

# *Curriculum Vitae*

## **Gregory D. Erhardt, PhD, PE**

Assistant Professor  
Department of Civil Engineering  
University of Kentucky  
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### **Education**

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- 2016      **University College London**  
Ph.D. Centre for Advanced Spatial Analysis  
*Thesis: Fusion of Large Continuously Collected Data Sources: Understanding Travel Demand Trends and Measuring Transport Project Impacts* under the supervision of Michael Batty and Elsa Arcaute. Examined by Peter Jones and Andrew Daly.
- 2002      **Northwestern University**  
M.S. Civil Engineering – Transportation Systems Planning and Analysis  
*Thesis: Modeling the Choice to Use Toll and High-Occupancy Vehicle Facilities* under the supervision of Frank Koppelman.
- 2000      **Cornell University**  
B.S. Civil and Environmental Engineering, Cum Laude

### **Professional Experience**

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- 2020-      Associate Director, T-SCORE Center – A Tier 1 University Transportation Center
- 2016-      Assistant Professor of Civil Engineering, University of Kentucky, Lexington, Kentucky
- 2013-2016 Senior Analyst, RAND Europe, Cambridge, United Kingdom
- 2005-2013 Senior Transportation Modeler, Parsons Brinckerhoff, San Francisco, California
- 2002-2005 Transportation Modeler, Denver Regional Council of Governments, Denver, Colorado
- 2000      Traffic Engineer, S.R.F. & Associates, Rochester, New York
- 1998-1999 Travel Forecasting Intern, Parsons Brinckerhoff, Herndon, Virginia

### **Honors and Awards**

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- 2018      Certificate of Appreciation in recognition of leadership in advancing the science of travel demand modeling, Committee on Transportation Demand Forecasting (ADB40), Transportation Research Board

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- 2016 Fellow, Chan Wui & Yunyin Rising Star Workshop for Early Career Professionals in Transportation
- 2014 Graduate Research Scholarship, University College London (~£40,000)
- 2014 Overseas Research Scholarship, University College London (~£24,000)
- 2013 Best Paper Presentation at the 14th Transportation Planning Applications Conference (Erhardt, et al. 2013)
- 2013 Best Paper Presentation at the 14th Transportation Planning Applications Conference (Hood, et al. 2014)
- 2012 Best Presentation at Futura 2012 (Clymer and Erhardt 2012)
- 2011 Best Presentation at Futura 2011 (Erhardt, et al. 2012)
- 2009 Best Paper Presentation at the 12th Transportation Planning Applications Conference (Sall, et al. 2010)
- 2008 Professional Associate, Parsons Brinckerhoff
- 2000 Walter P. Murphy Engineering Fellowship, Northwestern University (~\$37,000)

### **For Students Supervised**

- 2020 Jawad Hoque, William (Bill) Seymour Transportation Engineering Scholarship
- 2019 Jawad Hoque, 1<sup>st</sup> Place Team, Southern District of the Institute of Transportation Engineers (SDITE) William H. Temple Traffic Bowl (\$3,000); 2<sup>nd</sup> Place Team, Institute of Transportation Engineers National Traffic Bowl
- 2018 Jawad Hoque, 2<sup>nd</sup> Place Team, Southern District of the Institute of Transportation Engineers (SDITE) William H. Temple Traffic Bowl
- 2018 Sneha Roy, 3<sup>rd</sup> Place Student Poster Competition, Commonwealth Computational Summit
- 2018 Sneha Roy, Kentucky Section of the Institute of Transportation Engineers (KYSITE) Scholarship (\$2,500)
- 2018 Sneha Roy, Lifesavers Traffic Safety Scholar (\$1,000)
- 2017-2018 Alex Mucci, Dwight David Eisenhower Transportation Fellowship (\$5,000)
- 2017 Alex Mucci, 2<sup>nd</sup> Place, Three-Minute Thesis Competition, Southeast Transportation Center Student Spotlight

### **Professional Licenses**

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- 2017- Registered Professional Engineer, Kentucky License 32652
  - 2005- Registered Professional Engineer, Colorado License 39312

### **Publications**

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#### **Peer Reviewed Journal Articles**

Published or In-Press

Underlined: University of Kentucky student directly supervised

1. Roy, S., Cooper, D., Mucci, R.A., Sana, B., Chen, M., Castiglione, J., **Erhardt, G.D.** (2020) “Why is Traffic Congestion Getting Worse? A Decomposition of the Contributors to Growing Congestion in San Francisco and Determining the Role of TNCs”, *Case Studies on Transport Policy*, Vol 8, No. 4.
2. **Erhardt, G.D.**, Roy, S., Cooper, D., Sana, B., Chen, M., Castiglione, J. (2019) “Do Transportation Network Companies Decrease or Increase Congestion?”, *Science Advances*, Vol 5, No. 5.
3. Francis, D., Tsang, F., **Erhardt, G.D.** (2019) “Estimating the Cost and Utility of Statewide Travel Models Using Scenario-Based Interviews”, *Transportation Research Record*, No. 2673.
4. Mucci, A. and **Erhardt, G.D.** (2018) “Evaluating the ability of transit direct ridership models to forecast medium-term ridership changes: Evidence from San Francisco”, *Transportation Research Record*, No. 2672.
5. **Erhardt, G.D.** (2017) “Conceptual Models of the Effect of Information and Communications Technology on Long-Distance Travel Demand”, *Transportation Research Record*, No. 2658.
6. **Erhardt, G.D.** (2016) “How Smart is Your Smart Card? Evaluating Transit Smart Card Data with Privacy Restrictions and Limited Penetration Rates”, *Transportation Research Record*, No. 2544.
7. **Erhardt, G.D.**, (2016) Patil, S., Light, T., Tsang, F., Burge, P., Sorenson, P, Zmud, M. “Understanding the Potential of Variable Tolling to Smooth Congestion on Downstream Facilities: Applications of a Joint Time-of-Day and Route Choice Model”, *Transportation Research Record*, No. 2563.
8. Hood, J., **Erhardt, G.**, Frazier, C., Schenk, A. (2014) “Estimating Emissions Benefits of Bicycle Facilities with Stand-Alone Software Tools”, *Transportation Research Record*, No. 2430. Selected from the 14th Transportation Planning Applications Conference Best Paper Presentations in Columbus, Ohio, May 2013.
9. **Erhardt, G.D.**, Freedman, J., Stryker, A., Fujioka, H., Anderson, R. (2007) “The Ohio Long Distance Travel Model”, *Transportation Research Record*, No. 2003.
10. **Erhardt, G.D.**, Kurth, D.L., Sabina, E.E., Myung, S. (2005) “Market-Based Framework for Forecasting Parking Cost in Traditional and Microsimulation Modeling Applications”, *Transportation Research Record*, No. 1921.
11. **Erhardt, G.D.**, Koppelman, F.S., Freedman, J., Davidson, W.A., Mullins, A. (2003) “Modeling the Choice to Use Toll and High-Occupancy Vehicle Facilities”, *Transportation Research Record*, No. 1854.

