

HESHAM A. RAKHA, PH.D., P.ENG., F.ASCE, F.IEEE

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Personal Website: <https://sites.google.com/a/vt.edu/hrakha/>

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Center for Sustainable Mobility Website: <https://www.vtti.vt.edu/research/csm/index.php>

In addition to serving as the Samuel Reynolds Pritchard Professor of Engineering in the Charles E. Via, Jr. Department of Civil and Environmental Engineering and a Courtesy Professor in the Bradley Department of Electrical and Computer Engineering, Dr. Rakha directs the Center for Sustainable Mobility at the Virginia Tech Transportation Institute. His research focuses on large-scale transportation system optimization, modeling and assessment. He works on optimizing transportation system operations, including vehicle routing, developing various network and traffic signal control algorithms, developing freeway control strategies (speed harmonization and ramp metering), and optimizing vehicle motion (lateral and longitudinal control of connected automated vehicles (CAVs)) to reduce their energy consumption while ensuring their safety. A key component of these control algorithms are the tools needed to predict the system evolution while capturing the inherent stochasticity in the system. In this area, Dr. Rakha and his team develop and apply modeling, artificial intelligence, and statistical techniques to predict the spatiotemporal evolution of the system. Additionally, Dr. Rakha and his researchers apply machine-learning techniques, as needed, in the development of the control systems that can adapt to the dynamic changes in the surrounding environment. In the area of large-scale transportation system modeling, Dr. Rakha and his researchers have expanded the domain of knowledge (in traveler and driver behavior modeling) and developed a suite of multi-modal agent-based transportation modeling tools, including the INTEGRATION microscopic traffic simulation software. This software was used to evaluate the first dynamic route guidance system, TravTek in Orlando, Florida; to model the Greater Salt Lake City area in preparation for the 2002 Winter Olympic Games; to model Beijing in preparation for the 2008 Summer Olympic Games; to optimize and evaluate the performance of alternative traveler incentive strategies to reduce network-wide energy consumption in the Greater Los Angeles area; and to develop and test an Eco-Cooperative Automated Control (Eco-CAC) system. In the area of transportation system assessment, Dr. Rakha and his researchers continue to develop the theory and models needed to quantify the efficiency, safety, energy, and environmental impacts of these systems. In this domain, one of Dr. Rakha's distinctive technical contributions is in the area of transportation energy modeling and optimization. Specifically, he has developed various vehicle energy and fuel consumption models that are used world-wide to assess the energy and environmental impacts of Intelligent Transportation System (ITS) applications and emerging Connected Automated Vehicle (CAV) systems. The models include the VT-Micro, VT-Meso, the Virginia Tech Comprehensive Fuel consumption Model (VT-CPFM), the VT-CPEM, and the VT-CPHEM models.

Dr. Rakha is an IEEE Fellow and a Professional Engineer in Ontario. He is an Editor for *Sensors* (the Intelligent Sensors Section), a former Academic Editor for the *Journal of Advanced Transportation*, a Senior Editor for the *IEEE Transactions of Intelligent Transportation Systems* and an Associate Editor for the *Journal of Intelligent Transportation Systems: Technology, Planning and Operations* and the *SAE International Journal of Sustainable Transportation, Energy, Environment, & Policy*. Furthermore, he is on the Editorial Board of the *Transportation Letters: The International Journal of Transportation Research*, the *IET Intelligent Transport Systems Journal*, and the *International Journal of Transportation Science and Technology*.

EDUCATIONAL BACKGROUND

- **Queen's University**, Kingston, Canada, Civil Engineering, Post Doctorate Fellow (1993~95).
- **Queen's University**, Kingston, Canada, Civil Engineering, Ph.D. (1993).

- **Queen's University**, Kingston, Canada, Civil Engineering, M.Sc. (1990).
- **Cairo University**, Cairo, Egypt, Civil Engineering (Honors), B.Sc. (1987).

APPOINTMENTS

- **Samuel Reynolds Pritchard Professor of Engineering**, Charles E. Via, Jr. Department of Civil and Environmental Engineering, Virginia Polytechnic Institute and State University, April 2014~Present.
- **Courtesy Professor**, Bradley Department of Electrical and Computer Engineering, Virginia Polytechnic Institute and State University, May 2014~Present.
- **Professor**, Department of Civil and Environmental Engineering, Virginia Polytechnic Institute and State University, June 2007~April 2014.
- **Associate Professor**, Department of Civil and Environmental Engineering, Virginia Polytechnic Institute and State University, Aug. 2003~June 2007.
- **Assistant Professor**, Department of Civil and Environmental Engineering, Virginia Polytechnic Institute and State University, 1999~2003.
- **Director**, Center for Sustainable Mobility, Virginia Tech Transportation Institute, Aug. 2004~Present.
- **Leader**, Transportation Systems and Operations Group, Virginia Tech Transportation Institute, Aug. 1999~Aug. 2004.
- **Research Scientist**, Virginia Tech Transportation Institute, Sept. 1997~Aug. 1999.
- **Adjunct Assistant Professor**, Department of Civil and Environmental Engineering, Queen's University, Sept. 1995~Sept. 1997.
- **Transportation Systems Analyst**, Science Applications International Corporation (SAIC), Sept. 1995~Sept. 1997.
- **Project Manager**, M. Van Aerde & Associates Ltd., Sept. 1993~Sept. 1997.

PROFESSIONAL ACTIVITIES

- **Editor**, *Sensors*, Intelligent Sensors Section.
- **Senior Editor**, *Journal of IEEE Transactions on Intelligent Transportation Systems*.
- **Academic Editor (2018~2022)**, *Journal of Advanced Transportation*.
- **Associate Editor**, *SAE International Journal of Sustainable Transportation, Energy, Environment, & Policy*.
- **Associate Editor**, *Journal of Intelligent Transportation Systems: Technology, Planning and Operations*.
- **Editorial Board**, *Transportation Letters: The International Journal of Transportation Research*.
- **Editorial Board**, *IET Intelligent Transport Systems Journal*.
- **Editorial Board**, *International Journal of Transportation Science and Technology*.
- **Associate Editor (2012-2021)**, *Journal of IEEE Transactions on Intelligent Transportation Systems*.
- **Guest Editor**, Special Issue "Vehicle Energy Consumption and Emissions in Intelligent and Sustainable Transportation Systems", *Energies* (2022).
- **Editor**, Special Issue of *IEEE Transactions on Intelligent Transportation Systems* (2006).
- **Editor**, Special Issue of *Journal of Computer-Aided Civil and Infrastructure Engineering* on Traffic Computational Models (2006).
- **International Program Committee Member**, 9th International Conference on Vehicle Technology and Intelligent Transport Systems, VEHITS 2023, April 26-28, 2023, Prague, Czech Republic.
- **Program Committee Member**, 12th International Conference on Advances in Vehicular Systems, Technologies and Applications, VEHICULAR 2023, March 13-17, 2023, Barcelona, Spain.
- **International Program Committee Member**, 8th International Conference on Vehicle Technology and Intelligent Transport Systems, VEHITS 2022, April 27-29, 2022, Prague, Czech Republic.
- **Program Committee Member**, 10th International Conference on Advances in Vehicular Systems, Technologies and Applications, VEHICULAR 2021, July 18-22, 2021, Nice, France.
- **Associate Editor**, 32nd IEEE Intelligent Vehicles Symposium, Nagoya University, Nagoya, Japan, July 11-15, 2021.

