

ZHUO YAO, PH.D.

TRANSPORTATION ENGINEER (CIVIL)

Highway Performance Monitoring System Branch
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EDUCATION

➤ Ph.D. Civil Engineering (Transportation Systems and Engineering)	University of Cincinnati	2016
➤ M.S. Planning	Beijing University of Technology	2008
➤ B.S. Architecture	Polytechnic University of the Philippines	2004

WORK EXPERIENCE

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1. **California Department of Transportation**, Sacramento, California, United States of America (2021~now)
 - *Transportation Engineer (Civil)*
 2. **California Air Resources Board**, Sacramento, California, United States of America (2014-2021)
 - *Air Pollution Specialist*
 3. **California State University Sacramento**, Sacramento, California, United States of America (2015~now)
 - *Adjunct Professor (Volunteer)*
 4. **China Resource Land Limited**, Beijing, China (2008)
 - *Project Engineer/Architect*
 5. **China International Engineering and Design Consult Co., Ltd**, Beijing, China (2006-2007)
 - *Project Engineer/Architect*
 6. **UrbanScape Design International Co., Ltd**, Beijing, China (2004-2006)
 - *Project Engineer/Architect*
 7. **B-81 Builders**, Manila, Philippines (2003-2004)
 - *Engineer Intern*

RESEARCH

PUBLICATIONS

WORKING PAPERS

- J12. **Yao, Z.**, Wei, H., Perugu, H., and Abrishami, H. A Combined Axle and Length-based Vehicle Classification Method using Image Processing Techniques. (*In preparation for Journal Submission*).
- J11. **Yao, Z.**, Wei, H., Wang, X., Liu, H., and Yang, J. Y. Towards Better Household Travel Carbon Emission Management - Scenario-based Carbon Footprint Inventory Tool for Urban Sustainable Development Decision Support. (*In preparation for Journal Submission*).

PEER REVIEWED JOURNAL PAPERS PUBLISHED

- J10. Huang, H., Ramirez, C., Conway, S., Evans, K., Chu, C., McElhaney, M., Hart, R., Kennedy, K. and **Yao, Z.** (2019). "Estimating LiDAR-detected Single Tree Diameter from Plot-level Inventory, Landsat, and Environment over a Large Heterogeneous." *Forestry: An International Journal of Forest Research*.
- J09. Huang, H., Ramirez, C., McElhaney, M., Clark, C., and **Yao, Z.** (2019). "DRAST: Quantifying Spatiotemporal Post-disturbance Recovery using Field Inventory, Tree Growth, and Remote Sensing." *Journal of Geophysical Research-Biogeosciences*.
- J08. **Yao, Z.**, Wei, H., and Perugu, H. (2017). "A Heuristic Approach for Quantifying Household Travel GHG Emissions Using GPS Survey and Spatial Correlations - The Cincinnati Case Study." *Environmental Pollution and Climate Change*.
- J07. Perugu, H., Wei, H., **Yao, Z.** (2017). "Developing high-resolution urban scale heavy-duty truck emission inventory using the data-driven truck activity model output." *Atmospheric Environment*, 155, 210-230.
- J06. **Yao, Z.**, Wei, H., Li, Z., and Corey, J. (2016). "Fuzzy C-Means Image Segmentation Approach for Axle-based Vehicle Classification." *Transportation Research Record: Journal of the Transportation Research Board*, 2595.
- J05. Perugu, H., Wei, H., **Yao, Z.** (2016). "Integrated data-driven modeling to estimate PM2.5 pollution from heavy-duty truck transportation activity over metropolitan area". *Transportation Research Part D: Transport and Environment*. Volume 46, pp.114-127.
- J04. **Yao, Z.**, Wei, H., Perugu, H., Liu, H., and Li, Z. (2014). "Sensitivity Analysis of Project Level MOVES Running Emission Rates for Light and Heavy Duty Vehicles." *Journal of Traffic and Transportation Engineering* 1 (2), 62-71.
- J03. **Yao, Z.**, Wei, H., Li, Z., Ma, T., Liu, H., and Yang, J. Y. (2013). "Developing Operating Mode Distribution Inputs for MOVES with a Computer Vision-Based Vehicle Data Collector." *Transportation Research Record: Journal of the Transportation Research Board*, 2340, 49-58.
- J02. Li, Z., Wei, H., **Yao, Z.**, Xiong, H. and Yan, X. (2013). "Optimized Advance Detector Configuration for Option Zone Protection at High-Speed Signalized Intersections." *Transportation Research Record: Journal of the Transportation Research Board*, 2355, 60-72.
- J01. Han, L., and **Yao, Z.**, (2005). "Railway Construction and Urban Development in France." *Architectural Creation*, Vol. 10, Doi:10.3969/j.issn.1004-8537.2005.10.007