#### In-Review

1. **Erhardt, G.D.**, Mucci, R.A., Cooper, D., Sana, B., Chen, M., Castiglione, J. (in-review) “Do transportation network companies increase or decrease transit ridership? Empirical evidence from San Francisco”, in review by *Transportation*.
2. Hoque, J.M., **Erhardt, G.D.**, Schmitt, D., Chen, M., Chaudhary, A., Wachs, M., Souleyrette, R. (in-review) “The Changing Accuracy of Traffic Forecasts”, in review by *Transportation*.
3. Hoque, J.M., **Erhardt, G.D.**, Schmitt, D., Chen, M., Wachs, M., (in-review) “Estimating the Uncertainty of Traffic Forecasts from Their Historical Accuracy”, in review by *Transportation Research Part A: Policy and Practice*.
4. Sana, B., Zhang, X., Castiglione, J., Chen, M., **Erhardt, G.D.**, (in-review) “Using Big Data and Interactive Maps for Long-term and COVID-era Congestion Monitoring in San Francisco”, in review by *Transportation Research Record*.

#### Book Chapters

Refereed Full Chapter (Minimum of 2 Reviewers)

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1. **Erhardt, G.D.**, Batty, M., Arcaute, E. (2018) “Recommendations for Big Data Archival Programs at Transportation Agencies”. In *Big Data for Urban and Regional Science*, edited by L.A. Schintler and Z. Chen, 292-303, Routledge.
2. **Erhardt, G.D.**, Lock, O., Arcaute, E., Batty, M. (2017) “A Big Data Mashing Tool for Measuring Transit System Performance”. In *Seeing Cities Through Big Data - Research, Methods and Applications in Urban Informatics*, edited by V. Thakuriah, N. Tilahun, and M. Zellner, 257–78. Springer Geography. Springer International Publishing.

### Conference Proceedings

With Full Papers Review (Minimum of 2 Reviewers)

1. Graehler, M., Mucci, R.A., **Erhardt, G.D.** (2019) “Understanding the Recent Transit Ridership Decline in Major US Cities: Service Cuts or Emerging Modes?” Proceedings of the 98<sup>th</sup> Transportation Research Board Annual Meeting, Washington, D.C.
2. Mucci, R.A., Sagar, S., **Erhardt, G.D.**, Stamatiadis, N. (2019) “Understanding Factors Influencing Small to Mid-City Bike Share Ridership: A Direct Ridership Analysis” Proceedings of the 98<sup>th</sup> Transportation Research Board Annual Meeting, Washington, D.C.
3. Castiglione, J., Roy, S., Cooper, D., Sana, B., Chen, M., **Erhardt, G.D.** (2019) “The Effect of Transportation Network Companies (TNCs) on Congestion in San Francisco”, Proceedings of the 98<sup>th</sup> Transportation Research Board Annual Meeting, Washington, D.C.
4. **Erhardt, G.D.**, Rizzo, L. (2018) “Evaluating the Biases and Sample Size Implications of Multi-Day GPS-Enabled Household Travel Surveys”, *Transportation Research Procedia*, No 32.
5. **Erhardt, G.D.**, Dennett, A. (2018) “Understanding the Role and Relevance of the Census in a Changing Transportation Data Landscape”, *Transportation Research Circular E-C233*, Transportation Research Board. Commissioned paper on Keeping the Census Data Relevant for the 2017 Transportation Research Board Conference on Applying Census Data for Transportation, Kansas City, Missouri.
6. **Erhardt, G.D.** (2012) “Evaluating Travel Markets in a Statewide Model”, Proceedings of the 91<sup>st</sup> Transportation Research Board Annual Meeting, Washington, D.C.
7. Sall, E., Bent, E., Koehler, J., Charlton, B., **Erhardt, G.** (2010) “Evaluating Regional Pricing Strategies in San Francisco: Application of the SFCTA Activity-Based Regional Pricing Model”, Proceedings of the 89<sup>th</sup> Transportation Research Board Annual Meeting, Washington, D.C. Selected from the 12th Transportation Planning Applications Conference Best Paper Presentations in Houston, Texas, May 2009.

With Abstract Review (Minimum of 2 Reviewers)

1. Lock, O., **Erhardt, G.D.**, (2015) “Keeping Track—The Fusion of Large, Automatically Collected Transport Data in Capturing Long-Term System Change”, Proceedings of the Australian Institute of Traffic Planning and Management (AITPM) National Traffic and Transport Conference, Brisbane, Australia.
2. **Erhardt, G.D.**, Sall, E.A., Zorn, L., Tischler, D., Alsup, R., Nassir, N. (2013) “Development and Application of a Dynamic Traffic Assignment Model for San Francisco”, presented at the 41<sup>st</sup> European Transport Conference, Frankfurt, Germany.
3. Sabina, E.E., **Erhardt, G.D.**, Rossi, T.F., Coil, J. (2006) “Processing the Denver Travel Survey to Support Tour-Based Modeling: Methods, Data and Lessons Learned”, Proceedings of the Transportation Research Board Innovations in Travel Modeling Conference, Austin, Texas.

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## Research Reports

### With Panel Review or External Peer Review

1. Watkins, K.E., Berrebi, S., **Erhardt, G.**, Brakewood, C., (2020) *Recent Decline in Public Transportation Ridership: Analysis, Causes, Responses*, Interim Report: Phase I, Transit Cooperative Research Program Project A-43, Transportation Research Board, Washington, D.C.
2. **Erhardt, G.D.**, Schmitt, D., Hoque, J., Chaudhary, A., Rapolu, S., Kim, K., Weller, S., Sall, E., Chen, M., Souleyrette, R., Wachs, M. (2020), *Traffic Forecasting Accuracy Assessment Research*, National Cooperative Highway Research Program Report 934, Transportation Research Board, Washington, D.C.
3. Zhang, X., Van Dyke, C., **Erhardt, G.**, Chen, M. (2019) *Practices on Acquiring Proprietary Data for Transportation Applications*, National Cooperative Highway Research Program Synthesis 541, Transportation Research Board, Washington, D.C.
4. **Erhardt, G.D.**, Tsang, F., Francis, D., (2018) *Assessing the Utility and Costs of Statewide Travel Demand Models*, National Cooperative Highway Research Program Project 8-36C, Task 137, Transportation Research Board, Washington, D.C.
5. Rizzo, L., **Erhardt, G.D.**, (2016) *Sample Size Implications of Multi-Day GPS-Enabled Household Travel Surveys*, Research Results Digest 400, National Cooperative Highway Research Program, Transportation Research Board, Washington, D.C.
6. Donnelly, R., **Erhardt, G.D.**, Moeckel, R., Davidson, W.A. (2010) “Advanced Practices in Travel Forecasting”, *NCHRP Synthesis 406*, National Cooperative Highway Research Program, Transportation Research Board, Washington, D.C.