- **Associate Editor**, 16th IFAC Symposium on Control in Transportation Systems, Lille, France, June 8-11, 2021.
- **International Program Committee Member**, 7th International Conference on Vehicle Technology and Intelligent Transport Systems, VEHITS 2021, April 28-30, Virtual.
- **Program Committee Member**, 21st IEEE International Conference on Autonomous Robot Systems and Competitions (ICARSC2021), Santa Maria da Feira, Portugal, April 28-29, 2021.
- **Associate Editor**, 23rd IEEE International Conference on Intelligent Transportation Systems Conference, September 20-23, 2020, Rhodes, Greece.
- **Associate Editor**, 2020 IEEE Intelligent Vehicles Symposium (IV) (IV 2020), June 23-26, 2020, Las Vegas, NV, USA.
- **International Program Committee Member**, 6th International Conference on Vehicle Technology and Intelligent Transport Systems, VEHITS 2020, May 2-4, 2020, Prague, Czech Republic.
- **Associate Editor**, IEEE Forum on Integrated and Sustainable Transportation Systems (ISTS), June 30 - July 2, 2020, Delft, The Netherlands.
- **Associate Editor**, 22nd IEEE International Conference on Intelligent Transportation Systems Conference, October 27 - 30, 2019, Auckland, New Zealand.
- **Associate Editor**, 2019 IEEE Intelligent Vehicles Symposium (IV) (IV2019), June 9-12, Paris, France.
- **Scientific Committee**, 6th IEEE International Conference on Models and Technologies for Intelligent Transportation Systems, June 5-7, 2019, Krakow, Poland.
- **International Program Committee Member**, 5th International Conference on Vehicle Technology and Intelligent Transport Systems, VEHITS 2019, May 3-5, 2019, Crete, Greece.
- **Associate Editor**, 21st IEEE International Conference on Intelligent Transportation Systems Conference, November 4 - 7, 2018, Hawaii, USA.
- **Associate Editor**, IEEE Intelligent Vehicles Symposium, June 26 - July 1, 2018, Changshu, Suzhou, China.
- **Scientific Committee Member**, 7th International Conference on Advances in Vehicular Systems, Technologies and Applications, VEHICULAR 2018, June 24-28, 2018, Venice, Italy.
- **International Program Committee Member**, 15th IFAC Symposium on Control in Transportation Systems (CTS2018), June 6-8, 2018, Genoa, Italy.
- **International Program Committee Member**, 4th International Conference on Vehicle Technology and Intelligent Transport Systems, VEHITS 2018, March 16-18, 2018, Madeira, Portugal.
- **Associate Editor**, 20th IEEE International Conference on Intelligent Transportation Systems (ITSC), Oct. 16-19, 2017, Yokohama, Japan.
- **Scientific Committee Member**, 6th International Conference on Advances in Vehicular Systems, Technologies and Applications, VEHICULAR 2017, July 23-27, 2017, Nice, France.
- **Associate Editor**, IEEE International Conference on Vehicular Electronics and Safety (IEEE ICVES'17), June 27-29, 2017, Vienna, Austria.
- **Scientific Committee Member**, 5th IEEE International Conference on Models and Technologies for Intelligent Transportation Systems, June 26-28, 2017, Naples, Italy.
- **Associate Editor**, IEEE Intelligent Vehicles Symposium, June 11-14, 2017, Redondo Beach, CA, USA.
- **Scientific Committee Member**, 19th EURO Working Group on Transportation Meeting, Sept. 5-7, 2016, Istanbul, Turkey.
- **Associate Editor**, 19th IEEE International Conference on Intelligent Transportation Systems (ITSC), Nov. 1-4, 2016, Rio de Janeiro, Brazil.
- **Associate Editor**, IEEE Intelligent Vehicles Symposium, June 19-22, 2016, Gothenburg, Sweden.
- **Associate Editor**, 18th IEEE International Conference on Intelligent Transportation Systems (ITSC), Sept. 15-18, 2015, Las Palmas de Gran Canaria, Spain.
- **Associate Editor**, 16th IEEE International Conference on Intelligent Transportation Systems (ITSC), Oct. 4-9, 2013, The Hague, The Netherlands.
- **Conference Chairperson**, Conference on "Agent-Based Modeling in Transportation Planning and Operations," Blacksburg, Sept. 30-Oct. 2, 2013.
- **Associate Editor**, 15th IEEE International Conference on Intelligent Transportation Systems (ITSC), Sept. 17-20, 2012, Anchorage, Alaska, USA.

- **Associate Editor**, 14th IEEE International Conference on Intelligent Transportation Systems (ITSC), Sept. 17-20, 2011, Washington DC, USA.
- **Co-Chair**, 13th IEEE International Conference on Intelligent Transportation Systems (ITSC), Sept. 17-20, 2010, Madiera, Portugal.
- **Editor**, 9th IEEE International Conference on Intelligent Transportation Systems (ITSC), Sept. 17-20, 2006, Toronto, Canada.
- **Associate Editor**, 8th IEEE International Conference on Intelligent Transportation Systems (ITSC), Sept. 13-16, 2005, Vienna, Austria.
- **Associate Editor**, 7th IEEE International Conference on Intelligent Transportation Systems (ITSC), October 3-6, 2004, Washington D.C., USA.
- **Fellow**, American Society of Civil Engineers (ASCE).
- **Fellow (M'04, SM'18, F'20)**, Institute of Electrical and Electronics Engineers (IEEE).
- **Member**, Professional Engineers of Ontario (PEO).
- **Member**, Society for the Advancement of Science and Technology in the Arab World (SASTA).
- **Member**, Transportation Research Board (TRB).
- **Member**, ITS America Mobility on Demand Alliance Standing Committee.
- **Member**, Transportation Research Board Committee on Air Quality.
- **Former Member**, Transportation Research Board AHB40 Committee on Highway Capacity and Quality of Service (2009-2012).
- **Former Member**, Transportation Research Board Committee on Traffic Flow Theory & Characteristics (AHB45) (2013-2017).
- **Former Member**, ITS America Benefits Evaluation and Cost Committee.
- **Friend**, Transportation Research Board Committee on Highway Capacity and Quality of Service (AHB40).
- **Friend**, Transportation Research Board Committee on Artificial Intelligence (ABJ70).

AWARDS

- **Most Cited Article Award** (2023), International Journal of Transportation Science and Technology (IJTST) for paper Du, J.; Rakha, H.A.; Filali, F.; Eldardiry, H. COVID-19 Pandemic Impacts on Traffic System Delay, Fuel Consumption and Emissions. *International Journal of Transportation Science and Technology* 2020, <https://doi.org/10.1016/j.ijst.2020.11.003>.
- **American Society of Civil Engineers (ASCE) Fellow**, 2022.
- **Davis Miller Memorial Prize: Best Paper Presented at ATRF 2022 by a Young Researcher**, Australian Transport Research Forum 2022, Adelaide, Australia, September 28-30.¹
- **IEEE ITS Outstanding Research Award** (2021), IEEE Intelligent Transportation Systems Society (<https://ieeetitss.org/awards/outstanding-research/>).
- **First Place**, [IEEE ITSC 2020 UAS4T Competition](#).
- **IEEE Fellow** (Class of 2020) for contributions to optimization, modeling and assessment of transportation systems.
- **User Information Systems (AND20) 2019 Best Paper Award**, Transportation Research Board Annual Meeting, Washington DC, January 12-16, 2020.
- **Best Paper Award** (2018), 4th International Conference on Vehicle Technology and Intelligent Transport Systems (VEHITS), Madeira, Portugal, March 15-18.
- **Most Cited Article Award** (2018), International Journal of Transportation Science and Technology (IJTST) for paper Rakha H., Ahn K., and Moran K., (2012), INTEGRATION Framework for Modeling Eco-routing Strategies: Logic and Preliminary Results, *International Journal of Transportation Science and Technology*, Vol. 1, no. 3, pp. 259-274.
- **Best Paper Award** (2016), 2nd International Conference on Vehicle Technology and Intelligent Transport

¹ Yang, Z.; Zheng, Z.; Kim, J.; and Rakha, H.A. (2022), Cooperative Eco-driving System for Mixed Traffic on Urban Roads, 43rd Australasian Transport Research Forum 2022, Adelaide, Australia, September 28-30.