PEER REVIEWED CONFERENCE PAPERS

- C25. Wei, H., Abrishami, H. and **Yao, Z.**, (2020). "Image Processing Technique with Gaussian Mixture Models for Enhancing Length-Based and Axle-Based Vehicle Classification." *99th Transportation Research Board Annual Meeting*. Washington, D.C., 2020.
- C24. **Yao, Z.**, Wei, H., Li, Z. and Abrishami, H. (2018). "A Combined Axle and Length-based Vehicle Classification Method using Image Processing Techniques." *97th Transportation Research Board Annual Meeting*. Washington, D.C., 2018.
- C23. **Yao, Z.**, Wei, H., Rohne, A., Perugu, H., and Corey, J. (2017). "Quantifying Household Travel Carbon Emission at Traffic Analysis Zone Level Using High Resolution Survey Data." *96th Transportation Research Board Annual Meeting*. Washington, D.C., 2017.
- C22. **Yao, Z.**, Wei, H., Li, Z., and Corey, J. (2016). "A Fuzzy C-Means Image Segmentation Approach for Axle-based Vehicle Classification." *95th Transportation Research Board Annual Meeting*. Washington, D.C., 2016.
- C21. Perugu, H., Wei, H., and **Yao, Z.** (2016). "Estimating the Contribution of Heavy-Duty Trucks to Urban PM_{2.5} Pollution." *95th Transportation Research Board Annual Meeting*. Washington, D.C., 2016.
- C20. **Yao, Z.**, Wei, H., Rohne, A., Corey, J., Perugu, H., and Liu, H. (2015). "Connecting Household Socioeconomics and Travel Carbon Footprint: Empirical Results from High-Resolution GPS Household Travel Survey." *94th Transportation Research Board Annual Meeting*. Washington, D.C., (Practice-Ready Paper)
- C19. **Yao, Z.**, Wei, H., Wang, X., Liu, H. and Yang, Y. J. (2014). "Scenario-based Carbon Footprint Inventory Tool for Urban Sustainable Development Decision Support: The Cincinnati Case Study." *93rd Transportation Research Board Annual Meeting*, Washington D. C.
- C18. **Yao, Z.**, Wei, H., Xiao, X., Liu, H. and Ren, H. (2014). "A Prototype of Video-Based Vehicle Classification System Using Vision-Based Axle Detection." *93rd Transportation Research Board Annual Meeting*, Washington D. C.
- C17. Liu, H., Wei, H., **Yao, Z.**, Ren, H. and Ai, Q. (2014). "Modeling and Evaluating Short-Term On-Road PM_{2.5} Emission Factor Using Different Traffic Data Sources." *93rd Transportation Research Board Annual Meeting*, Washington D. C.
- C16. Perugu, H., Wei, H., and **Yao, Z.** (2014). "Modeling Truck Activity using Short-term Traffic Counts for Reliable Estimation of Heavy-Duty Truck Emissions in Urban Areas." *93rd Transportation Research Board Annual Meeting*, Washington D. C.
- C15. Li, Z., Ken Yang, Wei, H., **Yao, Z.**, Liu, H., and Wang, H. (2014). "Evaluation of Multi-Point Advance Detection Schemes for Dilemma Zone Protection." *Proceeding of CICTP 2014: Safe, Smart, and Sustainable Multimodal Transportation Systems*. Chang Sha, China.
- C14. Liu, H., Wei, H. and **Yao, Z.** (2014). "Validating MOVES PM_{2.5} Emission Factor Empirically by Considering Accumulative Emissions Effect." *Proceeding of CICTP 2014: Safe, Smart, and Sustainable Multimodal Transportation Systems*. Chang Sha, China.
- C13. **Yao, Z.**, Wei, H., Ma, T., Liu, H. and Ai, Q. (2013). Developing Operating Mode Distribution Inputs for MOVES using Computer Vision-based Vehicle Data Collector. *Compendium of Papers CD-ROM for 92nd Transportation Research Board Annual Meeting*. Washington, D.C.
- C12. Liu, H., Wei, H., **Yao, Z.**, Ai, Q. and Li, B. (2013). "Empirical Identification and Quantification of Driver Anticipation Factor in Car-Following Behavior Modeling." *Compendium of Papers CD-ROM for 92nd Transportation Research Board Annual Meeting*. Washington, D.C.

