Song Bai, PhD, PE

Manager, Environmental Modeling Division
Senior Air Quality Scientist

STi | Sonoma Technology

Dr. Bai joined STI in 2008 and focuses on mobile source emissions modeling, transportation project-level analysis for conformity and CEQA/NEPA assessment, GHG emissions assessment, and statistical analysis of air quality data. Before joining STI, he was a postdoctoral scholar at UC Davis (UCD), where he participated in the UCD-Caltrans Air Quality Project from 2006–2008. In 2007, Dr. Bai instructed undergraduate students at UCD in Transportation System Design core curriculum. He is a California-licensed Civil Engineer.

On-road emissions modeling for criteria pollutants, GHGs, and mobile source air toxics (MSATs). From 2007 to 2018, Dr. Bai was a lead developer of the CT-EMFAC on-road California emissions modeling tool. CT-EMFAC estimates project-level on-road CO_2, criteria pollutant, and air toxics emissions. In 2010, Dr. Bai developed a modeling approach to estimate naphthalene and polycyclic organic matter emissions from on-road vehicles. From 2006 to 2007, he was the technical lead on a UCD-Caltrans study that developed an MSAT analysis protocol for highway projects.

Particulate matter (PM) hot spot dispersion modeling. Since 2010, under Caltrans sponsorship, Dr. Bai has helped develop guidance for completing quantitative PM hot spot analyses. During 2007 and 2008, Dr. Bai worked with UCD, STI, and U.S. Federal Highway Administration researchers to compare how various dispersion modeling tools characterize real-world, near-roadway PM concentrations.

Construction emissions. Under Caltrans sponsorship, Dr. Bai collaborated with researchers and software engineers at STI to develop a spreadsheet tool for estimating emissions from construction activities. During 2007 and 2008, Dr. Bai assessed the emissions reduction benefits of retrofitting and replacing high-emitting construction equipment used to build transportation projects.

Education

- PhD, Civil and Environmental Engineering, University of California at Davis
- MS, Statistics, University of California at Davis
- MS, Civil Engineering, Tsinghua University, China
- BS, Civil Engineering, Tsinghua University, China

Memberships

- Transportation Research Board
- Air & Waste Management Association

For a list of publications, see
sonomatech.com/ResPub/SXBpub.pdf.

Source apportionment. Since 2010, Dr. Bai has been part of a team of STI and EPA researchers that developed a new version of the EPA Positive Matrix Factorization model (PMF version 5.0), which is a source apportionment tool that helps air quality planners identify the leading contributors to regional-scale air pollution.

Climate change. Since 2010, Dr. Bai has worked with researchers at the University of Illinois, Chicago, and the University of Arizona to integrate dynamic traffic simulations with carbon dioxide (CO_2) emissions based on the U.S. Environmental Protection Agency's (EPA) MOVES emissions model. From 2010 to 2013, Dr. Bai also developed a greenhouse gas (GHG) analysis protocol for on-road transportation projects for Caltrans. In 2007, Dr. Bai collaborated with other STI and UCD researchers to evaluate differences in GHG emissions estimates produced by MOVES and the EMFAC2007 on-road vehicle emissions model.

Land use and air quality. From 2009 to 2010, Dr. Bai led the technical development of a web-based application tool, Low-Carb Land, to evaluate how land use changes affect travel activities and CO_2 emissions. From 2006 to 2008, Dr. Bai and UCD researchers developed a system that includes land use, travel demand, and vehicle emissions models to study the impact of urban growth patterns on future transportation system performance and mobile source emissions inventories in the San Joaquin Valley.

Transportation network and emissions estimation. From 2002 to 2006, Dr. Bai developed a transportation planning framework and procedures to assess how temporal resolutions of traffic activity data affected regional mobile source emissions inventories.

1450 N. McDowell Blvd., Suite 200
Petaluma, CA 94954 • 707-665-9900