CURRICULUM VITAE

Dr. Bin Ran

Vilas Distinguished Achievement Professor
Department of Civil & Environmental Engineering
University of Wisconsin – Madison
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I. PERSONAL INFORMATION

Current Position: Professor of Civil and Environmental Engineering, UW-Madison

Research Areas:

Connected Autonomous Mobility	Intelligent Transportation Systems
Collaborative Automated Driving System	Dynamic Transportation Network Models
Connected Automated Vehicle Highway	Smart Cities & Big Data
Proactive Active Safety System	Embodied Intelligence

II. EDUCATION

Ph.D. Civil Engineering (Transportation Engineering), University of Illinois, Chicago, May 1993.

M.S. Civil Engineering (Transportation Engineering), University of Tokyo, Tokyo, Japan, March 1989.

B.S. Civil Engineering, Tsinghua University, Beijing, China, March 1986.

III. ACADEMIC AND PROFESSIONAL APPOINTMENTS

UW–Madison

Professor, Department of Civil and Environmental Engineering, 2006-Present.

Dean, Joint Research Institute on Internet of Mobility of Southeast University & UW–Madison, 2017-2024.

Faculty Director, UW "4+X" Program for Graduate Studies, 2016.

Founding Director, Wisconsin Traffic Operations and Safety Laboratory (TOPS), 2003-2007.

Associate Professor, Department of Civil and Environmental Engineering, 2001-2006.

Assistant Professor, Department of Civil and Environmental Engineering, 1995-2001.

Massachusetts Institute of Technology (MIT)

Lecturer, Department of Civil and Environmental Engineering, 1994-1995.

University of California, Berkeley

Post-Doctoral Researcher, Institute of Transportation Studies - PATH, 1993-1994.

CAVH LLC, Founder and Chairman (2017-Present)

TrafficCast International, Inc. Co-Founder (1999–2020), Chairman (1999-2003)

TranSmart Technologies, Inc. Co-Founder (1996–2022)

IV. HONORS AND AWARDS (Selected)

1. National Academy of Inventors (NAI) Senior Member, 2026.
2. Selected as the top 0.05% lifetime global Highly Ranked Scholars™ in Vehicular Automation, **Global Rank #4**, ScholarGPS™ in 2025 (Highly Ranked Scholars | Vehicular automation | ScholarGPS).
3. Selected as the top 0.05% lifetime global Highly Ranked Scholars™ in Transport, ScholarGPS™ in 2025 (Highly Ranked Scholars | Transport | ScholarGPS).
4. 2025 Best Paper Award, TRB Committee on Vehicle-Highway Automation (ACP30), "*Ethical Decision-Making in Autonomous Vehicles: A Reinforcement Learning Approach for Fair Risk Management*". No. TRBAM-25-02092. Selected Among 208 Papers. (All co-authors are Prof. Ran's former PhD/MS advisees.)
5. Selected as the top 0.05% lifetime global Highly Ranked Scholars™ in Transport, ScholarGPS™ in 2024 (Highly Ranked Scholars | Transport | ScholarGPS).
6. 2020 Best Paper Award of ASCE Journal of Transportation Engineering: Part A. "*Large-Scale Full-Coverage Traffic Speed Estimation Under Extreme Traffic Conditions Using a*

Big Data and Deep Learning Approach: Case Study In China.". (All co-authors are Prof. Ran's former PhD advisees.)

7. Wilbur S. Smith Distinguished Transportation Educator Award. Institute of Transportation Engineers (ITE) International, 2018.
8. Vilas Distinguished Achievement Professorship, UW–Madison, 2016.
9. 1st Place Award for Science and Technology, ITS China, September 2013. He C., Ran B. et al. Large-Scale Passenger Density And Distribution Detection Technology Research And Demonstration.
10. Martin Bruening Award for Best Paper, ITE Wisconsin, March 6, 2013. (Paper: Cheng Y., Parker S., Ran B., and Noyce D.A. Enhanced Analysis of Work Zone Safety Through Integration of Statewide Crash Data with Lane Closure System Data.)
11. Outstanding Service Award, Chinese Overseas Transportation Association (COTA), 2013.
12. 1st Place Award for Excellent Textbook by Tsinghua University. 2012. (Book: Ran B. 2007. Analytic Modeling for Dynamic Traffic Assignment. Chapter 10 in *Research Frontiers of Transportation Planning Theory.* (Eds.) H. Lu and H. Huang. Tsinghua University Press. ISBN 9787302141617.)
13. National Distinguished Expert, 1st Life Time Honor in Transportation Discipline given out by Chinese Central Government, 2010.