Systems (VEHITS), Rome, Italy.

- **Best Scientific Paper Award** (2013), 20th ITS World Congress, Tokyo, Japan.
- **Best Scientific Paper Award** (2012), 19th ITS World Congress, Vienna, Austria.
- **Best Paper Award in the TRB Truck and Bus Safety Committee** (2011), Transportation Research Board Meeting, Washington DC, USA. Paper was one of six papers nominated for the Patricia Waller Award for the best safety-related paper of the year at the 2011 TRB Annual Meeting.
- **Dean's Award for Excellence in Research** (2007), College of Engineering at Virginia Tech.
- **Faculty Fellow Award** (2004~2006), College of Engineering at Virginia Tech.
- **Dean's Award for Outstanding New Professor** (2002), College of Engineering at Virginia Tech.
- **Queen's Graduate Fellowship** (1991~1993), Queen's University.
- **McLaughlin Award** (1990), Queen's University.
- **Ontario Graduate Scholarship** (1989), Queen's University.
- **Dean's Award** (1988), Queen's University.
- **Civil Engineering Student Excellence Award** (1982~1987), Cairo University.

SCHOLARLY PUBLICATIONS

Google Scholar (<https://scholar.google.com/citations?user=JRbK06UAAAAJ&hl=en> accessed February 14, 2023) provides a breakdown of the various citations, as illustrated below.

	All	Last Five Years
Citations	19,261	9,606
h-index ¹	69	48
i10-index ²	320	208

1. h-index is the largest number h such that h publications have at least h citations. The second column has the "recent" version of this metric, which is the largest number h such that h publications have at least h new citations in the last 5 years.
2. i10-index is the number of publications with at least 10 citations. The second column has the "recent" version of this metric, which is the number of publications that have received at least 10 new citations in the last 5 years.

News Releases

- NR-1. Collegiate Times, "VTI writes algorithm to predict traffic flow," September 17, 2014. http://www.collegiatetimes.com/news/state/article_db6ac06c-3ebd-11e4-84f7-001a4bcf6878.html.
- NR-2. The Wall Street Journal, "Slowing Down Will Get You Through a Traffic Jam Faster," Nov. 7, 2014. <https://www.wsj.com/articles/traffic-engineers-say-slowing-down-will-get-you-through-a-jam-faster-1415386073>.
- NR-3. Virginia Tech News, "Virginia Tech Transportation Institute Launches Effort to Make Traveling Through Traffic Lights Safer, Smarter and Cheaper," May 2015. <http://www.vtnews.vt.edu/articles/2015/05/052015-vtti-trafficlighttests.html>.
- NR-4. ASHE Blue Ridge Section, "Virginia Tech Transportation Institute Launches Effort to Make Traveling Through Traffic Lights Safer, Smarter and Cheaper," May 2015.
- NR-5. Current Issues Tambah Pedas, "Caught in CNY traffic jam? Here are 3 reasons why they happen...according to science!" January 26, 2017. <https://cilisos.my/caught-in-cny-traffic-jam-here-are-3-reasons-why-they-happen-according-to-science/>.
- NR-6. National Public Radio Morning Edition, "Self-Driving Cars Could Ease Our Commutes, But That'll Take A While," February 10, 2017. <http://www.npr.org/sections/alltechconsidered/2017/02/10/514091049/self-driving-cars-could-ease-our-commutes-but-thatll-take-a-while>.
- NR-7. Virginia Tech News, "Certificate in urban computing trains grad students to become data scientists," February 20, 2017, <https://vtnews.vt.edu/articles/2017/02/ncr-urbancomputingcertificate.html>.
- NR-8. Las Vegas Review-Journal, "Nevada transportation department wishes for bliss on Las Vegas freeways," March 7, 2017, <https://www.reviewjournal.com/opinion/opinion-columns/steve-sebelius/nevada-transportation-department-wishes-for-bliss-on-las-vegas-freeways/>.
- NR-9. Virginia Tech News, "Virginia Tech expert: Rolling back emission standards for automobile companies will

- impact future production of electric cars, harm the environment,” March 8, 2017, <http://vtnews.vt.edu/articles/2017/03/unirel-emissions-rakha.html>.
- NR-10. Newswise, “Virginia Tech Expert Says Rolling Back Emission Standards for Automobile Companies Will Impact Future Production of Electric Cars, Harm the Environment,” March 8, 2017, <http://www.newswise.com/articles/virginia-tech-expert-says-rolling-back-emission-standards-for-automobile-companies-will-impact-future-production-of-electric-cars-harm-the-environment>.
- NR-11. Mid-Atlantic Transportation Sustainability (MATS) University Transportation Center e-Newsletter, “Research Spotlight: Eco-Speed Control for Diesel and Hybrid Electric Buses in the Vicinity of Signalized Intersections,” April 6, 2017, <http://www.matsutc.org/2017/03/research-spotlight-eco-speed-control-for-diesel-and-hybrid-electric-buses-in-the-vicinity-of-signalized-intersections/>.
- NR-12. TechZone360, “Self-Driving Cars and Their Impact on Your Commute,” by Lindsey Patterson, April 12, 2017, <http://www.techzone360.com/topics/techzone/articles/2017/04/12/431189-self-driving-cars-their-impact-your-commute.htm#>.
- NR-13. Wired, “Red Light Cameras May Issue Some Tickets Using the Wrong Formula,” by Aarian Marshall, May 1, 2017. <https://www.wired.com/2017/05/red-light-cameras-may-issuing-tickets-based-bogus-math/>.
- NR-14. MACH NBC News, “If Elon Musk Can't Solve Our Traffic Woes, These Technologies Just Might,” by Joseph Bennington-Castro, June 7, 2017, <https://www.nbcnews.com/mach/mach/if-elon-musk-can-t-solve-our-traffic-woes-these-n769171>.
- NR-15. The Roanoke Times, “Highway traffic in Botetourt County is headed for a new kind of roundabout,” by Laurence Hammack, September 22, 2017, http://www.roanoke.com/news/local/botetourt_county/highway-traffic-in-botetourt-county-is-headed-for-a-new/article_89434d2e-0509-509c-97bd-02ae70b38d0a.html.
- NR-16. KOIN 6 News, “Wrongly timed Beaverton light catches many drivers,” Dan Tilkin, November 30, 2017, <http://koin.com/2017/11/30/wrongly-timed-beaverton-light-catches-many-drivers/>.
- NR-17. Traffic Technology International Magazine, “Roadside Revolution,” James Gordon, April/May 2018, www.TrafficTechnologyToday.com, <http://www.ukimediaevents.com/publication/895ce3b9/48>.
- NR-18. Baltimore Sun, “Why is it so hard for Baltimore to synchronize its traffic lights? Here’s what we found,” Colin Campbell, October 15, 2019. <https://www.baltimoresun.com/ask/bs-ask-traffic-lights-20191015-ietjxqoqkngcvle6xywze65f2e-story.html>.
- NR-19. Transport Topics, “TuSimple Reports Its Autonomous Trucks Reduce Fuel Consumption,” Roger Gilroy, December 18, 2019. <https://www.ttnews.com/articles/tusimple-reports-its-autonomous-trucks-reduce-fuel-consumption>.
- NR-20. Virginia Tech, “Hesham Rakha awarded the 2021 IEEE Intelligent Transportation System Outstanding Research Award,” Nov. 30, 2021. https://vtx.vt.edu/articles/2021/11/vtti-hesham-rakha-ieee-transportation-research-award.html?utm_source=cmpgn_news&utm_medium=email&utm_campaign=vtUnirelNewsDailyPublicCMP_120121-public.
- NR-21. WSET, “When buying an electric vehicle is good for your wallet,” April 12, 2022. https://wset.com/news/local/when-buying-an-electric-vehicle-is-good-for-your-wallet-electric-vs-gas-car-gas-prices-fuel-electric-vehicle-charging-station-lynchburg-virginia-april-12-2022?utm_source=cmpgn_news&utm_medium=email&utm_campaign=vtUnirelNewsDailyCMP_042122-fs.
- NR-22. WSLs 10 News, ‘We cannot afford to be California’: Gov. Youngkin vows to fight against gas-vehicle ban, October 4, 2022. <https://www.wsls.com/news/local/2022/10/04/we-cannot-afford-to-be-california-gov-youngkin-vows-to-fight-against-gas-vehicle-ban/>.
- NR-23. WalletHub, “2022’s Best & Worst Cities to Drive in,” October 11, 2022. https://wallethub.com/edu/best-worst-cities-to-drive-in/13964#expert=Hesham_A._Rakha.
- NR-24. Virginia Tech, “Buying a car just got more efficient, thanks to Virginia Tech Transportation Institute's Hesham Rakha,” Oct. 19, 2022. https://vtx.vt.edu/articles/2022/10/vtti-icev-bev-cost-comparison-tool.html?utm_source=cmpgn_news&utm_medium=email&utm_campaign=vtUnirelNewsDailyCMP_10192-fs.
- NR-25. Civil Engineering Source, “Rakha elevated to Fellow status,” Jan. 27, 2023. <https://www.asce.org/publications-and-news/civil-engineering-source/article/2023/01/27/rakha-elevated-to-fellow-status>.