### Without Formal Review

7. Joan Walker, Daniel Chatman, Ricardo Daziano, **Gregory Erhardt**, Song Gao, Hani Mahmassani, David Ory, Elizabeth Sall, Chandra Bhat, Nicholas Chim, Clint Daniels, Brian Gardner, Josie Kressner, Eric Miller, Francisco Pereira, Rosella Picado, Stephane Hess, Pat Mokhtarian, Kay Axhausen, Elias Bareinboim, Moshe Ben-Akiva, Timothy Brathwaite, Billy Charlton, Siyu Chen, Giovanni Circella, Feras El Zarwi, Marta Gonzalez, Mustapha Harb, Amine Mahmassani, Daniel McFadden, Rolf Moekel, Alexei Pozdnukhov, Maddie Sheehan, Aruna Sivakumar, Jennifer Weeks, and Jinhua Zhao. “Advancing the Science of Travel Demand Forecasting” National Science Foundation Project Report, December 2019.
8. San Francisco County Transportation Authority *Congestion Management Program 2019*, Final Report, project team includes Zhang, X., Chen, M., Wilson, M.R., Sana, B., Cooper, D., Castiglione, J., **Erhardt, G.** (Principal Investigator), December 2019.
9. RSG “Analysis of the Value of Multiple Days of Travel Survey Data Collection,” prepared for California MPO Partners, prepared by Bradley, M., **Erhardt, G.D.**, Coy, C., June 20, 2019.
10. San Francisco County Transportation Authority *TNCs & Congestion*, project team includes Castiglione, J., Cooper, D., Sana, B., Tischler, D., Chang, T., **Erhardt, G.** (Principal Investigator), Roy, S., Chen, M., Mucci, A., San Francisco, CA, 2018.
11. Light, T., Patil, S., **Erhardt, G.D.**, Tsang, F., Burge, P., Sorensen, P., Zmud, M. “The Impact of Adopting Time-of-Day Tolling: Case Study of 183A in Austin, Texas”, RAND Corporation, RR-969-CTRMA, Santa Monica, CA, 2015.

## Editorials

### Without Formal Review

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1. **Erhardt, G.D.** (2020) “A Perspective on Our Role as Transportation Modelers”. *The Right Path Newsletter*, International Professional Association for Transport & Health, March 2020.
2. Akar, G. **Erhardt, G.D.**, (2018) “User Response to Autonomous Vehicles and Emerging Mobility Systems”. *Transportation*, No. 45, 1603.

## Presentations and Conference Participation

Excludes the presentation of papers listed in the publications or conference proceedings section. All presentations made by Dr. Erhardt unless otherwise noted.

### Plenary Sessions

1. **Erhardt, G.D.**, “Perspectives on Uncertainty”, scheduled for presentation at opening plenary session of Modelling World, Birmingham, United Kingdom (online due to COVID-19), October 2020.
2. Schmitt, D., Hoque, J., Sall, E., **Erhardt, G.D.**, “Forecasting Accuracy: Implementing New Practices”, presented by David Schmitt, Jawad Hoque and Elizabeth Sall at the closing plenary session of the Transportation Research Board National Transportation Planning Applications Conference, Portland, Oregon, June 2019.
3. **Erhardt, G.** “Data and Methods Fusion in a New TDM Landscape”, interactive plenary panelist with J. Kressner and D. Ory, moderated by R. Donnelly, 7<sup>th</sup> International Conference on Innovations in Travel Modeling (ITM2018), Atlanta, Georgia, June 2018.

### Conference Presentations: Lectern Sessions

1. Roy, S., **Erhardt, G.D.**, “Exploring the relationship between the emergence of Transportation Network Companies (TNCs) and growing congestion in San Francisco”, presented by Sneha Roy at the Workshop on Doctoral Research in Transportation Modeling, 98<sup>th</sup> Transportation Research Board Annual Meeting, Washington, D.C., January 2019.
2. Tsang, F., **Erhardt, G.D.** Francis, D. “Final Results from NCHRP Project 08-36 Task 137: Assessing the Utility and Costs of Statewide Travel Demand Models”, presented by Flavia Tsang at the annual meeting of the Critical Issues in Transportation Planning Subcommittee (ADA10(3)), 98<sup>th</sup> Transportation Research Board Annual Meeting, Washington, D.C., January 2019.
3. Roy, S., Mucci, A., Brashear, J., Cooper, D., Sana, B., Tischler, D., Castiglione, J., **Erhardt, G.**, “Exploring the Relationship between the Emergence of Transportation Network Companies (TNCs) and Growing Congestion in San Francisco,” presented by Sneha Roy at the 7<sup>th</sup> International Conference on Innovations in Travel Modeling (ITM2018), Atlanta, Georgia, June 2018.
4. **Erhardt, G.**, Ory, D., Axhausen, K., Circella, G., Gao, S., Hess, S., Kressner, J., Mahmassani, H., Miller, E., Moeckel, R., Pozdnukov, A., Waddell, P., “Advancing TDM: Advancing Knowledge in a Generalizable and Testable Manner”, presented at a session on Advancing the Science of Transportation Demand Modeling, 97<sup>th</sup> Transportation Research Board Annual Meeting, Washington, D.C. , January 2018.
5. Daniels, C., Miller, E., Chatman, D., Circella, G., **Erhardt, G.**, Harb, M., Moeckel, R., Picado, R., Sall, E., Sivakumar, A., Weeks, J., “Advancing TDM: Strengthening Linkages with Policy and Planning”, presented by C. Daniels and E. Miller at a session on Advancing the Science of Transportation Demand Modeling, 97<sup>th</sup> Transportation Research Board Annual Meeting, Washington, D.C., January 2018.
6. **Erhardt, G.D.**, “Subjecting Travel Forecasting to Rigorous, Scientific Testing”, oral presentation and panelist on Model Evaluation at the National Science Foundation Workshop on Advancing the Science of Transportation Demand Forecasting, Berkeley, California., April 2017.

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7. **Erhardt, G.D.**, Rizzo, L. "Sample Size Implications of Multi-Day GPS-Enabled Household Travel Surveys: An Overview of Research Results Digest 400", oral presentation at the annual meeting of the Standing Committee on Travel Survey Methods (ABJ40), Transportation Research Board, Washington, D.C., January 2017.
8. **Erhardt, G.D.** "Update on NCHRP Project 08-36 Task 137: Assessing the Utility and Costs of Statewide Travel Demand Models", presented at the annual meeting of the Subcommittee on Statewide Modeling (Joint Subcommittee of ADA10 and ABD40), Transportation Research Board, Washington, D.C., January 2017.
9. **Erhardt, G.D.**, "Fusion of Large Continuously Collected Data Sources: Understanding Travel Demand Trends and Measuring Transport Project Impacts", presented at the workshop on Doctoral Research in Transport Modeling and Traveler Behavior, 96th Transportation Research Board Annual Meeting, Washington, D.C., January 2017.
10. **Erhardt, G.D.** "Using Continuously Collected Data for Travel Demand Trend Analysis", presented at the Ohio Travel Demand Model Users Group", Columbus, Ohio, June 2016.
11. **Erhardt, G.D.** "Using Stated Preference Data and Choice Models to Measure the Impact of Time-of-Day Tolling", presented at the Transport Modellers' Forum, London, United Kingdom, January 2015.
12. **Erhardt, G.D.** "Microsimulation in Activity-Based Travel Models: Motivation, Stochastic Variation and Opportunities", presented at the Activity-Based Modelling and Appraisal Workshop, University of Hertfordshire, United Kingdom, April 2014.
13. **Erhardt, G.**, Hood, J., Frazier, C., Schenk, A. "Using Smartphone Location Data to Estimate the Air Quality Benefits of Bicycle Infrastructure", presented at the Seminars on Land Use, Transport Models and Big Data, The Martin Centre, University of Cambridge, Cambridge, United Kingdom, November 2013.
14. **Erhardt, G.**, Weidner, T., Geraghty, F., Ship, B., Wood, H., Sawers, A., Dehghani, Y. "Traffic and Revenue Forecasting for the Ohio Turnpike Asset Evaluation", presented at the 14<sup>th</sup> Transportation Research Board National Transportation Planning Applications Conference, Columbus, Ohio, May 2013. Winner of a Best Paper Presentation Award.
15. Moeckel, R., Giaimo, G., Jiang, Z., **Erhardt, G.**, Wood, H. "Analyzing Long-Distance Truck Travel for Freight Planning", presented at the 14<sup>th</sup> Transportation Research Board National Transportation Planning Applications Conference, Columbus, Ohio, May 2013.
16. Sall, E.A., **Erhardt, G.D.**, Zorn, L., Alsup, R., Tischler, D. "Modeling Every Hill, Bus, Traffic Signal and Car – How San Francisco Collaboratively Built a Citywide Dynamic Traffic Assignment Model", presented by Ms. Sall at the 14<sup>th</sup> Transportation Research Board National Transportation Planning Applications Conference, Columbus, Ohio, May 2013.
17. Zorn, L., Sall, E.A., Tischler, D., Alsup, R., **Erhardt, G.D.** "The Codebase IS the Deliverable: Collaborative Software Development for Modelers", presented by Ms. Zorn at the 14<sup>th</sup> Transportation Research Board National Transportation Planning Applications Conference, Columbus, Ohio, May 2013.
18. **Erhardt, G.D.**, Moeckel, R., Clymer C. "Ohio's Stand-Alone Freight and Land Use Models", presented at the Ohio Travel Demand Model Users Group", Columbus, Ohio, March 2013.
19. Clymer, C., **Erhardt, G.D.** "Implementing Statewide Land Use and Freight Models in Cube Script", presented by C. Clymer at Futura 2012, Citilabs Annual International Users Conference, Palm Springs, California, November 2012. Winner of Best Presentation award.
20. **Erhardt, G.D.**, Moeckel, R. "Arizona Statewide Travel Demand Model", webinar presented at the Arizona Model Users Group, Phoenix, Arizona, 2012.
21. **Erhardt, G.D.**, Ory, D., Sarvepalli, A., Freedman, J., Hood, J., Stabler, B. "MTC's Travel Model One: Applications of an Activity-Based Model in its First Year", paper presented at the 5<sup>th</sup> Transportation