V. RESEARCH INTERESTS

Connected Autonomous Mobility	Intelligent Transportation Systems
Collaborative Automated Driving System	Dynamic Transportation Network Models
Connected Automated Vehicle Highway	Smart Cities & Big Data
Traffic and Vehicle Safety	Embodied Intelligence

VI. PUBLICATIONS

A. Books

Ran B. and Boyce D.E. "Dynamic Urban Transportation Network Models -Theory and Implications for Intelligent Vehicle-Highway Systems." No.417 Lecture Notes in Economics and Mathematical Systems, *Springer-Verlag, Heidelberg*, 1994.

Ran B. and Boyce D.E. "Modeling Dynamic Transportation Networks - An Intelligent Transportation System Oriented Approach." *Springer-Verlag, Heidelberg*, 1996.

(10 total books and 6 total book chapters)

B. Peer-Reviewed Journal Articles (Selected)

1. Ran B., Boyce D.E. and LeBlanc L.J. 1993. "A New Class of Instantaneous Dynamic User-Optimal Traffic Assignment Models." *Operations Research*, 41, 1, 192-202.
2. Boyce D.E., Ran B. and LeBlanc L.J. 1995. "Solving an Instantaneous Dynamic User-Optimal Traffic Assignment Model." *Transportation Science*, 29, 2, 128-142.
3. Ran B., Hall R.W. and Boyce D.E. 1996. "A Link-Based Variational Inequality Model for Dynamic Departure Time/Route Choice." *Transportation Research*, Vol. 30B, No.1, 31-46.
4. Ran B., Leight S. and Johnson S. 1997. "Analysis for Human Involvement in Automated Driving." *Transportation Research Record*. No.1589, 30-34.
5. Ran B., Lee D.H., and Shin S. 2002. "A New Solution Algorithm For A Multi-Class Link-Based Dynamic Traffic Assignment Model." *ASCE Journal of Transportation Engineering*. Vol. 128, No. 4, pp. 323-335.
6. Ran B., Jin J., Boyce D.E., Qiu Z., and Cheng Y. 2012. "Perspectives on Future Transportation Research: Impact of ITS Technologies on Next Generation Transportation Modeling." *Journal of Intelligent Transportation Systems*. Vol. 16, Issue 3, pp. 226-242.
7. Ran B., Tan H., Feng J., Liu Y., and Wang W. 2015. "Traffic Speed Data Imputation Method Based on Tensor Completion." *Computational Intelligence and Neuroscience*. Vol. 2015, Article ID 364089.
8. B Liang, F Wang, B Ran. 2024. Optimizing Roadside Unit Deployment in VANETs: A Study on Consideration of Failure. IEEE Transactions on Intelligent Transportation Systems.

(480+ total journal publications)

C. Conference Papers (Selected)

1. Ran B. and Shimazaki T. 1989. "A General Model and Algorithm for the Dynamic Traffic Assignment Problems." *Transport Policy, Management and Technology Towards 2001*, *Selected Proceedings of the Fifth WCTR*. Ventura, CA: Western Periodicals Co.
2. LeBlanc L.J., Ran B. and Boyce D.E. 1992. "Dynamic Travel Choice Models for Urban Transportation Networks." *Proceedings of 1992 IEEE International Conference on Systems Man and Cybernetics*, 225-231.

3. Ran B., Lo H.K., Hongola B. and Weissenberger S. 1994. "Predicting Dynamic Travel Times Under Incidents in Transportation Networks." *Proceedings of IVHS America Fourth Annual Meeting*, 925-933.
4. Ran B. and Tsao H.S.J. 1995. "Toward a Macroscopic Formulation Approach for Dynamic Traffic Flow on An Automated Highway System." Proceedings *of ITS America Fifth Annual Meeting*, 117-126.
5. Ran B. and Tsao H.S.J. January 1996. "Traffic Flow Analysis for an Automated Highway System." Presented at the 75th TRB Annual Meeting.
6. Ran B. and Liu H.X. January 2000. "Development of A Vision-Based Real Time Lane Detection and Tracking System for Intelligent Vehicles." *Proceedings of the 79th TRB Annual Meeting*.
7. Jin J. and Ran B. "Empirical Characteristics of Vehicular (Lagrangian) Fundamental Diagrams and Vehicular (Lagrangian) Shock Waves." *Proceedings of the 90th TRB Annual Meeting*, January 2011.
8. H. Ma and B Ran. 2024. Investigating Traffic Flow Stability: The Role of CAV Market Penetration, Spatial Distribution, and V2X Communication. Paper No. TRBAM-24-01131. *Proceedings of the 103rd TRB Annual Meeting*, January 2024.

