

ZHUO YAO, PH.D.

TRANSPORTATION ENGINEER (CIVIL)

Highway Performance Monitoring System Branch
Office of Data Services and Technology (ODST)
Division of Research, Innovation and System Information (DRISI)
California Department of Transportation

1120 N Street
Sacramento, CA 95814

PHONE: (530)-821-8258

CELL: (513)-382-6110

E-MAIL: zhuo.yao@dot.ca.gov

WEB: <http://www.zhuoyao.net>

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

-
1. **California Department of Transportation**, Sacramento, California, United States of America (04/01/2024~now)
 - *Transportation Engineer (Civil) - D03 / DPLN / Advance Planning*
 2. **California Department of Transportation (Temporary Assignment)**, Sacramento, California, United States of America (11/01/2023~02/29/2024)
 - *Transportation Engineer (Civil) - D03 / DPLN / Advance Planning*
 3. **California Department of Transportation**, Sacramento, California, United States of America (2021~2023)
 - *Transportation Engineer (Civil)- HQ / DRISI / ODST / HPMS*
 4. **California Air Resources Board**, Sacramento, California, United States of America (2014~2021)
 - *Air Pollution Specialist*
 5. **California State University Sacramento**, Sacramento, California, United States of America (2015~now)
 - *Adjunct Professor*
 6. **China Resource Land Limited**, Beijing, China (2008)
 - *Project Engineer/Architect*
 7. **China International Engineering and Design Consult Co., Ltd**, Beijing, China (2006-2007)
 - *Project Engineer/Architect*
 8. **UrbanScape Design International Co., Ltd**, Beijing, China (2004-2006)
 - *Project Engineer/Architect*
 9. **B-81 Builders**, Manila, Philippines (2003-2004)
 - *Engineer Intern*

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

<i>Board of Directors</i>	Chinese Overseas Transportation Association (COTA) http://www.cota-home.org (2024~Present)
<i>Webmaster</i>	Institute of Transportation Engineers (ITE) Great Lakes (Ohio, Indiana, Michigan) www.greatlakesite.com (2010~Present)
<i>Editor</i>	Intelligent Transportation Society (ITS) Midwest Newsletter, (2009~Present) http://www.itsmidwest.org/newsletter.shtml
<i>Vice-President</i>	Chinese Student and Scholar Association University of Cincinnati, (2009~2010)
<i>IT-officer</i>	Chinese Student and Scholar Association University of Cincinnati, (2010~Present)
<i>Webmaster</i>	ITE University of Cincinnati Chapter University of Cincinnati, (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
Member	American Society of Highway Engineers (ASHE)	2012~present
Member	Chinese Overseas Transportation Association (COTA)	2009~present
Associate Member	Royal Institute of Architects, Singapore	2004~present
Associate Member	Royal Institute of Scholars, Singapore	2004~present

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 PM2.5 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 PM2.5 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 PM2.5 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 Nemalapuri, 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

1. **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)**
2. **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)

1. **Adaptive Video-based Vehicle Classification Technique for Monitoring Traffic**, funded by Ohio Department of Transportation, 10/01/2014 to 10/01/2015.
2. **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.
3. **Traffic Data for Integrated Project-Level PM2.5 Conformity Analysis**, funded by Ohio Department of Transportation, 04/21/2012-04/21/2014
4. **Integrated Analysis Approach for Traffic Emission Impact**, funded by Ohio Department of Transportation, 10/01/2010 to 01/31/2012.
5. **Integrating Traffic Operation with Emission Impact using Dual-loop Data**, funded by Ohio Transportation Consortium (OTC), 09/01/2010 – 12/31/2011.
6. **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.
7. **Bicycle Trip Forecasting Model: Cincinnati Metropolitan Case Study**, funded by Ohio Department of Transportation, 04/01/2012 to 04/01/2013.
8. **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
CVE 676 - Introduction to Sustainable Engineering

Guest Lecturer

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