- C11. Liu, H., , Wei, H., **Yao, Z.**, and Li, B. (2013). "Quantifying Effect of the Advanced Traveler Information System on En Route Drivers Anticipation Behavior." *Compendium of Papers CD-ROM for 92nd Transportation Research Board Annual Meeting*. Washington, D.C.
- C10. **Yao, Z.**, Wei, H., Liu, H., and Li, Z. (2013). "Statistical Vehicle Specific Power Profiling for Urban Freeways." *Proceeding of 13th COTA International Conference of Transportation Professionals (CICTP)*. Shen Zhen, China.
- C09. Liu, H., , Wei, H., **Yao, Z.** and Hui Ren. "Effects of Collision Avoidance System on Driving Patterns in Curve Road Conflicts." *Proceeding of 13th COTA International Conference of Transportation Professionals (CICTP)*. Shen Zhen, China, 2013.
- C08. Liu, H., Wei, H. and **Yao, Z.** (2012). "Modeling ITS data sources for generating realistic traffic operating parameters for project-level conformity analysis." *15th International IEEE Conference on Intelligent Transportation Systems (ITSC)*. Anchorage, AK.
- C07. Wei, H., Wang, X., **Yao, Z.**, Liu, H., Liang, S. and Yang, J.Y. (2012). "Framework for Integrating Traffic-Source Emission Estimates into Sustainability Analysis." *Proceeding of 12th COTA International Conference of Transportation Professionals (CICTP)*. Beijing, China. Doi: 10.1061/9780784412442.364
- C06. Liu, H., Wei, H., **Yao, Z.** and Ai, Q. (2012). "Estimating Emission Impact of Traffic Flow Operation with Dual-Loop Data." *Proceeding of 12th COTA International Conference of Transportation Professionals (CICTP)*. Beijing, China. 2012. Doi: 10.1061/9780784412442.347
- C05. Wei, H., Yang, J.Y., Wang, X., **Yao, Z.**, Liang, S. and Liu, H. (2011). "Integrated Approach to Explore Roadway Air impact of Travel Demand and Traffic Operation for Transportation Sustainability Analysis." *Proceeding of American Institute of Chemical Engineers (AIChE) annual meeting*, Minneapolis, MN.
- C04. Liang, S., **Yao, Z.**, Wei, H., Wang, X., Lu, M., and Keener, T. (2011). "Near-road Black Carbon Emission: Its Relations with On-road Traffic and Meteorological Conditions." *Proceeding of A&WMA 104th Annual Conference, Orlando, FL. 2011*.
- C03. Yang, J.Y., Neal, J., Liang, S., **Yao, Z.**, Keener, T., Wei, H. and Wang, X. (2011). "On the Black Carbon Related Carbon Footprints in Urban Transportation." *Proceeding of A&WMA 104th Annual Conference, Orlando, FL. 2011*.
- C02. Ai, Q., **Yao, Z.**, Wei, H. and Li, Z. (2010). "Identifying Characteristics of Freeway Traffic Headway by Vehicle Types Using Video Trajectory Data." *Proceeding of 10th COTA International Conference of Transportation Professionals*. Doi: 10.1061/41127(382)214
- C01. Li, Z., Wei, H., Ai, Q., **Yao, Z.** (2010). "Developing Empirical Analysis of Drivers' Yellow Stopping Behaviors Associated with Dilemma Zones." *Compendium of Papers CD-ROM for the 89th Transportation Research Board Annual Meeting*, Washington D.C.

CONFERENCE PRESENTATIONS/ INVITED TALKS

- P10. Perugu, H., Wei, H., **Yao, Z.** (2013). "An Improved Methodology for Modeling Truck Contribution to Regional Air Quality." 14th TRB National Transportation Planning Applications Conference. Columbus, Ohio, May 06, 2013.
- P09. **Yao, Z.** (2013). "Vehicle Specific Power Approach for Freeway Emission Modeling: Statistics and Data Collection." Sustainable Urban Engineering Seminar, College of Engineering and Applied Science, University of Cincinnati, Cincinnati, Ohio, March 01, 2013.