(350+ total conference papers)

VII. PATENTS (SELECTED)

1. Ran B, et al. 2025. Localized Artificial Intelligence for Autonomous Driving. US Patent 12,333,944.
2. Ran B., et al. 2025. Autonomous Vehicle Intelligent System. US Patent 12,260,746.
3. Ran B., et al. 2024. Autonomous Vehicle Control System with Roadside Unit (RSU) Network's Global Sensing. US Patent 11,955,002.
4. Ding F., Ran B., et al. 2022. Systems and methods for driving intelligence allocation between vehicles and highways. US Patent 11,495,126.
5. Ran B., et al. 2020-2024. Intelligent Road Infrastructure System (IRIS): Systems and Methods. US Patent 10,692,365, 10,867,512; China Patent 201810287873.3; Japan Patent JPO 7,058,022, JPO 7,207,670.
6. Ran B., et al. 2019-2024. Connected Automated Vehicle Highway Systems and Methods. US Patent 10,380,886; China Patent ZL 201711222257.1; Japan Patent JPO 6,994,203; Korea Patent KIPO 10-2386960; Australia Patent 2018208404. Europe Patent EP 3568843.
7. Ran B. and Li J. 2001. Central Processing and Combined Central and Local Processing of Personalized Real-Time Traveler Information Over Internet/Intranet. US Patent 6,209,026.

8. Ran B. 2001. A Method of Providing Travel Time Predictions. US Patent No. 6,317,686.
9. Ran B. and Huang W. 1998. Proactive Exterior Airbag System and Its Deployment Method for a Motor Vehicle. US Patent 5,732,785.

(220+ total patents and patents pending)

VIII. RESEARCH PROJECTS

Selected Projects:

TransPortal. Wisconsin Department of Transportation (WisDOT).

CFIRE - Next Generation Intersection Control. US Department of Transportation.

System Architecture and Roadmap Development for Autonomous Vehicle Systems. Transportation Research Board.

White Paper on Vehicle-Road-Cloud Systems. International Road Federation.

Guidelines and Standards Development of Cooperative, Connected & Automated Mobility (CCAM). International Road Federation.

IX. TEACHING ACTIVITIES

A. Courses Taught

UW-Madison

Urban Transportation Planning (CEE571)

Advanced Traffic Model and Simulation (CEE678)

Transportation Engineering Seminar – Automated Driving (CEE579-4)

Transportation Engineering Seminar (CEE579-1)

Traffic Control (CEE574)

Advanced Transportation Demand and Supply Modeling (CEE679A)

Intelligent Transportation System (CEE679C)

GIS Applications in Transportation (CEE679D)

MIT

Transportation Network Equilibrium Analysis (1.207)

Methods for Transportation Systems Analysis (1.200, co-taught with Prof. Cynthia Barnhart)

B. Graduate Advising

PhD Students Mentored: 69

MS Students Mentored: 89

Postdoctoral and visiting researchers supervised: 136

Former students, postdoctoral and visiting researchers now faculty: 119

Former students, postdoctoral and visiting researchers in senior organization and industry roles globally: 33, including Prof. Keechoo Choi, President of Ajou University, Korea; Prof. Henry Liu, Directors of UMTRI and MCity, University of Michigan; Prof. Daniel A. Rodriguez, Director of Institute of Transportation Studies, UC-Berkeley; Shawn Leight, Former President of ITE International.

X. SERVICE

A. Professional Service

- Chairman, Faculty Committee, World Transport Convention (WTC), 2023-2026.
- Chairman, Committee on Connected and Autonomous Mobility (CCAM), International Road Federation (IRF), 2023-2028.
- Member, Board of Directors, International Road Federation (IRF), 2026-2027.
- Chair, Task Group on System Architecture, V2X, and Cybersecurity for Connected Automated Vehicle Systems, Transportation Research Board (TRB), 2023-2027.
- Secretary General, Vehicle-Road Coordination Innovation Consortium (VRCIC), China Highway and Transportation Society, China Society of Automotive Engineering, China Institute of Communications, and Global OEM, Vehicle and Technology Companies from US, Europe, and Japan, 2023-2028.
- Chairman, Working Committee on Automated Driving, China Highway and Transportation Society, 2019-2029.
- Associate Editor, *ITS Journal*, 2000-2026; *Transportation Research, Part C*, 2012-2014; *Networks and Spatial Theory*, 2000-2007.
- Reviewer (NSF, University Transportation Center Program, UC Berkeley et al)