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Research Board Innovations in Travel Modeling Conference, Tampa, Florida, May 2012. Originally presented at and winner of Best Presentation award at Futura 2011: Citilabs Annual International Users Conference, Palm Springs, California, November 2011.

22. **Erhardt, G.D.**, Moeckel, R., Williams, J. “Moving Travel Models to the Next Level”, paper presented at the 3rd Transportation Research Board Innovations in Travel Modeling Conference, Tempe, Arizona, May 2010.
23. Yennamani, R., Granato, S., Giaimo, G., **Erhardt, G.** “Semi-Automated Approach to Develop Focus Area Forecasts from a Statewide Model”, presented by Mr. Yennamani at the 12th Transportation Research Board National Transportation Planning Applications Conference, Houston, Texas, May 2009.
24. **Erhardt, G.D.**, Charlton, B., Freedman, J., Castiglione, J., Bradley, M., Linesch, N. “Modeling Congestion Pricing in San Francisco”, presented at the Ohio Travel Demand Model Users Group”, Columbus, Ohio, September 2008.
25. **Erhardt, G.D.**, Charlton, B., Castiglione, J., Freedman, J., Bradley, M. “Enhancement and Application of an Activity-Based Travel Model for Congestion Pricing”, paper presented at the Transportation Research Board Innovations in Travel Modeling Conference, Portland, Oregon, June 2008.
26. **Erhardt, G.D.**, Freedman, J. “Calibration and Application of the Ohio Long Distance Travel Model”, presented at the 11th Transportation Research Board National Transportation Planning Applications Conference, Daytona Beach, Florida, May 2007.
27. Picado, R., Freedman, J., Stryker, A., **Erhardt, G.D.**, Cohen, O. “The Ohio Short Distance Travel Model”, presented by Dr. Picado at the 11th Transportation Research Board National Transportation Planning Applications Conference, Daytona Beach, Florida, May 2007.

#### **Conference Participation: Poster Sessions**

1. Hoque, J.M., **Erhardt, G.** “Quantifying the Inherent Uncertainty in Traffic Forecasts Using Quantile Regression Methods,” poster presented by Jawad Hoque at the Commonwealth Computational Summit, Lexington, Kentucky, October 2019.
2. Roy, S., Cooper, D., Sana, B., Chen, M., Castiglione, J., **Erhardt, G.D.** “Quantifying the Impact of Transportation Network Companies on Traffic Congestion in San Francisco using Big Data”, poster presented by Sneha Roy at the Commonwealth Computational Summit, Lexington, Kentucky, June 2018. 3<sup>rd</sup> Place in Student Poster Competition.

#### **Conference Participation: Invited Speaker and Panelist**

1. **Erhardt, G.**, “Opportunities Using both Parallel and Fused Data Sources”, Panel on the Intersection of Survey and Passive Data, Zephyr Virtual Learning Sessions (online), September 2020.
2. Invited participant in the Transportation Research Board and Federal Highway Administration Emerging Trends Symposium on “Technology Opportunities for Regional Mobility,” Washington, D.C., November 2019.
3. Schmitt, D., **Erhardt, G.D.** “Interim Findings from NCHRP Project 8-110, Traffic Forecasting Accuracy”, speaker and interactive panelist at Workshop 1061 on “Progress in Improving Travel Forecasting Accuracy”, 98<sup>th</sup> Transportation Research Board Annual Meeting, Washington, D.C., January 2019.
4. **Erhardt, G.D.**, Castiglione, J. “Empirical Evidence from San Francisco”, speaker and interactive panelist at interactive session on “Do TNCs Increase or Decrease Congestion”, 98<sup>th</sup> Transportation Research Board Annual Meeting, Washington, D.C., January 2019.

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5. **Erhardt, G.D.** “Advances in Surveys and Passive Data – Data Fusion”, speaker and interactive panelist at Workshop 1009 on “‘Big’ Solutions to ‘little’ Survey Problems: Travel Surveys, Passive Data, Visualization and More”, 98<sup>th</sup> Transportation Research Board Annual Meeting, Washington, D.C., January 2019.

### **Invited Seminars**

1. **Erhardt, G.D., Roy, S., Mucci, R.A.,** Chen, M., Cooper, D., Sana, B., Tischler, D., Castiglione, J., “Using Big Data to Quantify the Effect of TNCs on Transit Ridership and Congestion”, presented at the Alabama Transportation Institute Seminar Series, University of Alabama, November 2019.
2. **Erhardt, G.D., Roy, S., Mucci, R.A.,** Chen, M., Cooper, D., Sana, B., Tischler, D., Castiglione, J., “Do Transportation Network Companies Decrease or Increase Congestion”, presented at the Congestion Management Committee of the Lexington Area Metropolitan Planning Organization, August 2019.
3. **Erhardt, G.D., Roy, S., Mucci, R.A.,** Chen, M., Cooper, D., Sana, B., Tischler, D., Castiglione, J., “Measuring the Effect of Uber and Lyft on Transit Ridership and Traffic Congestion”, presented at the Louisville Metro Mobility Innovation Team Meeting, May 2019.
4. **Erhardt, G.D., Graehler, M. and Mucci, R.A.,** “Ride Hailing’s Impact on Transit Ridership”, presented at the Issues and Opportunities in Micro Transit and Public Transit Series, conference call with representatives of 22 North American transit agencies, February 2019.
5. **Erhardt, G.D.,** “Using Big Data to Quantify the Effect of TNCs on Transit Ridership and Congestion”, presented at the University of Toronto Transportation Research Institute (UTTRI) Seminar Series, Ontario, Canada, October 2018.
6. **Erhardt, G.D.,** “Measuring the effect of Uber and Lyft on traffic congestion and transit ridership”, presented at the Martin School of Public Policy Seminar Series, University of Kentucky, Lexington, Kentucky, September 2018.
7. **Erhardt, G.D.** “Activity-Based Travel Models and Big Data as Tools for Complementing and Extending UK Research Strengths”, presented at the Department of Civil Engineering, University of Kentucky, Lexington, Kentucky, November 2015.
8. **Erhardt, G.D.** “Back to the Data: From Data-Driven Travel Models to Theory-Driven Travel Models and Back”, presented at the Urban Big Data Centre, University of Glasgow, United Kingdom, June 2015.
9. **Erhardt, G.D.,** “An Overview of the Denver Region’s Ozone Early Action Compact”, presented at Metropolitan State University of Denver, Denver, Colorado, 2004.