Books

- B-1. **Rakha H.A.** (1990), "An Evaluation of the Benefits of User and System Optimized Route Guidance Strategies," Master Thesis, Department of Civil Engineering, Queen's University, p168. ISBN: 0315608714.
- B-2. **Rakha H.A.** (1993), "A Simulation Approach for Modeling Real-Time Traffic Signal Controls," Ph.D. Thesis, Department of Civil Engineering, Queen's University, p413. ISBN: 0315852143.
- B-3. **Rakha, H.;** Chen, H.*; Haghani, A.; Kaveh, F.S. (2013), "Assessment of Data Quality Needs for Use in Transportation Applications," US Department of Transportation, p124. ISBN-13: 978-1495413780.
- B-4. **Rakha, H.;** Ahn, K.; Park, S. (2014), "Predictive Eco-Cruise Control (ECC) System: Model Development, Modeling, and Potential Benefits," US Department of Transportation, p94. ISBN-13: 978-1499518986.

Book Chapters

- BC-1. **Rakha, H.;** Paramahamsan, H.*; Van Aerde, M. (2005), "Comparison of Static Maximum Likelihood Origin-Destination Formulations," *Transportation and Traffic Theory: Flow, Dynamics and Human Interaction*, Proceedings of the 16th International Symposium on Transportation and Traffic Theory (ISTTT16), pp. 693-716.
- BC-2. Yue, H.*; **Rakha, H.** (2008), "Validation of the VT-Meso Vehicle Fuel Consumption and Emission Model," *Efficient Transportation and Pavement Systems: Characterization, Mechanisms, Simulation and Modeling* (Editors: Al-Qadi, Sayed, Alnuaimi, and Masad), Taylor and Francis, ISBN: 978-0-415-48979-9 (Hand Book), ISBN: 978-0-203-88120-0 (Electronic Book), pp. 97-114.
- BC-3. Zhang, Y.*; **Rakha, H.** (2008), "Systematic Analysis of Capacity of Weaving Sections," *Efficient Transportation and Pavement Systems: Characterization, Mechanisms, Simulation and Modeling* (Editors: Al-Qadi, Sayed, Alnuaimi, and Masad), Taylor and Francis, ISBN: 978-0-415-48979-9 (Hand Book), ISBN: 978-0-203-88120-0 (Electronic Book), pp. 151-164.
- BC-4. **Rakha, H.;** Arafeh, M.*; Abdel-Salam, A.*; Guo F.; Medina, A. (2008), "Linear Regression Crash Prediction Models: Issues and Proposed Solutions," *Efficient Transportation and Pavement Systems: Characterization, Mechanisms, Simulation and Modeling* (Editors: Al-Qadi, Sayed, Alnuaimi, and Masad), Taylor and Francis, ISBN: 978-0-415-48979-9 (Hand Book), ISBN: 978-0-203-88120-0 (Electronic Book), pp. 241-256.
- BC-5. **Rakha, H.;** Tawfik, A.* (2009), "Traffic Networks: Dynamic Traffic Routing, Assignment, and Assessment," *Encyclopedia of Complexity and Systems Science*, Part 20, pp. 9429-9470, https://doi.org/10.1007/978-0-387-30440-3_562.
- BC-6. **Rakha H.** (2015), "Transportation Sustainability: What Can Intelligent Transportation Systems Offer?" in The Institution of Engineering and Technology Engineering and Technology Reference. DOI: 10.1049/etr.2015.0002.
- BC-7. Chen, H.*; **Rakha, H.** (2015), "Real-Time Freeway Travel Time Prediction," in The Institution of Engineering and Technology Engineering and Technology Reference. <https://doi.org/10.1049/etr.2015.0001>.
- BC-8. Elbery, A.*; **Rakha, H.;** ElNainay, M.; Hoque, M.A. (2015), "An Integrated Architecture for Simulation and Modeling of Small- and Medium-Sized Transportation and Communication Networks," in Smartgreens 2015 and VEHTS 2015, CCIS 579, pp. 1–22.
- BC-9. **Rakha H.** (2016), "Traffic Flow Theory," in Handbook of Transportation. ISBN 978-1-138-79821-2.
- BC-10. Elbery, A.*; **Rakha, H.A.;** ElNainay, M.; Hoque, M.A. (2016), "An Integrated Architecture for Simulation and Modeling of Small- and Medium-Sized Transportation and Communication Networks," in Smart Cities, Green Technologies, and Intelligent Transport Systems, Volume 579 of the series Communications in Computer and Information Science, pp. 282-303. https://doi.org/10.1007/978-3-319-27753-0_16.
- BC-11. **Rakha, H.A.;** Elhenawy, M.*; Ashqar, H.*; Almannaa, M.*; Ghanem, A.* (2018), "Smart Bike-Sharing Systems for Smart Cities," in *Data Analytics for Smart Cities*, pp. 125-156. ISBN: 978-1138308770.

* Student or postdoc.

