

John L. Bowman, Ph. D.

Transportation Systems and Decisions Sciences
Bowman Research and Consulting
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SUMMARY

John Bowman is best known for his research, development and ongoing improvement of the activity schedule approach for the forecasting of regional passenger travel demand, and for enabling planning agencies to develop knowledge, skills, models and software needed to implement and use the approach. He has a special interest in effectively incorporating non-motorized modes into these models, and in fostering livable communities at the local level. He has also conducted planning studies for advanced model development; developed market demand simulators (based on customer and stated choice data), airport access models and commuter rail demand forecasts; and evaluated models developed by others. Dr. Bowman contributes to the field through publications, presentations and journal reviews, and has taught occasionally at MIT, where he earned graduate degrees as a student of Professor Moshe Ben-Akiva (MST 1995, PhD Transportation Systems and Decision Sciences 1998). He works at his home office in Brookline, Massachusetts.

EXPERIENCE: 22 years in the field, 17 years as a sole proprietor

RESEARCH, CONSULTING AND TEACHING

Research and consulting in advanced travel demand modeling

2012-present. Delaware Valley Regional Planning Commission (DVRPC). Leading design and technically directing implementation of an activity-based model system spanning the 25 counties of the DVRPC region and surrounding area.

2011-present. FHWA (STEP). With Mark Bradley and RSG. Lead contractor and Principal Investigator empirically testing and demonstrating the transferability of advanced (activity-based, or "AB") models between regions.

2011-present. Danish Council for Strategic Research. Collaborating with Danish researchers in development of an advanced AB model framework with emphasis on intra-household interactions, at-home family priority time, non-motorized and public transport, and disaggregate assignment. Resident in Copenhagen for five months in each of 2013 and 2014.

2005-present. Co-developer, with Mark Bradley and RSG software engineers in the ongoing development and enhancement of **DaySim**, the micro-simulation software platform used in numerous regional AB model forecasting systems.

2013-2014. Metropolitan Government of Nashville and Davidson County (Metro). Guided the preparation of survey data and other technical aspects for implementation of an activity-based (AB) model for the Nashville region.

2013-2014. San Diego Association of Governments (SANDAG). Advised SANDAG on the incorporation of bicycle route choice model and accessibility into the SANDAG regional AB model.

2013. Danish Road Directorate. Interviewed officials in the four largest Danish cities and wrote white paper proposing improved model-based forecast methods to better meet their information needs related to bicycle infrastructure and policy.

2009-2014. Puget Sound Regional Council (PSRC). With Bradley, DKS Associates and RSG. Managed project to implement an activity-schedule-based travel demand model system. Served as technical lead, principal designer and model developer (with Bradley). Guided and assisted all other aspects of project.

2010-2013. NCHRP (project 08-78). With J. Richard Kuzmyak and others. Developed model-based methods for a guidebook for practitioners on estimating and forecasting bicycling and walking activity.

2010-2013. Beijing Transportation Research Center. Advised Beijing researchers in the development of an activity-based model system for the Beijing metropolitan region.

2009-2013. FHWA (SHRP2 C10A project). With Resource Systems Group (RSG), Mark Bradley and AECOM Consult. Integrated an activity-based model system (DaySim) with the TranSims Router and Microsimulator.

2012. San Francisco County Transportation Authority (SFCTA). Advised SFCTA modelers on the resolution of technical issues related to use of their bicycle route choice model in their activity-based model system (pro bono).

2010-2012. Sacramento Area Council of Governments (SACOG). With DKS, Mark Bradley and RSG. Implemented major SACSIM/DaySim enhancement to support advanced pricing, costs and transit service features.

2010-2012. San Joaquin Valley MPOs. With Mark Bradley, RSG and others. Implemented activity-based models in the San Joaquin Valley, including a parcel-based model in Fresno, and a microzone-based model for the northern three counties.

2010-2012. FHWA (STEP). With RSG and others. Assisted in the research and development of advanced tour-based and logistics supply chain models for freight transport forecasting, with responsibility for developing the data development plan.

2009-2010. Chicago Metropolitan Agency for Planning (CMAP). Developed the data development component of a strategic plan for advanced travel modeling at CMAP.

2008-2010. Mid-Ohio Regional Planning Council (MORPC). Assisted University of Texas at Austin to compare MORPC trip-based model system with their new tour-based model system.

2008-2010. FHWA. With Bradley, Joe Castiglione and RSG. Integrated the SACOG activity-based demand model (DaySim) with the TranSims Router.