### **Webinars**

1. **Erhardt, G.D., Schmitt, D., Hoque, J.,** Chen, M. “How Accurate are Traffic Forecasts?”, Transportation Research Board Webinar, October 2020.
2. **Erhardt, G., Hoque, J.,** Engelberg, D., Copperman, R., Weidner, T. “Prospective and Retrospective Views of Uncertainty in Travel Forecasting”, Zephyr Virtual Sessions (online), June 2020.

### **Workshops Organized and Sessions Chaired**

1. Presiding Officer for Travel Demand Forecasting (ADB40) Poster Session, 98<sup>th</sup> Transportation Research Board Annual Meeting, Washington, D.C., January 2019.

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2. Presiding Officer for Parallel Session TS1 “The True Theory of Modeling”, 7<sup>th</sup> International Conference on Innovations in Travel Modeling (ITM2018), Atlanta, Georgia, June 2018.
3. Sall, E., Ory, D., **Erhardt, G.**, Charlton, B., Walker, J. and Gardner, B. "From Ad-hoc to Organized: Writing the Roadmap for Improving Travel Analysis Methods", Workshop 162 at the 96<sup>th</sup> Transportation Research Board Annual Meeting, Washington, D.C., January 2017.
4. Presiding Officer for Session 591 “You Have a Choice: Choice Model Estimation” at the 89<sup>th</sup> Transportation Research Board Annual Meeting, Washington, D.C., January 2010.

## Project Funding

Since joining UK, Dr. Erhardt has secured a total of \$2,255,000 in project funding as Principal Investigator or co-Principal Investigator. Dr. Erhardt had direct budgetary responsibility for \$945,000 of that total, with \$961,000 of the contract value flowing to the University of Kentucky.

Prior to joining UK, Dr. Erhardt secured an additional \$1,608,000 in project funding as Principal Investigator or Project Manager, with direct budgetary responsibility for \$1,468,000 of that amount.

The tables below show Dr. Erhardt’s funded proposals. His project roles are summarized as follows: PI – Principal Investigator for the project as a whole; PI (UK) – the lead investigator at UK, where UK is a sub-recipient to another organization; Co-PI – co-Principal Investigator as named on the proposal and not the lead at UK. In all instances, the project’s overall PI is listed first.

### Funded Proposals since joining UK

Year	Role	Proposal	Value		
			Total	To UK	To Erhardt
2020	PI (UK)	Watkins, K.E., Erhardt, G.D., Brakewood, C., MacFarlane, G., Hunter, M., Van Hentenryck, P., Peeta, S., Cherry, C. "Transit - Serving Communities Optimally, Responsively, and Efficiently (T-SCORE) Center, A Tier 1 University Transportation Center, US Department of Transportation	\$1,000,000	\$172,575	\$172,575
2020	Co-PI	Baker, C.E., Erhardt, G., Grant, C.E., Khamgroush, H., “Low-cost Smart Cities: Designing Affordable Smart Cities for All Communities,” National Science Foundation: Smart and Connected Communities Program.	\$150,000	\$150,000	\$31,500
		Greene, E., Bradley, M., Bricka, S., Deutch-Burgner, K., Walker, J., Erhardt, G.D., Kressner, J. “California Metropolitan Planning Organization (MPO) Cooperative Household Travel Survey” <i>Metropolitan Transportation Commission (MTC), with Southern California Association of Governments (SCAG), San Diego Association of Governments (SANDAG) and Sacramento Area Association of Governments (SACOG)</i> . On-call contract limit of \$1,160,000.			
2019	PI (UK)	Task Order 1: Multi-day weighting methods research	\$5,600	\$5,600	\$5,600
2018	PI	Erhardt, G.D., Chen, M., “Performance Monitoring and Analysis Services,” San Francisco County Transportation Authority.	\$99,968	\$49,908	\$99,968
2018	PI (UK)	Watkins, K.E., Brakewood, C., Erhardt, G.D., Hemily, B., Kressner, J., "TCRP Project A-43: Recent Decline in Public Transportation Ridership: Analysis, Causes, Responses", <i>Transit Cooperative Research Program, Transportation Research Board</i> .	\$400,000	\$75,796	\$75,796

Underlined: University of Kentucky student directly supervised

2017	Co-PI	Chen, M. Erhardt, G.D. “NCHRP Synthesis 20-05 Topic 49-14 Best Practices on Acquiring Non-Traditional Data for Transportation Applications,” National Cooperative Highway Research Program, Transportation Research Board.	\$45,000	\$45,000	\$5,000
2017	PI	Erhardt, G.D., Chen, M. “Understanding the Effects of TNCs in San Francisco,” <i>San Francisco County Transportation Authority (SFCTA)</i> .	\$57,099	\$57,099	\$57,099
2017	PI	Erhardt, G.D., Dennett, A. “Understanding the Role and Relevance of the Census in a Changing Data Landscape,” commissioned paper on the topic of “Keeping the ‘Census Data’ Relevant” for the 2017 Transportation Research Board Conference on Applying Census Data for Transportation, <i>American Association of State Highway and Transportation Officials</i> . (consulting)	\$8,000		\$8,000
		Bostrom, R., Bernardin, V., Erhardt, G.D., et al. “VAR – STW – Travel Demand Modeling 2017-1,” <i>Ohio Department of Transportation</i> . On-call contract limit of \$800,000			
2017	PI (UK)	Task Order 1: ODOT Model Validation.	\$4,240	\$4,240	\$4,240
2016	PI	Erhardt, G.D., Schmitt, D., Souleyrette, R., Chen, M., Wachs, M., Sall, E., Weller, S., Kim, Y., “NCHRP Project 08-110: Traffic Forecasting Accuracy Assessment Research” <i>National Cooperative Highway Research Program (NCHRP)</i> , <i>Transportation Research Board</i> .	\$350,000	\$350,000	\$350,000
2016	PI	Erhardt, G.D., Tsang, F., “NCHRP Project 08-36C, Task 137: Assessing the Utility and Costs of Statewide Travel Demand Models” <i>National Cooperative Highway Research Program (NCHRP)</i> , <i>Transportation Research Board</i> .	\$125,000	\$51,042	\$125,000
		Freedman, J. Davidson, W.A., Erhardt, G.D., et al. “FY 2016 Transportation Behavioral Model and Data On-Call”, <i>Maricopa Association of Governments (MAG)</i> , 2016. (UK and MAG could not agree on contract terms, so work continued as consultant.) On-call contract limit of \$250,000			
2016	PI (UK)	Task Order 1: Mode Choice Model Calibration, 2016	\$7,483		\$7,483
2016	PI (UK)	Task Order 2: Skimming and TOD Factoring, 2016	\$2,493		\$2,493
<b>Total</b>			<b>\$2,254,883</b>	<b>\$961,260</b>	<b>\$944,754</b>