- BC-12. Elouni, M.*; **Rakha, H.A.**; Bichiou, Y.* (2019), Implementation and Investigation of a Weather- and Jam Density-Tuned Network Perimeter Controller. In: Donnellan, B., Klein, C., Helfert, M., Gusikhin, O. (eds) Smart Cities, Green Technologies and Intelligent Transport Systems. SMARTGREENS VEHITS 2018 2018. Communications in Computer and Information Science, vol 992. Springer, Cham. https://doi.org/10.1007/978-3-030-26633-2_13.
- BC-13. Elbery, A.*; Bichiou, Y.*; **Rakha, H.A.**; Du, J.; Dvorak, F.; Klenk, M. (2018), "City-level Agent-based Multi-modal Modeling of Transportation Networks: Model Development and Preliminary Testing," in *Smart Cities, Green Technologies, and Intelligent Transport Systems*. https://doi.org/10.1007/978-3-030-26633-2_14.
- BC-14. Ihenawy, M.*; Hassan, A.A.*; **Rakha, H.A.** (2019). A Probabilistic Travel Time Modeling Approach Based on Spatiotemporal Speed Variations. In: Donnellan, B., Klein, C., Helfert, M., Gusikhin, O. (eds) Smart Cities, Green Technologies and Intelligent Transport Systems. SMARTGREENS VEHITS 2018 2018. Communications in Computer and Information Science, vol 992. Springer, Cham. https://doi.org/10.1007/978-3-030-26633-2_17.
- BC-15. Kang, K.*; **Rakha, H.A.** (2019) Development of a Decision-Making Model for Merging Maneuvers: A Game Theoretical Approach. In: Hamdar S. (eds) Traffic and Granular Flow '17. TGF 2017. https://doi.org/10.1007/978-3-030-11440-4_12.
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⁵ Recipient of the Best Scientific Paper Award from North America.

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- C-129. Kamalanathsharma, R.*; **Rakha, H.** (2013), "Fuel-Optimal Vehicle Throttle Control: Model Logic and Preliminary Testing," 20th ITS World Congress, Tokyo, Japan, October 14-18 [Paper: 4136].
- C-130. Chen, H.*; **Rakha, H.**; McGhee, C. (2013), "Dynamic Travel Time Prediction using Pattern Recognition," 20th ITS World Congress, Tokyo, Japan, October 14-18 [Paper: 4108].⁶
- C-131. Kamalanathsharma, R.*; Zohdy, I.*; **Rakha, H.** (2013), "Public Perception on Increased Use of Technology in Automobiles: Survey Findings," 20th ITS World Congress, Tokyo, Japan, October 14-18 [Paper: 4112].
- C-132. Chen, H.*; **Rakha, H.** (2014), "Agent-Based Modeling Approach to Predict Experienced Travel Times," Transportation Research Board 93rd Annual Meeting, Washington DC, January 12-16, CD-ROM [Paper # 14-3851].
- C-133. Kamalanathsharma, R.*; **Rakha, H.** (2014), "Simulation Testing of Connected Vehicle Applications in a Cloud-based Traffic Simulation Environment," Transportation Research Board 93rd Annual Meeting, Washington DC, January 12-16, CD-ROM [Paper # 14-4260].
- C-134. Chen, H.*; **Rakha, H.** (2014), "Data-driven Particle Filter for Multi-step Look-ahead Travel Time Prediction," Transportation Research Board 93rd Annual Meeting, Washington DC, January 12-16, CD-ROM [Paper # 14-0824].
- C-135. **Rakha, H.**; Baird, M.*; El-Shawarby, I. (2014), "Designing Traffic Signal Yellow and Change Intervals Considering Truck Impacts," Transportation Research Board 93rd Annual Meeting, Washington DC, January 12-16, CD-ROM [Paper # 14-0285].
- C-136. Cetin, M.*; **Rakha, H.** (2014), "Estimating Fuel Consumption and Carbon Footprint at Signalized Intersections using Probe Vehicle Trajectories," Transportation Research Board 93rd Annual Meeting, Washington DC, January 12-16, CD-ROM [Paper # 14-2285].
- C-137. Kamalanathsharma, R.*; **Rakha, H.** (2014), "Fuel-Optimal Vehicle Throttle Control: Model Logic and Preliminary Testing," Transportation Research Board 93rd Annual Meeting, Washington DC, January 12-16, CD-ROM [Paper # 14-0433].
- C-138. Jahangiri, A.*; **Rakha, H.** (2014), "Developing a Support Vector Machine Classifier for Transportation Mode Identification by Using Mobile Phone Sensor Data," Transportation Research Board 93rd Annual Meeting, Washington DC, January 12-16, CD-ROM [Paper # 14-1442].
- C-139. Elhenawy, M.*; **Rakha, H.** (2014), "Congestion Prediction Using Adaptive Boosting Machine Learning Classifiers," Transportation Research Board 93rd Annual Meeting, Washington DC, January 12-16, CD-ROM [Paper # 14-0830].
- C-140. Tawfik, A.*; **Rakha, H.** (2014), "Modeling Driver Perceptions of Travel Conditions in an In-Situ Route Choice Experiment in Real-World Conditions," Transportation Research Board 93rd Annual Meeting, Washington DC, January 12-16, CD-ROM [Paper # 14-5060].
- C-141. Sangster, J.*; **Rakha, H.** (2014), "Implications of CAP-X: Operational Limitations of Alternative Intersections," Transportation Research Board 93rd Annual Meeting, Washington DC, January 12-16, CD-ROM [Paper # 14-3794].
- C-142. Elhenawy, M.*; **Rakha, H.** (2014), "Congestion Prediction using Adaptive Boosting Machine Learning Classifiers," 21st ITS World Congress, Ann Arbor, USA, September 8-11.
- C-143. Zohdy, I.*; **Rakha, H.** (2014), "Intersection Management of Autonomous Vehicles using an Agent-based Passenger Priority Framework," 21st ITS World Congress, Ann Arbor, USA, September 8-11.
- C-144. Elhenawy, M.*; **Rakha, H.** (2014), "Random Forest Travel Time Prediction Algorithm using Spatiotemporal Speed Measurements," 21st ITS World Congress, Ann Arbor, USA, September 8-11.
- C-145. Jahangiri, A.*; **Rakha, H.**; Dingus, T. (2015), "Predicting Red-light Running Violations at Signalized Intersections using Machine Learning Techniques," Transportation Research Board 94th Annual Meeting,

⁶ Received Best Paper Award.

