- I appreciated the discussions on ethics and applying them to our work - few of my classes have mentioned them more than once in a semester, and rarely with applicable concerns.
- I have more of a desire to be involved in the planning process in the future communities that I'll live in.
- Dr. Macfarlane is the reason that I didn't change majors. CE 361 was my favorite fundamentals of engineering course and made me want to become an engineer. CE 565 (this course) has been my favorite course at BYU. Dr. Macfarlane knows his stuff and does a good job of teaching in an interesting and engaging way.

#### CE 594R: DATA SCIENCE FOR ENGINEERS

A first-semester graduate course in programming and data science techniques: literate programming in Markdown and LaTeX, version control with git, data manipulation and visualization with R, object-oriented programming with Java.

Semester	Enrolled	Student Rating (Historical)	Average GPA
Fall 2019	4	4.8 - 5.0 ()	3.85
Fall 2020	9	3.5 - 4.7 ()	3.81
Fall 2021	6	4.5 - 5.0 ()	3.68

Selected student comments:

- I know you didn't have to teach this course, but I appreciate you doing it. When I signed up for the course, I thought I would learn about data science techniques (as what I should look for in analyzing data—types of tests to perform, processes, etc). I think that could be a good edition that could come from Dr. Macfarlane, is teaching more about data science and what that entails, rather than just use R to solve problems.
- I felt like he was pretty good at responding to emails and being merciful and helpful and understanding. He definitely recognized that this semester was different and was flexible.
- I really appreciated Dr. Macfarlane and he did curate some great resources for us to use. He was willing and available to help. And he was flexible and merciful in the midst of a challenging and different semester.
- Almost every class period something that Dr. Macfarlane taught blew my mind! This was an excellent course and much needed to round out my engineering education.

#### CE 662: TRANSPORT SIMULATION AND ANALYSIS

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.

Semester	Enrolled	Student Rating (Historical)	Average GPA
Winter 2019	2	4.6 (4.3)	3.70
Winter 2020	3	5.0 - 5.0 (4.4)	3.00
Winter 2022	7	3.3 - 5.0 (4.3)	3.44

Selected student comments:

- Dr. Macfarlane is really patient in explaining the challenging concepts, and he will find the simple way to describe or teach twice to make sure we totally understand.
- Always came well prepared to lectures. It was obvious that he had put time, thought, and effort into preparing an engaging and effective lecture, every time.
- The instructor expected us to use critical thinking and to not just go for the "right" answer without thought about it. I think this is a valuable way of building students' character.
- The course was well organized because it was clearly explained how new material builds from the previous subject. It was easy to see the progression of how each lecture builds from the last and prepares you for the next.

#### CE 694R: ADVANCED CHOICE MODELING

An advanced graduate course in discrete choice modeling. Theory of choice models, including estimation and validation techniques. Mode choice models for work and non-work trip purposes using multinomial and nested logit models.

Semester	Enrolled	Student Rating (Historical)	Average GPA
Winter 2021	5	4.0 - 5.0 ( )	3.48

#### GRADUATE MENTORING

Students mentored as graduate committee chair (9 total, 4 current):

9 Emily Blanchard. MS scheduled August 2024.

8 Hayden Atchley. MS scheduled December 2023.

- 7 Daniel Jarvis. MS scheduled December 2023.
- 6 Natalie Gray. MS scheduled April 2023.
- 5 Emma Stucki, *Evaluating equitable access to nutrition in Utah*. MS granted December 2022.
- 4 Gillian Riches, *Transforming GPS points to daily activities using simultaneously optimized DBSCAN-TE parameters*. MS granted December 2022.
- 3 Christopher Day, *Forecasting ride-hailing across multiple model frameworks*. MS granted December 2022.
- 2 Max Barnes, *Resiliency of Utah's road network: a logit-based approach*. MS granted December 2021.
- 1 Nate Lant, *Estimation and simulation of daily activity patterns for individuals using wheelchairs*. MS granted June 2021.