#### **Funded Proposals prior to joining UK**

Year	Role	Proposal	Value		
			Total	To UK	To Erhardt
2015	Co-PI	Rizzo, L, Erhardt, G.D., “NCHRP Project 08-36C, Task 123: Survey Sample Size and Weighting,” <i>National Cooperative Highway Research Program (NCHRP)</i> , <i>Transportation Research Board</i> .	\$100,000		\$30,000
2015	Co-PI	Krenzke, T., Li, J., Erhardt, G.D., “NCHRP Project 08-36C, Task 135: Addressing Margins of Error in Small Areas of Data Delivered through the American Fact Finder or the Census Transportation Planning Products Program,” <i>National Cooperative Highway Research Program (NCHRP)</i> , <i>Transportation Research Board</i> .	\$75,000		\$5,000
2013	PI	Erhardt, G.D., “Data Fusion Research Services”, <i>San Francisco County Transportation Authority</i> .	\$50,000		\$50,000

Underlined: University of Kentucky student directly supervised

2013 PI	Erhardt, G.D., Hood, J., Stabler, B., "Monterey Bay Area Bicycle Travel Demand Modeling Project, Phase 2," <i>Association of Monterey Bay Area Governments</i> .	\$125,000	\$125,000
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	Erhardt, G.D., Freedman, J., et al. "On-Call Modeling and Technology Services," <i>San Francisco County Transportation Authority</i> . On-call contract limit of \$400,000		
2013 PI	Task Order 1: South of Market Area Ramps Dynamic Traffic Assignment Model Runs	\$5,028	\$5,028
2013 PI	Task Order 2: Model Development for Treasure Island Pricing Study	\$11,328	\$11,328
2013 PI	Task Order 3: Model Application for Treasure Island Pricing Study	\$30,268	\$30,268
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	Erhardt, G.D., Willison, C., Moeckel, R. et al. "Maintain and Enhance Statewide Travel Demand Forecasting Model," <i>Ohio Department of Transportation</i> . On-call contract limit of \$300,000		
2012 PI	Task Order SMA-5: Enhancements to Freight and Spatial Models	\$244,765	\$244,765
2012 PI	Task Order SMA-6: Begin 2010 Update and On-going Support for Statewide Travel Demand Forecasting Model	\$50,369	\$50,369
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	Erhardt, G.D., Freedman, J., Davidson, W.A., et al. "On-Call Consulting Services for Transportation Model Re-Calibration," <i>Maricopa Association of Governments</i>		\$0
2011 PI	Task Order 1: Onboard Survey Data Analysis	\$34,582	\$34,582
2011 PI	Task Order 2: Time-of-Day and Destination Choice Model Revisions	\$65,462	\$65,462
2012 PI	Task Order 3: Model Calibration	\$61,180	\$61,180
2012 PI	Task Order 4: Model Validation for Base Year 2011	\$51,806	\$51,806
2013 PI	Task Order 5: Model Testing and Staff Training	\$7,080	\$7,080
2011 PI	Erhardt, G.D., Hood, J., Wolf, J., "Monterey Bay Area Bicycle Travel Demand Modeling Project," <i>Association of Monterey Bay Area Governments</i>	\$90,000	\$90,000
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	Erhardt, G.D., Willison, C., Donnelly, R., et al. "Maintain and Enhance Statewide Travel Demand Forecasting Model," <i>Ohio Department of Transportation</i> . On-call contract limit of \$250,000		
2011 PI	Task Order SMA-4: Ongoing Support for Statewide Travel Demand Forecasting Model	\$60,112	\$60,112
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	Erhardt, G.D., Freedman, J., Xyntarakis, M., "On-Call Modeling and Technology Services," <i>San Francisco County Transportation Authority</i> . On-call contract limit of \$600,000.		
2009 PI	Task Order 1: Central Subway Ridership and User Benefits Update	\$10,046	\$10,046
2009 PI	Task Order 2: Doyle Drive Diversion Impact Study	\$196,285	\$196,285
2010 PI	Task Order 3: SF-CHAMP Model Updates: DTA and Scripting	\$63,500	\$63,500
2010 PI	Task Order 4: CHAMP 4 Model Process: New Starts Analysis	\$26,109	\$26,109
2011 PI	Task Order 5: Dynamic Traffic Assignment	\$97,645	\$97,645
2012 PI	Task Order 6: Dynamic Traffic Assignment 2	\$152,482	\$152,482
<b>Total</b>		<b>\$1,608,047</b>	<b>\$0 \$1,468,047</b>

## Students Supervised

Underlined: University of Kentucky student directly supervised

### **Ph.D. Students Advised**

1. Goyal, Vedant. Expected Completion: May 2022.
2. Mucci, Alex. Dissertation Topic: “Transferrable Models of Ride-Hail Demand,” Expected completion: December 2021.
3. Hoque, Jawad. PhD Candidate. Dissertation Topic: “Assessing and Quantifying the Uncertainty in Traffic and Transit Ridership Forecasts,” Expected Completion: May 2021.
4. Roy, Sneha. Dissertation: “Quantifying the Impact of Transportation Network Companies (TNCs) on Traffic Congestion in San Francisco,” May 2019.

### **M.S. Thesis Students Advised**

1. Ivanchak, Brandon. Thesis Topic: “What effect do initial congestion conditions on urban interstate highways have on VMT elasticities with respect to lane miles?” expected completion December 2021.
2. Edmiston, Joseph. Thesis Topic: “An Analysis of Trends in Social Equity in Mass Transit Systems Using Job Accessibility,” expected completion May 2021.
3. Hoque, Jawad. Thesis Topic: “Measuring and Improving the Accuracy of Project-Level Traffic Forecasts,” May 2019.
4. Mucci, Alex. Thesis: “TNCs and Transit Ridership: Influence of Transit Ridership Trends,” Co-supervised with Dr. Mei Chen, December 2017.
5. Lock, Oliver. Thesis: “The use of automatically-collected transport data in the spatiotemporal analysis and visualization of policy change: a case study of the San Francisco Municipal Railway,” University College London, M.Res. Advanced Spatial Analysis & Visualisation, August 2014.

### **M.S. Non-Thesis Students Advised**

1. Francis, Danny. Independent Study Topic: “Estimating the Cost and Utility of Statewide Travel Models Using Scenario-Based Interviews,” December 2018.

### **Undergraduate Student Research Advised**

1. Greenway, Emily. Summer research evaluating the potential effect of climate migration on urban growth. Summer 2020.
2. Graehler, Michael. Summer research on the causes of recent transit ridership declines. Summer 2018.

### **Ph.D. Dissertation Committees**

1. Sagar, Shraddha, Dissertation Topic: “Effect of Socioeconomic and Demographic Factors on Crash Occurrence,” Expected completion: May 2020.
2. Kiriakos Amiridis, Dissertation Topic: “Crash Data Analysis in Rural Highways Utilizing 3-D Differential Geometry,” December 2018.