- Washington DC, January 11-15, CD-ROM [Paper # 15-2910].
- C-146. Jahangiri, A.*; **Rakha, H.** (2015), "Distributed Learning: An Application to Transportation Mode Identification," Transportation Research Board 94th Annual Meeting, Washington DC, January 11-15, CD-ROM [Paper # 15-0826].
- C-147. Chen, H.*; **Rakha, H.** (2015), "Predicting Freeway Travel Times Using Dynamic Template Matching," Transportation Research Board 94th Annual Meeting, Washington DC, January 11-15, CD-ROM [Paper # 15-1883].
- C-148. Hassan, A.*; **Rakha, H.** (2015), "A Fully-Distributed Heuristic Algorithm for Control of Autonomous Vehicle Movements at Isolated Intersections," Transportation Research Board 94th Annual Meeting, Washington DC, January 11-15, CD-ROM [Paper # 15-4157].
- C-149. Elhenawy, M.*; **Rakha, H.** (2015), "Matrix Projection Approach for Predicting Freeway State Evolution and Dynamic Travel Times," Transportation Research Board 94th Annual Meeting, Washington DC, January 11-15, CD-ROM [Paper # 15-0843].
- C-150. Wang, J.*; **Rakha, H.** (2015), "Impact of Dynamic Route Information on Day-to-Day Driver Route Choice Behavior," Transportation Research Board 94th Annual Meeting, Washington DC, January 11-15, CD-ROM [Paper # 15-4918].
- C-151. Elhenawy, M.*; Chen, H.*; **Rakha, H.** (2015), "Traffic Congestion Identification Considering Weather and Visibility Conditions Using Mixture Linear Regression," Transportation Research Board 94th Annual Meeting, Washington DC, January 11-15, CD-ROM [Paper # 15-3323].
- C-152. Sangster, J.*; **Rakha, H.**; Al-Kaisy, A. (2015), "Comparative Analysis of Through-about, Roundabout, and Conventional Signalized Intersection Designs," Transportation Research Board 94th Annual Meeting, Washington DC, January 11-15, CD-ROM [Paper # 15-1866].
- C-153. Wang, J.*; **Rakha, H.**; Yu, L. (2015), "Operating Mode Distribution Characteristics of Different Freeway Weaving Configurations and their Effects on Vehicular Emissions," Transportation Research Board 94th Annual Meeting, Washington DC, January 11-15, CD-ROM [Paper # 15-1429].
- C-154. Ong, B.T.*; **Rakha, H.**; El-Shawarby, I. (2015), "Designing Traffic Signal Clearance Intervals Considering Bus Impacts," Transportation Research Board 94th Annual Meeting, Washington DC, January 11-15, CD-ROM [Paper # 15-1344].
- C-155. Yang, H.; **Rakha, H.** (2015), "Estimation of Dynamic Origin-Destination Matrices using Simulation-based Optimization," Transportation Research Board 94th Annual Meeting, Washington DC, January 11-15, CD-ROM [Paper # 15-2977].
- C-156. Ong, B.T.*; El-Shawarby, I.; **Rakha, H.** (2015), "Analysis of Bus Driver Perception Reaction Times and Deceleration Behavior for the Design of Traffic Signal Clearance Times," Transportation Research Board 94th Annual Meeting, Washington DC, January 11-15, CD-ROM [Paper # 15-0994].
- C-157. Tawfik, A.*; **Rakha, H.** (2015), "Modeling Heterogeneity of Driver Route Choice Behavior using Hierarchical Learning-Based Models: A Longitudinal, In-Situ Experiment in Real World Conditions," Transportation Research Board 94th Annual Meeting, Washington DC, January 11-15, CD-ROM [Paper # 15-3135].
- C-158. Laharotte, P.A.*; Billot, R.; El Faouzi, N.; **Rakha, H.** (2015), "Network-Wide Traffic State Prediction Using Bluetooth Data," Transportation Research Board 94th Annual Meeting, Washington DC, January 11-15, CD-ROM [Paper # 15-3022].
- C-159. Park, S.; Ahn, K.; **Rakha, H.**; Lee, C.* (2015), "Real-Time Emission Modeling with EPA MOVES: Framework Development and Preliminary Investigation," Transportation Research Board 94th Annual Meeting, Washington DC, January 11-15, CD-ROM [Paper # 15-2604].
- C-160. Sangster, J.*; **Rakha, H.** (2015), "Capacity-based Predictions and Delay-based Results: CAP-X Limitations and Suggestions for Improvement," Transportation Research Board 94th Annual Meeting, Washington DC, January 11-15, CD-ROM [Paper # 15-1857].
- C-161. Elbery, A.*; **Rakha, H.A.**; ElNainay, M.; Hoque M.A., (2015) "VNetIntSim: An Integrated Simulation Platform to Model Transportation and Communication Networks," International Conference on Vehicle Technology and Intelligent Transport Systems, Lisbon, Portugal, May 20-22.

- C-162. Van Essen, M.*; **Rakha, H.**; Vreeswijk, J.; Wismans, L.; Van Berkum, E. (2015). "Day-to-day route choice modeling incorporating inertial behavior." IATBR Conference, 19-23 July, 2015, Windsor, UK.
- C-163. Elhenawy, M.*; Elbery, A.*; Hassan, A.*; **Rakha H.** (2015), "An Intersection Game-Theory-Based Traffic Control Algorithm in a Connected Vehicle Environment," IEEE 18th International Conference on Intelligent Transportation Systems, Las Palmas de Gran Canaria, Spain, Sept. 15-18. [Paper # 1505].
- C-164. Elbery, A.*; **Rakha, H.**; El-Nainay, M.; Drira, W.; Filali, F. (2015), "Eco-Routing Using V2I Communication: System Evaluation," IEEE 18th International Conference on Intelligent Transportation Systems, Las Palmas de Gran Canaria, Spain, Sept. 15-18. [Paper # 1436].
- C-165. Du, J.; **Rakha, H.**; Gayah V. (2015), "Transportation Network Control using the Macroscopic Fundamental Diagram" IEEE 18th International Conference on Intelligent Transportation Systems, Las Palmas de Gran Canaria, Spain, Sept. 15-18. [Paper # 1442].
- C-166. Jahangiri, A.*; **Rakha, H.**; Dingus, T. (2015), "Adopting Machine Learning Methods to Predict Red-light Running Violations," IEEE 18th International Conference on Intelligent Transportation Systems, Las Palmas de Gran Canaria, Spain, Sept. 15-18. [Paper # 299].
- C-167. Wang, J.*; **Rakha, H.** (2016), "Heavy-Duty Diesel Truck Fuel Consumption Modeling," Transportation Research Board 95th Annual Meeting, Washington DC, January 10-14. [Paper # 16-2147]
- C-168. Fiori, C.; Ahn, K.; **Rakha, H.** (2016), "Virginia Tech Comprehensive Power-based Electric Vehicle Energy Consumption Model: Model Development and Validation," Transportation Research Board 95th Annual Meeting, Washington DC, January 10-14. [Paper # 16-0631]
- C-169. Du, J.; Guo, F.; **Rakha, H.** (2016), "Evaluation of High-Occupancy-Toll Lane Usage by Single-Occupancy Vehicles," Transportation Research Board 95th Annual Meeting, Washington DC, January 10-14. [Paper # 16-0793]
- C-170. Laguna, A.*; **Rakha, H.**; Du J. (2016), "Optimizing Isolated Traffic Signal Timing Considering Energy and Environmental Impacts," Transportation Research Board 95th Annual Meeting, Washington DC, January 10-14. [Paper # 16-1092]
- C-171. Ahn, K.; **Rakha, H.**; Kang, K.*; Govindarajan, V. (2016), "Multimodal Intelligent Transportation Signal System Impact Assessment: Field Testing and Simulation Results," Transportation Research Board 95th Annual Meeting, Washington DC, January 10-14. [Paper # 16-0731]
- C-172. Elhenawy, M.; Jahangiri, A.*; **Rakha, H.**; El-Shawarby, I. (2016), "Classification of Driver Stop/Run Behavior at the Onset of a Yellow Indication for Different Vehicle Types and Roadway Surface Conditions using Historical Behavior," Transportation Research Board 95th Annual Meeting, Washington DC, January 10-14. [Paper # 16-1632]
- C-173. Sangster, J.*; **Rakha, H.** (2016), "New Perspectives on Delay and Level of Service at Intersections and Interchanges," Transportation Research Board 95th Annual Meeting, Washington DC, January 10-14. [Paper # 16-2397]
- C-174. Abdelmegeed, M.*; Ahn, K.; **Rakha, H.** (2016), "Modeling Light Duty Vehicle Emissions Exploiting VT-CPFM Fuel Estimates," Transportation Research Board 95th Annual Meeting, Washington DC, January 10-14. [Paper # 16-2448]
- C-175. Elhenawy, M.*; **Rakha, H.** (2016), "Expected Travel Time and Reliability Prediction using Mixture Linear Regression," Transportation Research Board 95th Annual Meeting, Washington DC, January 10-14. [Paper # 16-2813]
- C-176. Elhenawy, M.*; **Rakha, H.** (2016), "Traffic Stream Speed Short-term Prediction using Machine Learning Techniques: I-66 Case Study," Transportation Research Board 95th Annual Meeting, Washington DC, January 10-14. [Paper # 16-3805]
- C-177. Yang, H.; Ala, V.M.*; **Rakha H.** (2016), "Eco-Cooperative Adaptive Cruise Control at Signalized Intersections Considering Queue Effects," Transportation Research Board 95th Annual Meeting, Washington DC, January 10-14. [Paper # 16-1593]
- C-178. Elbery, A.*; **Rakha, H.**; ElNainay, M.; Drira, W.; Felali, F. (2016), "Eco-Routing: An Ant Colony Based Approach," 2nd International Conference on Vehicle Technology and Intelligent Transport Systems