B. University Service

- Faculty hiring committees
- Graduate admissions committees
- University Faculty Senator

C. Outreach

- Working with World Bank on Infrastructure and Transportation Issues in Developing Countries during 2003-2008 (with SVP Javed Burki and Richard Stern)
- Advisor for International Affairs for Governors Thompson, Doyle, and Walker, State of Wisconsin
- Founding President, Chinese Overseas Transportation Association (COTA), 1996-1998

XI. INVITED TALKS & KEYNOTES (SELECTED)

1. Traffic Modeling and Dynamic Traffic Assignment. Federal Highway Administration (FHWA). 1992-1995.
2. Dynamic Urban Transportation Networks: DINOSAUR Model Development for ITS Applications, New York Metropolitan Transportation Commission, September 1995.
3. Automated Highway System, Korea Research Institute for Human Settlement (KRIHS) and Seoul National University, Korea, May 1997.
4. Development of An Integrated Transportation System of Connected Automated Vehicles and Highways, Senior Executives from US DOT Secretary's Office, January 8 and February 9, 2018.
5. Connected Automated Vehicle Highway (CAVH) System and Classification of Connected Automated Highways (CAH). AASHTO, ITE, USDOT, FHWA, TRB, ITS America, State DOTs, and City DOTs, January 29, 2020.
6. Technical Development Roadmaps for Collaborative Automated Driving System. IRF and European Union. November 21, 2021.
7. Key Technologies and Industrialized Paths for ICV Development. Moderator of Panel Discussion, Plenary Session, World Intelligent Connected Vehicles Conference. October 17, 2024. Participants include founders, CEOs, Chairmans of major auto firms. In-person attendance over 7,000, Online attendance over 3 million.

XII. INDUSTRY & ENTREPRENEURSHIP

A. TrafficCast International, Inc.

- Co-Founder (1999–2020)
- Chairman & Chief Scientist (1999-2003)
- Provided cutting edge traffic information technology, applications, and digital content to a variety of clients in media, automotive, mobility technology, and public sector markets across North America.
- Raised $20M across seed, Series A, and Series B rounds from venture firms.
- Clients include Google Maps, Apple Maps, 14 auto companies, Sirius XM Radio, iHeart Media, ABC, NBC.
- A team with 100+ employees in engineering, operation centers, and business development.
- Acquired by Iteris Inc., a public company, in 2020, which was later acquired by Almaviva S.p.A. in 2024.

B. CAVH LLC

- Founder and Chairman (2017-Present)
- A leader in the development of vehicle-cloud and vehicle-road-cloud autonomous mobility solutions. It is the owner of the most important vehicle-cloud and vehicle-road-cloud patent portfolio and related implementation know-how. Its technological solutions have been deployed in several settings in the United States, Europe, and Japan, and comprise the backbone of China's aggressive autonomous mobility deployment efforts.
- The Company has over 160 patents and patents pending. It is actively expanding its patent portfolio in the United States and internationally.
- Licensing agreements with leading companies in automotive, AI, roadway, cloud, telecommunication, transport, and map sectors.

C. TranSmart Technologies, Inc.

- Co-Founder (1996–2022)
- A full-service, multi-disciplinary consulting firm, provides planning, engineering, and construction-related services to public and private sector clients.
- TranSmart specializes in Intelligent Transportation Systems (ITS), Connected and Autonomous Vehicles (CAV), civil, traffic, structural, multimodal, and electrical engineering services.
- TranSmart's team of dedicated, and experienced engineers and specialists have successfully led and completed transportation projects covering all phases from conception through operations and maintenance.
- 120+ employees with headquarters in Chicago, Illinois.
- Acquired by Atlas Technical Consultants Inc., a public company, in 2022, which was later acquired by GI Partners, a private equity firm in 2023.

XIII. PROFESSIONAL AFFILIATIONS

- Transportation Research Board (TRB)
- International Road Federation (IRF)
- Institute of Transportation Engineers (ITE) International
- World Transport Convention (WTC)
- Society of Automotive Engineers (SAE) International
- American Society of Civil Engineers (ASCE)
- Institute of Electrical and Electronics Engineers (IEEE)