2003-2009. Developed a population synthesizer (PopSyn) for Atlanta Regional Commission (ARC). Helped DRCOG, PSRC and SANDAG implement it for their regions.

2008. Florida DOT Region 7 (Tampa Bay area) and Southern California Association of Governments (SCAG). With Bradley. Explained the state of practice and prepared activity-based model system design and implementation plan.
2008. Puget Sound Regional Council (PSRC). With Bradley and Castiglione. Implemented a day-activity schedule microsimulation model and integrated it with PSRC's existing trip-based model system. Conducted planning and design for a subsequent full implementation of an activity-based model system.
- 2006-2008. Denver Regional Council of Governments (DRCOG). Helped design and develop a new activity-schedule-based travel demand model system. Guided the development of model components by DRCOG staff.
- 2005-2008. Sacramento Area Council of Governments (SACOG). With Bradley. Designed, developed, programmed and implemented a new activity-schedule-based travel demand model system with detailed treatment of time and space dimensions (DaySim). Integrated it with traffic assignment, validated and calibrated it with SACOG and DKS. Enhancing it over time.
- 2001-2004. Atlanta Regional Commission (ARC). Designed model system with Bradley and Vovsha.
- 2001-2003. Mid-Ohio Regional Planning Commission (MORPC). Assisted in design and model estimation.
- 1996-2001. Portland Metro. Designed activity-based model system, the first practical modern activity-schedule-based model system used for policy analysis. Assisted Mark Bradley in model estimation.

Academic Research and Teaching at Massachusetts Institute of Technology

1992-2007. For his Masters thesis at MIT (1995), Bowman developed the first modern activity-schedule-based travel demand model: designed it, processed all survey data, estimated all models, demonstrated the feasibility of developing an integrated activity-based model system, and demonstrated the correlation of activity schedule choices with transport level of service. For his PhD thesis at MIT (1998), he improved and formalized the activity schedule model, emphasizing (a) the influence of activity accessibility on activity participation, at-home vs on-tour decisions, trip chaining and inter-tour trade-offs, and (b) the influence of lifestyle on activity and activity pattern utility. He implemented the activity pattern model for Portland, Oregon. He also developed an integrated discrete choice model system of a household's residential location choice and its members' activity and travel schedules, demonstrating how activity-based accessibility impacts residential location. Bowman served as teaching assistant, and continues to serve as occasional visiting lecturer for the graduate demand modeling courses. Bowman's faculty advisor at MIT was Moshe Ben-Akiva, Edmund K. Turner Professor of Civil & Environmental Engineering.

Other research and consulting

2008. Prepared experimental design, guided survey development, developed demand models and developed market share simulator to forecast small business market acceptance of small business internet service delivery with optional automated services such as network configuration, security and backup for a major US telecommunications provider. Simulator includes simulated annealing search for optimal configuration of product attributes.
- 2006-2007. Developed demand models to predict future customer behavior based on past customer behavior, for a major U.S. mutual fund company.
2006. Researched the current state of the practice in land use modeling as advisor to the Atlanta Regional Commission.
2006. Provided design and development advice, and prepared experimental design, for a stated choice study of the effects of benefit programs on employee retention, for a major North American hospital system.
- 1998-2004. Prepared experimental designs, guided survey development, developed demand models and implemented interactive market share simulators to forecast consumer acceptance of broadband (TV, internet, telephone, triple-play), wireless, investment brokerage and credit card products for telecommunications companies, banks and investment firms operating in various North American and European markets.
2002. Advised on survey design and developed mode choice models to forecast demand for proposed Sacramento airport rail transit access.
2000. Developed discrete choice model to forecast effect of airline alliance brand name and features on international travelers' carrier choice in 16 countries worldwide.
1999. Analyzed available data, developed demand model, calibrated, and predicted ridership under alternative scenarios for a recently privatized major commuter rail system (South America).
- 1998-2002. Designed survey instruments, developed demand models, and implemented interactive decision-support tools for transportation projects involving bus and rail transit, and commuter rail for private and public sector clients in North America and Western Europe.
- 1999-2001. Technically evaluated travel demand forecasts made by other consulting firms for urban rail transit and inter-city passenger rail systems in North America and Southeast Asia, providing expert advice to litigators and estimates of bias and uncertainty for the placement of revenue guarantee insurance.
1999. Prepared stated choice survey experimental design and developed mode choice model for high speed rail pricing study (Europe). Employed nested logit structure, estimation with simultaneous use of revealed and stated choice data, and WESML estimation techniques for choice-based sample.
1998. For a commuter rail demand analysis project in Mexico: designed survey, selected survey intercept sites, designed demand models, developed EMME2 network model, calibrated and applied the model system under alternative forecast scenarios. Employed computer-based personal interviews, demand models with inter-modal choice alternatives, and transit path assignment techniques to accommodate intermodal choices.