- (VEHITS), Rome, April 23-24.
- C-179. Elhenawy, M.*; **Rakha, H.**; Chen, H. (2016), "Traffic Stream Short-term State Prediction using Machine Learning Techniques," 2nd International Conference on Vehicle Technology and Intelligent Transport Systems (VEHITS), Rome, April 23-24.
- C-180. Elhenawy, M.*; **Rakha, H.**; Chen, H. (2016), "A Unified Real-time Automatic Congestion Identification Model Considering Weather and Roadway Visibility Conditions," 2nd International Conference on Vehicle Technology and Intelligent Transport Systems (VEHITS), Rome, April 23-24. ⁷
- C-181. Chen, H.*; **Rakha, H.**; Amara, L.; El-Shawarby, I.; AlMannaa, M. (2016), "Development and Preliminary Field Testing of an In-Vehicle Eco-Speed Control System in the Vicinity of Signalized Intersections," 14th IFAC Symposium on Control in Transportation Systems, Istanbul, Turkey, May 18-20.
- C-182. Elbery, A.*; El-Nainay, M.; **Rakha, H.** (2016), "Proactive and Reactive Carpooling Recommendation System based on Spatiotemporal and Geosocial Data," WiMob, New York, USA, October 17-19.
- C-183. Elhenawy, M.*; **Rakha, H.** (2016), "Stretch-Wide Traffic State Prediction Using Discriminatively Pre-Trained Deep Neural Networks," 19th IEEE Intelligent Transportation Systems Conference, Rio de Janeiro, Brazil, Nov. 1-4.
- C-184. Jahangiri, A.*; Elhenawy, M.*; **Rakha, H.**; Dingus, T. (2016), "Investigating Cyclist Violations at Signal-Controlled Intersections Using Naturalistic Cycling Data," 19th IEEE Intelligent Transportation Systems Conference, Rio de Janeiro, Brazil, Nov. 1-4.
- C-185. Abdelghaffar, H.*; Yang, H.; **Rakha, H.** (2016), "Isolated Traffic Signal Control Using a Game Theoretic Framework," 19th IEEE Intelligent Transportation Systems Conference, Rio de Janeiro, Brazil, Nov. 1-4.
- C-186. Bichiou, Y.; **Rakha, H.** (2017), "Real-Time Optimal Intersection Control System for Autonomous-Cooperative Vehicles," Transportation Research Board 96th Annual Meeting, Washington DC, January 7-12. [Paper # 17-00202].
- C-187. Tu, R.*; Du, J.; **Rakha, H.** (2017), "System-Wide Impacts of Arterial and Freeway Eco-Cooperative Adaptive Cruise Control," Transportation Research Board 96th Annual Meeting, Washington DC, January 7-12. [Paper # 17-02513].
- C-188. Yang, H.; **Rakha, H.** (2017), "Reinforcement Learning Ramp Metering Control for Weaving Sections in a Connected Vehicle Environment," Transportation Research Board 96th Annual Meeting, Washington DC, January 7-12. [Paper # 17-03689].
- C-189. Fiori, C.; Ahn, K.; **Rakha, H.** (2017), "Effect of Route Choice on Battery Electric Vehicle Energy Consumption," Transportation Research Board 96th Annual Meeting, Washington DC, January 7-12. [Paper # 17-00199].
- C-190. Elhenawy, M.*; **Rakha, H.** (2017), "Random Forest/Hidden Markov Transportation Mode Recognition Model using Smartphone Sensor Data," Transportation Research Board 96th Annual Meeting, Washington DC, January 7-12. [Paper # 17-00213].
- C-191. Fiori, C.; Ahn, K.; **Rakha, H.** (2017), "Microscopic Plug-in Hybrid Electric Vehicle Energy Consumption Model: Model Development and Validation," Transportation Research Board 96th Annual Meeting, Washington DC, January 7-12. [Paper # 17-00266].
- C-192. Fadhloun, K.*; **Rakha, H.**; Abdelkefi, A.; Loulizi, A. (2017), "An Enhanced Rakha-Pasumarthy-Adjerid Car-Following Model Accounting for Driver Behavior," Transportation Research Board 96th Annual Meeting, Washington DC, January 7-12. [Paper # 17-00440].
- C-193. Elbery, A.*; **Rakha, H.** (2017), "A Novel Stochastic Linear Programming Feedback Eco-routing Traffic Assignment System," Transportation Research Board 96th Annual Meeting, Washington DC, January 7-12. [Paper # 17-00912].
- C-194. Wang, J.*; **Rakha, H.A.**; Fadhloun, K. (2017), "Comparison of Car-Following Models: A Vehicle Fuel Consumption and Emissions Estimation Perspective," Transportation Research Board 96th Annual Meeting, Washington DC, January 7-12. [Paper # 17-01158].

⁷ Received Best Paper Award.