- P08. Yao, Z. (2012). *“Transportation Activity Related On-road Emissions.”* Sustainable Urban Engineering Seminar, University of Cincinnati, Cincinnati, Ohio, February 25, 2012.
- P07. Yao, Z., and Liang, S. (2011). *“Near-Road Black Carbon Emission: It’s Relations with On-Road Traffic.”* Graduate Poster Forum, University of Cincinnati, Cincinnati, Ohio, February 25, 2011.
- P06. Yao, Z., and Liang, S. (2010). *“Urban Intersection CO/PM Emission Concentration Prediction Using Travel Demand Models.”* CEAS Tech Expo, University of Cincinnati, Cincinnati, Ohio, May 4, 2010.
- P05. Yao, Z., Liang, S., and Nimalapuri, V. (2010). *“Urban Intersection CO/PM Emission Concentration Prediction Using Travel Demand Models.”* University Clean Energy Alliance of Ohio, Columbus, Ohio, April 20, 2010.
- P04. Yao, Z., and Ramirez, M. (2009). *“The Missing Piece to our Transportation System.”* University Clean Energy Alliance of Ohio, Columbus, Ohio, April 9, 2009.
- P03. Han, L., and Yao, Z. (2007). *“Beijing in Fission: Revolution and Evolution.”* Polytechnic University of the Philippines, Mapua Institute of Technology, Far Eastern University Manila, Philippines, September 14-17, 2007.
- P02. Yao, Z. (2006). *“Suitability and Effectiveness - on the New Village Residence Design.”* 12th ARCASIA student forum, Tsinghua University, Beijing, September 15, 2006.
- P01. Yao, Z. (2003). *“The New Era of Chinese Architecture from the 1980’s to now.”* Third CAFA week seminar, Polytechnic University of the Philippines, September 22, 2003.

AWARDED RESEARCH PROJECTS

- Traffic Data for Integrated Project-Level PM2.5 Conformity Analysis** (PS No. 2012-19) (PI: Wei, H., \$320,000), 04/21/12 –08/21/14. A FHWA Fund via Ohio Department of Transportation (ODOT) Partnered Research Exploration Program (OPREP). (50% effort)
- Adaptive Video-based Vehicle Classification Technique for Monitoring Traffic** (PI: Wei, H., \$40,000), 09/1/13 – 12/31/14. Fund by ODOT Student Study Problem Program. (100% effort)

RESEARCH PROJECTS (SELECTED)

- Adaptive Video-based Vehicle Classification Technique for Monitoring Traffic**, funded by Ohio Department of Transportation, 10/01/2014 to 10/01/2015.
- Case Studies of Sustainable Water Resources and Infrastructure Adaptation to Climate and Socioeconomic Changes**, funded by U.S. Environmental Protection Agency, 09/30/2009 to 09/30/2014.
- Traffic Data for Integrated Project-Level PM2.5 Conformity Analysis**, funded by Ohio Department of Transportation, 04/21/2012-04/21/2014
- Integrated Analysis Approach for Traffic Emission Impact**, funded by Ohio Department of Transportation, 10/01/2010 to 01/31/2012.
- Integrating Traffic Operation with Emission Impact using Dual-loop Data**, funded by Ohio Transportation Consortium (OTC), 09/01/2010 – 12/31/2011.
- Impact of Urban Traffic on Population Exposure to Air Pollution: An Integrated Approach**, funded by University of Cincinnati Research Council, 08/13/09 - 07/14/10.
- Bicycle Trip Forecasting Model: Cincinnati Metropolitan Case Study**, funded by Ohio Department of Transportation, 04/01/2012 to 04/01/2013.
- RET Site on Sustainable Engineering for Urban Needs: Research Experiences for Middle and High School Teachers**, funded by National Science Foundation, summer (2009 – 2012).

9. REU Site on Sustainable Engineering for Urban Needs: Research Experiences for Undergraduate Students, funded by National Science Foundation, summer (2009 – 2013).

TEACHING AND MENTORING

TEACHING EXPERIENCE

California State University Sacramento

Adjunct Professor CE261 *Transportation Planning*

University of Cincinnati

Teaching Assistant

- CVE2004 - *Transportation Infrastructure Engineering*
- CEE 351/CVE351 - *Transportation Engineering*
- CEE 605/ PLAN 659 - *Travel Demand Forecasting*
- CVE 606 - *Traffic Signal Design*
- CVE 608 - *Transportation Systems Planning*
- CEE 610/CVE 610 - *Computer Methods in Transportation*
- CVE 6012 - *Transportation Demand Forecasting and Environmental Analysis*
- CVE 6022C - *Traffic Control and Signal System Design*
- CVE 774 - *Traffic Theory and Network Modeling*

Guest Lecturer

- CVE 676 - *Introduction to Sustainable Engineering*

Beijing University of Technology

Teaching Assistant Urban Planning Theory

Instructor Computer Aided Design and Drafting

MENTORING EXPERIENCE

*National Science Foundation Sustainable Engineering Research for Urban Needs
Research Experiences for Undergraduate Students*