1997. Developed demand models for infrastructure project evaluation (Brazil and Uruguay) and airport access (Portland, Oregon).

PUBLICATIONS, WORKING PAPERS AND PRESENTATIONS

Refereed publications (most are available at <http://JBowman.net>)

- G. Vuk, J.L. Bowman, A. Daly and S. Hess, "Impact of family in-home quality time on person travel demand", Under review for publication in *Transportation*. Preliminary draft available at <http://JBowman.net>. 2015.
- M. Bradley, J.L. Bowman and B. Griesenbeck, "SACSIM: An applied activity-based model system with fine-level spatial and temporal resolution", *Journal of Choice Modeling* Vol. 3 No. 1: 5-31, 2010. Also available at <http://jocm.org.uk>
- X. Dong, M.E. Ben-Akiva, J.L. Bowman and J. Walker, "Moving from Trip-Based to Activity-Based Measures of Accessibility", *Transportation Research A*, 40: 163-180, 2006.
- J. Bowman and M. Ben-Akiva, "Activity-based Disaggregate Travel Demand Model System with Activity Schedules", *Transportation Research A* 35: 1-28, 2001.
- J. Bowman, M. Bradley, Y. Shifan, T.K. Lawton and M. Ben-Akiva, "Demonstration of an Activity Based Model System for Portland", in *Proceedings of the 8th World Conference on Transport Research (WCTR)*, Antwerp, Belgium, Vol. 3: 171, Pergamon, 1999.
- M. Ben-Akiva and J. Bowman, "Activity Based Travel Demand Models", in *Equilibrium and Advanced Transportation Modeling*, P. Marcotte and S. Nguyen, eds., Kluwer Academic Publishers, 1998.
- M. Ben-Akiva and J. Bowman, "Integration of an Activity-based Model System and a Residential Location Model", *Urban Studies* 35 (7): 1231-1253, 1998.
- M. Ben-Akiva, J. Bowman and D. Gopinath, "Travel Demand Model System for the Information Era", *Transportation* 23: 241-266, 1996.

Other publications and working papers

- J.L. Bowman. "Incorporating Bicycling into Activity-based Regional Travel Forecasting Models in Denmark: Identified Needs and Proposed Solutions", Report prepared for Danish Road Directorate (Vejdirektoratet), available at <http://JBowman.net>, 2014.
- J.L. Bowman. "Historical Development of Activity Based Model Theory and Practice" (part 2), *Traffic Engineering and Control*, Vol. 50 No. 7: 314-318, 2009.
- J.L. Bowman. "Historical Development of Activity Based Model Theory and Practice" (part 1), *Traffic Engineering and Control*, Vol. 50 No. 2: 59-62, 2009.
- M. Bradley, J.L. Bowman and B. Griesenbeck, "Activity-Based model for a medium sized city: Sacramento", *Traffic Engineering and Control*, Vol. 50 No. 2: 73-79, 2009.
- J.L. Bowman. "Population Synthesizers", *Traffic Engineering and Control*, Vol. 49 No. 9: 342, 2008.
- J.L. Bowman and M.A. Bradley. "Activity-Based Models: Approaches used to achieve integration among trips and tours throughout the day", presented at the 2008 European Transport Conference, Leeuwenhorst, The Netherlands, October, 2008.
- M.A. Bradley, J.L. Bowman and B. Griesenbeck. "Development and application of the SACSIM activity-based model system", presented at the 11th World Conference on Transport Research, Berkeley, California, USA, June, 2007.
- J.L. Bowman, M.A. Bradley and J. Gibb. "SacSim, a regional travel forecasting model system developed in 2005 and implemented in 2006 for the Sacramento (California) Area Council of Governments (SACOG), a series of technical reports available at <http://JBowman.net>, 2006.
- J.L. Bowman, M.A. Bradley and J. Gibb, "The Sacramento Activity-Based Travel Demand Model: Estimation And Validation Results", presented at the European Transport Conference, September 18-20, 2006, Strasbourg, France, 2006.
- J.L. Bowman and M.A. Bradley, "Upward Integration of Hierarchical Activity-based Models", working paper, 2006.
- J.L. Bowman and G. Rousseau, "Validation of the Atlanta (ARC) Population Synthesizer (PopSyn)", white paper presented at the TRB Conference on Innovations in Travel Modeling, May 21-23, 2006, Austin, Texas, 2006.
- M.A. Bradley and J.L. Bowman, "A Summary of Design Features of Activity-Based Microsimulation Models for U.S. MPOs", white paper presented at the TRB Conference on Innovations in Travel Demand Modeling, May 21-23, 2006, Austin, Texas, 2006.
- J. L. Bowman and M. A. Bradley, "Disaggregate treatment of purpose, time of day and location in an activity-based regional travel forecasting model", presented at the European Transport Conference, October 3-5, 2005, Strasbourg, France, 2005.
- J.L. Bowman, "Logit kernel (or mixed logit) models for large multidimensional choice problems: identification and estimation", presented at the European Transport Conference, October 3-5, 2005, Strasbourg, France, 2005, and at Transportation Research Board Annual Meeting, Washington, D.C., January, 2004.
- J.L. Bowman, "A comparison of population synthesizers used in microsimulation models of activity and travel demand", working paper, 2004.
- M. Bradley, P. Vovsha and J.L. Bowman, "Activity-based travel forecasting models in the United States: Progress since 1995 and Prospects for the Future", presented at the EIRASS Conference on Progress in Activity-Based Analysis, May 28-31, 2004, Vaeshartelt Castle, Maastricht, The Netherlands, 2004.