Students mentored as graduate committee member (15 total, 5 current, 2 non-BYU):

- 15 Joel Hyer. MS scheduled December 2023.
- 14 Benjamin Meek. MS scheduled April 2023.
- 13 Mylan Cook. Ph.D. in Physics proposed May 2022.
- 12 Tomas Barriga. MS scheduled April 2023.
- 11 Wang Bangyu (Bruce). Ph.D. proposed May 2021.
- 10 Cory Ward, *An evaluation of the safe speed limit setting procedure and tool for Utah* (Project). MS granted December 2022.
- 9 Samantha Lau, *Analysis of using V2X DSRC equipped snowplows to request signal preemption*. MS granted August 2022.
- 8 Tanner Daines, *Evaluating ramp meter delay in Utah*. MS granted April 2022.
- 7 Logan Bennett, *Analysis of benefits of an expansion to UDOT's incident management program*. MS granted August 2021.
- 6 Camille Lunt, *Crash analysis methodology for segments of Utah highway*. MS granted April 2021.
- 5 Chad Vickery, *Quantifying the conditioning period for geogrid-reinforced aggregate base materials through cyclic loading*. MS granted August 2020.
- 4 Michael Sheffield, *Impacts of changing the transit signal priority requesting threshold on bus performance and general traffic: a sensitivity analysis*. MS granted June 2020.
- 3 Michael Adamson, *An analysis of decision boundaries for left-turn treatments*. MS granted April 2019.

- 2 Nico Boyd, *Accessibility to urban parks and health outcomes on the neighborhood level*. MS granted August 2018 (at Georgia Tech).
  - 1 Zhang Bingling, *Friendship influences on air travel: a social autoregressive analysis*. MS granted August 2014 (at Georgia Tech).
- 

UNDERGRADUATE  
MENTORING

Students mentored on funded research projects (25 total):

- 23 Harrison Holdsworth, undergraduate research assistant in demand microsimulation (2021 - 2022).
- 22 Brynn Wooley, undergraduate research assistant in demand microsimulation (2022 - )
- 21 Jeremy Raine, undergraduate research assistant in community resources (2022 - 2022). Majoring in Psychology.
- 20 Jonathan Orton, undergraduate research assistant in e-scooters and pavements (2022 - 2022).
- 19 Dylan Apelu, undergraduate research assistant in e-scooters and pavements (2021 - ).
- 18 Hayden Atchley, undergraduate research assistant in demand microsimulation (2020 - 2022). Now MS student at BYU.
- 17 Nicole Adams, undergraduate research assistant in e-scooters and pavements (2021 - ).
- 16 Liv Neeley, undergraduate research assistant in e-scooters and pavements (2021 - 2022).
- 15 Kaeli Monahan, undergraduate research assistant in community resources and passive data (2020 - 2022). Now BS student in Mechanical Engineering at BYU.
- 14 Shannon Anderson, undergraduate research assistant in V2X data, jointly mentored with Grant Schultz (2020 - 2022).
- 13 Corey Ward, undergraduate research assistant in ramp meter evaluation, jointly mentored with Grant Schultz (2020 - 2021). Now MS student at BYU.
- 12 Michael Copley, undergraduate research assistant in third-party passive data (2018 - 2021). Now MS student at University of Illinois.
- 11 James Umphress, undergraduate research assistant in ramp meters (2020-2021), jointly mentored with Grant Schultz. Now MS student at Oregon State University.
- 10 Christopher Day, undergraduate research assistant in demand microsimulation (2020 - 2021). Now MS student at BYU.
- 9 Emma Stucki, undergraduate research assistant in community resources (2020 - 2021). Now MS student at BYU.
- 8 Gillian Martin Riches, undergraduate research assistant in community resources (2020 - 2021). Now MS student at BYU.