### **M.S. Thesis Committees**

1. Madamori, Oluwashina. Thesis: “Optimal Gateway Placement in Low-cost Smart Cities,” University of Kentucky Department of Computer Science. Expected completion: December 2019.
2. Rahman, Fahmida. Thesis: “Evaluating Probe Speed Data Quality to Improve Transportation Modeling”, May 2019.
3. Obenauf, Austin, Thesis: “Connected and Autonomous Vehicles’ Effects on Emergency Response Times”, May 2019.
4. Cambron, Aaron, Thesis: “Effect of Socioeconomic and Demographic Factors on Kentucky Crashes,” December 2018.

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5. Brashear, Jacob, Thesis: “Quantifying and Modeling Vehicle Delay Using Probe-Vehicle Data,” August 2018.
6. Sagar, Shraddha, Thesis: “Prediction of Protected-Permissive Left-Turn Phasing Crashes Based on Conflict Analysis,” December 2017.
7. Kiriakos Amiridis, Thesis: “Safety-Based Guidelines for Left-Turn Phasing Decisions with Negative Binomial Regression,” December 2016.

## Teaching

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### Teaching Responsibilities

2017-2020 (S)	CE 599: Data Science for Transportation
2016-2020 (F)	CE 331: Introduction to Transportation Engineering
2019-2020 (F)	CE 699: The Science of Cities
2018 (F)	CE 699: Advanced Transportation Modeling
2008-2013	National Highway Institute, Instructor for Course 152054: Introduction to Urban Travel Demand Forecasting.
2012	Parsons Brinckerhoff, Instructor for 3-day course on scripting in Cube software.
2012	Ohio Department of Transportation, Instructor for 5-day course in the Java programming.
2007	Ohio Department of Transportation, Instructor for 5-day course on travel model theory.
1997-2000	Cornell Outdoor Education, Teambuilding and Wilderness Survival Instructor

## Service

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### Internal Committees

1. Department of Civil Engineering Diversity and Inclusion Committee (2020-)
2. Department of Civil Engineering Research Committee (2018-2019)
3. Joint College Committee Exploring Supply Chain Degree Development, College of Engineering and Gatton College (2018-2019)
4. Department of Civil Engineering Service Committee (2016-2018, 2019-2020)
5. Department of Civil Engineering Graduate Student Recruiting Team (2017)

### External Committees

1. Transportation Planning Policy and Processes Committee (AEP10), Transportation Research Board of the National Academies (Member 2020-present)
2. Transportation Planning Applications Committee (ADB50), Transportation Research Board of the National Academies (Member 2019-2020)
3. Transportation Demand Forecasting Committee (ADB40, AEP50), Transportation Research Board of the National Academies (Member 2012-present, Young Member 2006-2012)

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4. Chair, Project Management Group for Open Science, Zephyr Foundation for Advancing Travel Analysis Methods (2018-2019)
5. Chan Wui & Yunyin Rising Star Workshop for Early Career Professionals in Transportation, Steering Committee (2017-2019)
6. Statewide Travel Demand Forecasting Subcommittee (ADA10(2)), Transportation Research Board of the National Academies (Member 2009-present)

### **Conference Planning Committees**

1. Transportation Research Board Innovations in Travel Modeling Conference Planning Committee (ITM2020)
2. mobil.TUM 2018 - International Scientific Conference on Mobility and Transport, June 13th - 14th, 2018 in Munich, Germany, International Scientific Committee
3. Southern Data Science Conference (SDSC), Program Committee, Research Track (2017-Present)

### **Editing**

1. *Transportation*. Editorial Advisory Board (2019-present).
2. *Networks and Spatial Economics*. Guest Editor with Ke Han for Special Issue on “Intersections between Mobility and Communications” in conjunction with the Chan Wui & Yunyin Rising Star Workshop (expected publication Fall 2020).
3. *Transportation*. Guest Editor with Gulsah Akar for Special Issue on “User response to autonomous vehicles and emerging mobility systems” in partnership with the Transportation Research Board Committees on Travel Behavior and Values (ADB10) and Transportation Demand Forecasting (ADB40) (2018).

### **Anonymous Reviewer**

1. *Proceedings of the National Academy of Sciences* (1 paper)
2. *International Journal of Sustainable Transportation* (1 paper)
3. *Journal of Public Transportation* (1 paper)
4. *Transportation Research Part A: Policy and Practice* (1 paper)
5. *Transportation Science* (1 paper)
6. *Transportation* (~7 papers)
7. *Transportation Research Part C: Emerging Technologies* (2 papers)
8. *Journal of Transport Geography* (2 papers)
9. *Transport Policy* (1 paper)
10. *Journal of Urban Planning and Development* (1 paper)
11. *Transportation Research Record* and Transportation Research Board Annual Meeting (8-10 papers per year, 2006-present)
12. *Sustainable Cities and Society* (1 paper)

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13. Reviewer for *Big Data for Urban and Regional Science*, edited by L.A. Schintler and Z. Chen, Routledge (2 papers)
14. Transportation Research Board Innovations in Travel Modeling (ITM) Conference (1-3 papers per conference, 2010-present)
15. European Transport Conference (10-20 abstract reviews per year, 2015-2016)
16. University of California Los Angeles (UCLA) Institute of Transportation Studies (2 proposals)
17. National Center for Sustainable Transportation (NCST), a Tier 1 University Transportation Center (UTC) (1 proposal)
18. Council of University Transportation Centers (CUTC) Student Awards (4 MS Theses, 2018)

### **Review Panels**

1. Peer Review Panel for the San Francisco/Seattle Federal Highway Administration (FHWA) Strategic Highway Research Program 2 (SHRP2) C10 Fast-Trips Dynamic Transit Assignment Project (2017)
2. Tennessee Activity-Based Model Guideline Development Committee (2016)
3. Travel Model Improvement Program Peer Review Panelist for the Anchorage Metropolitan Area Transportation Study (2004)

### **Leadership**

1. Co-lead, Travel Modeling as a Science Special Initiative, Transportation Demand Forecasting Committee (ADB40), Transportation Research Board of the National Academies (2016-2017).
2. Zephyr Foundation for Advancing Travel Analysis Methods, Instigator and Founding Stakeholder (2016-present)

### **Outreach and Community Service**

1. Judge, Future Cities Competition (2019-2020)
2. Assistant Den Leader, Cub Scout Pack 73 (2016-)

### **Media**

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1. Dr. Erhardt's participation in the Chan Wui & Yunyin Rising Star Workshop and organization of a follow-on workshop was covered by:
  - Musa, A., "Transportation ideas aim of UALR's Italy trip," *Arkansas Democrat Gazette*, September 18, 2017.
  - Kortum, K., "Exploring the Nexus of Mobility and Communications on an Ocean Crossing: The Chan Wui & Yunyin Rising Star Workshop," *TR News* 307, Jan-Feb 2017.
2. Dr. Erhardt's research report *TNCs & Congestion* was covered in at least 31 news stories. Selected articles include:
  - Said, Carolyn. "Uber, Lyft Cars Clog SF Streets, Study Says." *San Francisco Chronicle*, October 16, 2018, Front Page.