J. L. Bowman, D. Gopinath and M. Ben-Akiva, "Estimating the probability distribution of a travel demand forecast", working paper, 2002.

M. Bradley, J. Bowman and T. K. Lawton, "A Comparison of Sample Enumeration and Stochastic Microsimulation for Application of Tour-Based and Activity-Based Travel Demand Models", European Transport Conference, September 1999, Cambridge, UK.

J. Bowman and M. Ben-Akiva, "Incorporating Activity Utility, At-home Activities and Lifestyle in an Activity-based Travel Demand Model", working paper, April, 1999.

J.L. Bowman and M. Ben-Akiva, "Activity-Based Travel Forecasting", in Activity-Based Travel Forecasting Conference, June 2-5, 1996, Summary, Recommendations and Compendium of Papers, U.S. Department of Transportation report number DOT-T-97-17, 1997.

Selected recent presentations

G. Vuk, J.L. Bowman, A. Daly and S. Hess. Impact of in-home household activities on person travel demand: the case of family priority time in activity based models, Presented at 5th Transportation Research Board Conference on Innovations in Travel Modeling, April 27-30, 2014, Baltimore, Maryland.

J.L. Bowman, M. Bradley J. Castiglione and S. Yoder. Making advanced travel forecasting models affordable through model transferability, Presented at the TRB 93rd Annual Meeting, January 12-16, 2014, Washington, D.C.

J.L. Bowman. Activity-Based Models 1993-2012: One Developer's Perspective, Presented at the University of California, Berkeley, September 14, 2012.

J Castiglione, B Grady, J.L. Bowman, M. Bradley and S. Lawe. Building an Integrated Activity-Based and Dynamic Network Assignment Model, Presented at the 3rd Transportation Research Board Conference on Innovations in Travel Modeling, May 9-12, 2010, Tempe, Arizona, USA. J.L. Bowman. "Activity Model Development Experiences", TMIP Webinar, June 18, 2009.

J.L. Bowman. "Activity-Based Models: 1994-2009", presented at the MIT ITS Lab, March 10, 2009.

J.L. Bowman. "How is an Activity-Based Model Set Developed?" presented at the Chicago Metropolitan Agency for Planning Symposium on Developing and Implementing an Activity-Based Travel Demand Model, August 27, 2008.

J.L. Bowman. "The Day Activity Schedule Approach of Bowman, Ben-Akiva and Bradley: 1994-2008", presented at the Transportation Research Board Innovations in Travel Modeling Conference, June 22-24, 2008.

J.L. Bowman. "From Theory To Practice: What can we learn from our U.S. experience?" presented at the Transportation Research Board Annual Meeting Task Force on Moving Activity-based Approaches into Practice, January 13, 2008.

SERVICE

Member of Brookline Complete Streets Committee

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Paper reviews for the following journals and conferences: Transportation, Transportation Research, Transportation Research Record, Transportation Science, Journal of Consumer Research, Geographical Analysis, Marketing Science, Journal of Choice Modeling, IATBR, Journal of Transport Engineering, World Conference on Transport Research

Past memberships: Transportation Research Board Committee on Passenger Travel Demand Forecasting, European Transport Conference Innovative Methods Programme Committee.