- 7 Natalie Gray, undergraduate research assistant in network resiliency (2019 - 2021). Now MS student at BYU.
- 6 Max Barnes, undergraduate research assistant in network resiliency (2019 - 2020). Now working as an engineering consultant, after completing MS at BYU.
- 5 Kim Munseok, undergraduate research assistant in demand microsimulation (2020 - 2021). Now BS student in computer science at BYU.
- 4 Christian Hunter, undergraduate research assistant in demand microsimulation (2018 - 2019). Completed MS at University of Texas at Austin.
- 3 Christian Vanderhoeven, undergraduate research assistant in demand microsimulation (2019). Completed MS at University of Washington.
- 2 Hayden Anderson, undergraduate research assistant in e-scooters (2019 - 2020). Completed MS at the University of California, Davis.
- 1 Emily Andrus, undergraduate research assistant in signal performance data, jointly mentored with Grant Schultz (2019). Now working as an engineering consultant.
- 0 Sabrina McCuen, undergraduate research assistant in signal performance data, jointly mentored with Grant Schultz (2019 - 2020). Now working as an engineering consultant.

Students mentored as civil engineering capstone team advisor (19 total):

- 2022-2023 SR-140 Corridor alternatives. Sponsored by Bluffdale City. Students: Clinton Childers, Robert Mickelson, Trevor Mickelson, and Joseph Wells.
- 2021-2022 BYU household travel survey. Sponsored by BYU Sustainability Office. Students: Nicole Adams, Hayden Atchley, Kyle Leatham, and Daniel Jarvis.
- 2020-2021 Forecasting demand for future FrontRunner scenarios. Sponsored by Utah Transit Authority. Students: Gillian Martin Riches, Tomas Barriga, Landon Pratt, and Cole Larsen.
- 2019-2020 UTA microtransit pilot evaluation. Sponsored by Utah Transit Authority. Students: Christian Hunter, Austin Martinez, and Elizabeth Smith.
- 2018-2019 Demand for wheelchair-accessible vehicles. Sponsored by Utah Transit Authority. Students: Nate Lant, Byron Yates, Cody Irons, and Matthew Strong.

---

## AWARDS AND HONORS

**MOST INFLUENTIAL FACULTY** Given to the faculty member in the department whom graduating seniors name as the most influential on their undergraduate education. Awarded by 2022 graduating class.

**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.

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.

JIM MCGEE MEMORIAL SCHOLARSHIP Cash award from the Georgia chapter of the American Society of Highway Engineers, one of two awards in 2011.

GEORGIA DEPARTMENT OF TRANSPORTATION SCHOLARSHIP One of ten cash awards in 2010 to students from the southeastern United States.

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

Registered professional engineer in North Carolina, license #044518

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 and editor of [tfresource.org](http://tfresource.org).
- AMS20: Economics and Land Development Member of the committee (2014 — ). formerly standing committee on transportation and land use.
- Young Members Council (2019 — 2021). Planning and Environment subcommittee chair.

Reviewer for the following journals:

- Transportation Research Part A: Policy and Practice
- Transportation Research Record
- Environment and Planning B: Urban Analytics and City Science
- International Journal of Sustainable Transport
- Journal of Public Transportation

Member of the following professional organizations:

- Zephyr Foundation (2020 - ).
  - Institute of Transportation Engineers (2009-2013, 2018-2020)
  - Tau Beta Pi (Utah  $\beta$  '09).
  - Young Professionals in Transportation (2013-2018); organizing co-chair of Triangle NC chapter.
  - American Public Transportation Association scholar task force (2011 - 2013).
-

## MEDIA

Carlisle, N. (2022). Here's what it might cost to ride the Little Cottonwood Canyon gondola. *Fox 13 Salt Lake City*. Quoted expert opinion. November 16th, 2022. <https://www.fox13now.com/news/fox-13-investigates/heres-what-it-might-cost-to-ride-the-little-cottonwood-canyon-gondola>.

McCann, A. (2021). Best and worst cities to drive in. *WalletHub*. Quoted expert opinion. August 31, 2021. [https://wallethub.com/edu/best-worst-cities-to-drive-in/13964#expert=Gregory\\_Macfarlane](https://wallethub.com/edu/best-worst-cities-to-drive-in/13964#expert=Gregory_Macfarlane)

**Macfarlane, G.S..** (2020). No, Utah County does not have to choose between preservation and growth. *Deseret News*. Guest Opinion, August 21, 2020. <https://www.deseret.com/opinion/2020/8/21/21376479/>

---

## INTERNAL CITIZENSHIP

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

Department undergraduate committee Chair (2023 — ), Member (2021 — ). Leading curriculum revisions for civil engineering program.

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