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- Fitzgerald Rodriguez, Joe. "Study: Half of SF's Increase in Traffic Congestion Due to Uber, Lyft." *The San Francisco Examiner*, Top News, October 16, 2018.
  - Brekke, Dan. "City Analysis: Uber, Lyft Are Biggest Contributors to Slowdown in S.F. Traffic." *KQED News*, October 16, 2018, Top News.
  - Chronicle Editorial Board. "Editorial: Uber, Lyft Must Work with City to Ease Traffic Congestion." *San Francisco Chronicle*, October 21, 2018.
  - Baldassari, Erin. "Uber, Lyft Responsible for Half of Growth in SF Traffic, Study Says." *San Jose Mercury News*, October 16, 2018.
3. Erhardt et al 2019 has been covered in at least 128 news stories in multiple languages, including English, Spanish, French, German, Russian and others. This paper has an Altmetric Attention Score of 1511, putting it in the top 0.02% of all research outputs, #28 of all outputs from *Science Advances* and the top 100 articles of a similar age from any publication. Selected articles include:
- Ira Flato. "A 'Shared Ride' May Be A Public Burden." *NPR Science Friday*. May 10, 2019.
  - Crespi, Sarah, Meagan Cantwell, David Grimm. "Probing the Secrets of the Feline Mind and How Uber and Lyft May Be Making Traffic Worse." *Science Podcast | AAAS*. May 9, 2019.
  - Sutherland, Mary Elizabeth. "Lyft and Uber Increase Congestion in San Francisco." *Nature Human Behaviour*, June 2019.
  - Kenneth Cukier. "Uber Traffic: Are Ride-Hailing Apps Making Congestion Worse?" *Babbage from Economist Radio*, May 8, 2019.
  - Rosen, Julia. "Uber and Lyft Have Made San Francisco's Traffic Much Worse, Study Says." *Los Angeles Times*, May 8, 2019.
  - Mary Wisniewski, and Jennifer Smith Richards. "Uber and Lyft Said Ride-Sharing Would Cut Traffic Congestion and Supplement Public Transit. But Has It Worked?" *Chicago Tribune*, June 7, 2019.
  - Singh, Seema, and Olina Banerji. "From Uber in SF to Ola in Bengaluru: Ride-Sharing's Hidden Secret." *The Ken*, May 10, 2019.
  - Kennedy, Merrit. "Uber And Lyft Caused Major Traffic Uptick In San Francisco, Study Says." *NPR*, May 8, 2019.
4. Graehler et al 2019 was covered in at least 23 news stories in multiple languages. Selected articles include:
- Schmitt, Angie. "Study: Uber and Lyft Caused U.S. Transit Decline." *Streetsblog USA*, January 22, 2019.
  - Bliss, Laura. 2019. "Another Study Blames Uber and Lyft for Public Transit's Decline." *CityLab (The Atlantic)*. January 24, 2019.
  - Millman, Zosha. 2019. "Seattle Is the Only City to Not See a Drop in Ridership. Here's What Researchers Think." *Seattle Post-Intelligencer*, January 30, 2019.
  - EFE. 2019. "Las Empresas Como Uber, Lyft o Cabify Reducen Hasta Un 1,7% El Uso Del Transporte Público | Expansión." *Expansion (blog)*. January 26, 2019.
  - Redactie. 2019. "Studie: Uber Haalt Mensen Uit Het Ov | OV-Magazine." *OV-Magazine (blog)*. February 5, 2019.
5. NCHRP Report 934 (Erhardt et al 2020) is covered in these publications:
- Ewoldsen, Beth. "Forecasting through COVID-19 Will Be Crucial for the Future of Transportation | National Academies." *TRB Blog (blog)*, May 26, 2020.
  - "TRB Looks at How Transportation May Change Due to COVID-19." *AASHTO Journal*, May 29, 2020.

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6. Beyond the coverage of specific research outputs described above, Dr. Erhardt has been asked to comment to the media more broadly on issues related to ride-hailing, congestion and transit ridership and his research has been referenced in relation to related topics. Selected articles include:
- Brown, Eliot. “The Ride-Hail Utopia That Got Stuck in Traffic.” *Wall Street Journal*, front page of Technology section. February 15, 2020.\*
  - Dungca, Nicole, Saurabh Datar, Rebecca Ostriker, Adam Vaccaro, and Andrew Ryan. 2019. “Seeing Red Part 3: Tech and Consequences. Companies like Uber, Lyft and Amazon intensify gridlock with little government pushback” *The Boston Globe*, part of the 3-part front-page “Seeing Red” series by *The Boston Globe Spotlight Team* November 21, 2019.
  - *The Economist*. “British Columbia Gives Uber a Cautious Go-Ahead,” August 1, 2019.
  - Willson, Miranda. “With Ride-Sharing Affecting Revenue, the RTC Explores New Solutions.” *Las Vegas Sun*, January 31, 2020.
  - Dobush, Grace. “Uber Has Troves of Data on How People Navigate Cities. Urban Planners Have Begged, Pleaded, and Gone to Court for Access. Will They Ever Get It?” *Marker*, September 9, 2019.
  - Fitzgerald Rodriguez, Joe. “Uber and Lyft Traffic Impacts Double SF’s Own Estimates.” *The San Francisco Examiner*, August 5, 2019.
  - Bliss, Laura. “A Post-Pandemic Reality Check for Transit Boosters.” CityLab, May 6, 2020.
  - Sparling, Hannah K. “COVID-19: Will Greater Cincinnati’s Bus Systems Ever Recover from the Coronavirus Pandemic?” *The Cincinnati Enquirer*, June 25, 2020.

## Policy

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### Policy Advice

The following efforts were conducted on a volunteer basis using personal time.

- |      |   |
|------|---|
| 2020 | Advisor to the California Governor’s Office of Planning and Research on assessing induced travel resulting from roadway capacity increases.   |
| 2019 | Technical advisor for the development of the Clean Miles Standard for transportation network companies (TNCs), California Air Resources Board |

### Policy Impact

The following are selected examples where Dr. Erhardt’s research influenced policy decisions.

- |      |  |
|------|--|
| 2019 | Section 1207 of the Senate’s draft transportation reauthorization bill directs the Secretary to compare travel demand forecasts with observed data to 1) evaluate the impacts of transportation investments, and 2) support more accurate forecasts. This section is aligned with the recommendations of NCHRP Report 934 (Erhardt et al 2020).  |
| 2018 | A co-author presented <i>TNCs &amp; Congestion</i> (SFCTA 2018) to the San Francisco Board of Supervisors sitting as the Transportation Commissioners. The chair, Supervisor Peskin, cited the report as the impetus to 1) lobby the state legislature for regulatory authority over TNCs, 2) seek voter approval for a TNC congestion mitigation tax, and 3) re-study the possibility of implementing congestion pricing. |
| 2012 | The Governor used the traffic and revenue analysis later reported in Erhardt et al 2013 (presentation) to select among financing options for the Ohio Turnpike, choosing to request \$1.5 billion in bonding authority against future toll revenue.  |
| 2011 | The California Transportation Commission approves local authority for an additional 290 miles of express (high-occupancy/toll) lanes on the basis of forecasts prepared by Mr. Erhardt (Erhardt  |

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- et al 2011 presentation). The full network would be for 570 miles of express lanes constructed over 3 decades with revenue of \$4-6 billion.
- 2010 The San Francisco County Transportation Authority studies, but does not implement, congestion pricing using Mr. Erhardt's models (Sall et al 2010, Erhardt et al 2008). In 2018, The Authority resurrects the proposal in response to the *TNCs and Congestion* report (SFCTA 2018).
- 2004 Voters in the Denver region approve the \$4 billion FasTracks rapid transit expansion, with the program evaluation using models develop in part by Mr. Erhardt.