- 8 weeks mentoring program mentored 8 Undergraduate students

Research Experiences for Middle and High School Teachers

- 6 Weeks mentoring program mentored 4 High School Teachers

AWARDS, HONORS AND SCHOLARSHIPS

- **Outstanding Service Award**, Chinese Overseas Transportation Association (COTA). July, 2017.
- **Top Article Award**, Journal of Traffic and Transportation Engineering. January, 2017.
- **First place**, Institute of Transportation Engineers (ITE) Great Lakes District Student Paper Competition. December, 2016.
- **Finalist**, Kikuchi-Karlaftis Best Paper Award. December, 2016.
- **Excellence Service Award**, Intelligent Transportation Society Midwest. September, 2015.
- **Second place**, ITE Great Lakes District Student Paper Competition. May, 2014.
- **Winner**, Civil Engineering Graduate Student Association Logo Contest, College of Engineering and Applied Science, University of Cincinnati, Ohio. April, 2014.
- **ITE Outstanding Graduate Student in Transportation**, Ohio Institute of Transportation Engineers. November 2009.
- **University Graduate Scholarship**, University of Cincinnati. 2008-2014.

- **Research Excellence Award**, Beijing University of Technology. October, 2007.
- **Special Contribution Award**, Beijing University of Technology. October 2007.
- **Academic Excellence Award**, Beijing University of Technology. November 2006.
- **Best Senior Project**, Polytechnic University of the Philippines. April 2004.
- **Special Award for Graduated in 4-Years Only**, Polytechnic University of the Philippines. April 2004.
- **Assistantship Award**, Royal Institute of Education, Singapore. January 2000.

SERVICES

PROFESSIONAL SERVICES

Webmaster	Institute of Transportation Engineers (ITE) Great lakes (Ohio, Indiana, Michigan) www.greatlakesite.com (2010~Present)
Editor	Intelligent Transportation Society (ITS) Midwest Newsletter , (2009~Present) http://www.itsmidwest.org/newsletter.shtml
Communication Officer	Chinese Oversea Transportation Association (COTA) http://www.cota-home.org (2010~Present)
Vice-President	Chinese Student and Scholar Association University of Cincinnati, (2009~2010)
IT-officer	Chinese Student and Scholar Association University of Cincinnati, (2010~Present)
Webmaster	ITE University of Cincinnati Chapter , (2008~2009)

EDITORIAL SERVICES

- **Editorial Board Member**, *International Journal of Sustainable Development Research*
- **Area Editor**, *The 17th COTA International Conference of Transportation Professionals (CICTP2017)*. American Society of Civil Engineers (ASCE)
- **Editor**, *International Journal of Vehicular Telematics and Infotainment Systems*
- Guest Editor, *Special Issue on Transportation Planning and Management*, *Journal of Transportation Technologies*.
- **Technical Program Committee Member**, *International Conference on Building Materials and Civil Engineering (ICBMC 2015)*
- **Area Editor**, *Safe, Smart, and Sustainable Multimodal Transportation Systems Proceedings of the 14th COTA International Conference of Transportation Professionals (CICTP2014)*. American Society of Civil Engineers (ASCE)
- **Area Editor**, *Intelligent and Integrated Sustainable Multimodal Transportation Systems -Proceedings of the 13th COTA International Conference of Transportation Professionals (CICTP2013)*. Elsevier Procedia - Social and Behavioral Sciences, Volume 96, pp. 1-2962. ISBN 1877-0428
- **Area Editor**, *Multimodal Transportation Systems-Convenient, Safe, Cost-Effective, Efficient-Proceedings of the 12th COTA International Conference of Transportation Professionals (CICTP 2012)*. American Society of Civil Engineers (ASCE)
- **Associate Editor**, *ASCE Proceedings of the 11th International Conference of Chinese Transportation Professional published by American Society of Civil Engineering, USA. August 14-17, 2011.*
- **Associate Editor**, *Integrated Transportation Systems: Green • Intelligent • Reliable - Proceedings of the 10th International Conference of Chinese Transportation Professionals (ICCTP 2010)*. American Society of Civil Engineers (ASCE). ISBN: 978-0-7844-1127-8. 2012

PROFESSIONAL AFFILIATIONS

Member	Professional Engineers in California Government	2014~present
Member	TRB Sustainability Research Subcommittee, ADD40(2)	2014~present
Member	ITE Sustainability Task Force	2013~present
Student Member	IEEE Intelligent Transportation Systems Society	2012~present
Student Member	American Society of Highway Engineers (ASHE)	2011~present
Student Member	Chinese Overseas Transportation Association (COTA)	2009~present
Student Member	Institute of Transportation Engineers	2008~present
Associate Member	Royal Institute of Architects, Singapore	2004~present
Associate Member	Royal Institute of Scholars, Singapore	2004~present