- C-195. Calle Laguna, A.*; **Rakha, H.A.**; Du, J. (2017), "Comprehensive Analysis on Signal Timing Optimization to Reduce Energy and Environmental Impacts," Transportation Research Board 96th Annual Meeting, Washington DC, January 7-12. [Paper # 17-02510].
- C-196. Yue, Y.; Qi, X.; Han, J.; Zhou, L.; **Rakha, H.A.** (2017), "Integrated Modeling and Optimization of Train Scheduling and Shunting at Complex Railway Stations," Transportation Research Board 96th Annual Meeting, Washington DC, January 7-12. [Paper # 17-01821].
- C-197. Park, S.; Ahn, K.; **Rakha, H.A.**; Jung, H. (2017), "Evaluating the Environmental Impacts of Freight Signal Priority Using Connected Trucks," Transportation Research Board 96th Annual Meeting, Washington DC, January 7-12. [Paper # 17-03692].
- C-198. Chen, H.*; **Rakha, H.A.** (2017), "Automatic Freeway Bottleneck Identification and Visualization Using Image Processing Techniques," Transportation Research Board 96th Annual Meeting, Washington DC, January 7-12. [Paper # 17-04388].
- C-199. Chen, H.*; **Rakha, H.A.**; Loulizi, A.; Almannaa, M.*; El-Shawarby, I. (2017), "Field Implementation of an Eco-cooperative Adaptive Cruise System at Signalized Intersection," Transportation Research Board 96th Annual Meeting, Washington DC, January 7-12. [Paper # 17-04918].
- C-200. Yang, H.; Almutairi, F.*; **Rakha, H.A.** (2017), "Eco-cooperative Adaptive Cruise Control at Multiple Signalized Intersections," Transportation Research Board 96th Annual Meeting, Washington DC, January 7-12. [Paper # 17-05237].
- C-201. Ashqar, H.I.*; Elhenawy, M.; Almannaa, M.H.*; Ghanem, A.*; **Rakha, H.A.**; House, L. (2017), "Modeling bike availability in a bike-sharing system using machine learning," *2017 5th IEEE International Conference on Models and Technologies for Intelligent Transportation Systems (MT-ITS)*, Naples, 2017, pp. 374-378. <https://doi.org/10.1109/MTITS.2017.8005700>.
- C-202. Ghanem, A.*; Elhenawy, M.; Almannaa, M.*; Ashqar, H.I.*; **Rakha, H.A.** (2017), "Bike share travel time modeling: San Francisco bay area case study," *2017 5th IEEE International Conference on Models and Technologies for Intelligent Transportation Systems (MT-ITS)*, Naples, 2017, pp. 586-591. <https://doi.org/10.1109/MTITS.2017.8005582>.
- C-203. Almutairi, F.*; Yang, H.; **Rakha, H.A.** (2017), "Eco-cooperative adaptive cruise control at multiple signalized intersections: Network-wide evaluation and sensitivity analysis," *2017 5th IEEE International Conference on Models and Technologies for Intelligent Transportation Systems (MT-ITS)*, Naples, 2017, pp. 520-525. <https://doi.org/10.1109/MTITS.2017.8005727>.
- C-204. Abdelghaffar, H.M.*; Yang, H.; **Rakha, H.A.** "Developing a de-centralized cycle-free nash bargaining arterial traffic signal controller," *2017 5th IEEE International Conference on Models and Technologies for Intelligent Transportation Systems (MT-ITS)*, Naples, 2017, pp. 544-549. <https://doi.org/10.1109/MTITS.2017.8005732>.
- C-205. Elhenawy, M.*; **Rakha, H.A.** (2017), "A heuristic for rebalancing bike sharing systems based on a deferred acceptance algorithm," *2017 5th IEEE International Conference on Models and Technologies for Intelligent Transportation Systems (MT-ITS)*, Naples, 2017, pp. 188-193. <https://doi.org/10.1109/MTITS.2017.8005663>.
- C-206. Almannaa, M.H.; Elhenawy, M.; Ghanem, A.; Ashqar, H.I.; **Rakha, H.A.** (2017), "Network-wide bike availability clustering using the college admission algorithm: A case study of San Francisco Bay area," *2017 5th IEEE International Conference on Models and Technologies for Intelligent Transportation Systems (MT-ITS)*, Naples, 2017, pp. 580-585. <https://doi.org/10.1109/MTITS.2017.8005738>.
- C-207. Elbakary, M.I.; Abdelghaffar, H.*; Afrifa, K.*; **Rakha, H.A.**; Cetin, M.; Iftexharuddin, K.M. (2017), "Aerosol Detection using Lidar-based Atmospheric Profiling," SPIE Optics and Photonics Conference, San Diego, Aug. 6-10.
- C-208. Du, J.; **Rakha, H.A.**; Elbery, A.*; Klenk, M. (2018), "Microscopic Simulation and Calibration of a Large-Scale Metropolitan Network: Issues and Proposed Solutions," Transportation Research Board 97th Annual Meeting, Washington DC, January 7-11. [Paper # 18-02086].
- C-209. Abdelghaffar, H.*; **Rakha, H.A.** (2018), "A Novel Game Theoretic De-centralized Traffic Signal Controller: Model Development and Testing," Transportation Research Board 97th Annual Meeting, Washington DC, January 7-11. [Paper # 18-02078].

- C-210. Yang, H.; **Rakha H.A.** (2018), "Enhancing Weaving Section Capacities based on Connected Vehicle-Enabled Ramp-Metering Control," Transportation Research Board 97th Annual Meeting, Washington DC, January 7-11. [Paper # 18-04744].
- C-211. Almannaa, M.*; Elhenawy, M.; **Rakha, H.A.** (2018), "A Novel Clustering Algorithm for Traffic Operational Analysis," Transportation Research Board 97th Annual Meeting, Washington DC, January 7-11. [Paper # 18-01390].
- C-212. Ashqar, H.*; Elhenawy, M.; Ghanem, A.*; Almannaa, M.*; **Rakha H.A.** (2018), "Quantifying the Effect of Various Features on the Modeling of Bike Counts in a Bike-Sharing System," Transportation Research Board 97th Annual Meeting, Washington DC, January 7-11. [Paper # 18-00282].
- C-213. Almannaa, M.*; Elhenawy, M.; **Rakha H.A.** (2018), "Predicting Bike Availability in Bike Sharing Systems Using Dynamic Linear Models," Transportation Research Board 97th Annual Meeting, Washington DC, January 7-11. [Paper # 18-01384].
- C-214. Elouni, M.*; **Rakha, H.A.** (2018), "Impact of Inclement Weather on the Network Fundamental Diagram," Transportation Research Board 97th Annual Meeting, Washington DC, January 7-11. [Paper # 18-03031].
- C-215. Wang, J.*; **Rakha, H.A.** (2018), "A Simulation-based Framework for Dynamic Eco-routing System: Model Development and Testing," Transportation Research Board 97th Annual Meeting, Washington DC, January 7-11. [Paper # 18-01053].
- C-216. Elhenawy, M.; Bichiou, Y.; **Rakha, H.A.** (2018), "A Heuristic Algorithm for Rebalancing Bike Sharing Systems," Transportation Research Board 97th Annual Meeting, Washington DC, January 7-11. [Paper # 18-00958].
- C-217. Ahn, K.; Park, S.; **Rakha, H.A.** (2018), "Impact of Intersection Control on Electric Vehicle Energy Consumption," Transportation Research Board 97th Annual Meeting, Washington DC, January 7-11. [Paper # 18-02937].
- C-218. Elhenawy, M.; Hassan, A.*; **Rakha, H.A.** (2018), "Travel Time Modeling using Spatiotemporal Speed Variation and a Mixture of Linear Regressions," 4th International Conference on Vehicle Technology and Intelligent Transport Systems, Madeira, Portugal, March 16-18.
- C-219. Elouni, M.*; **Rakha, H.A.** (2018), "Weather-Tuned Network Perimeter Control - A Network Fundamental Diagram Feedback Controller Approach," 4th International Conference on Vehicle Technology and Intelligent Transport Systems, Madeira, Portugal, March 16-18.⁸
- C-220. Elbery, A.*; Dvorak, F.; Du, J.; **Rakha, H.A.**, Klenk, M. (2018), "Large-scale Agent-based Multi-modal Modeling of Transportation Networks - System Model and Preliminary Results," 4th International Conference on Vehicle Technology and Intelligent Transport Systems, Madeira, Portugal, March 16-18.
- C-221. Elbery, A.*; **Rakha, H.A.** (2018), "VANET Communication Impact on a Dynamic Eco-Routing System Performance: Preliminary Results," The IEEE International Workshop on Communication, Computing, and Networking in Cyber Physical Systems (CCNCPS), May 20-24, Kansas City, MO, USA.
- C-222. Elbery, A.*; **Rakha, H.**; Elnainay, M. (2018), "Large-scale Modeling of Connected Vehicle Systems," Proceedings of Traffic and Granular Flow, TGF'17, Conference on Traffic and Granular Flow, Washington DC.
- C-223. Kang, K.*; **Rakha, H.** (2018), "Development of a Decision Making Model for Merging Maneuvers: A Game Theoretical Approach," Proceedings of Traffic and Granular Flow, TGF'17, Conference on Traffic and Granular Flow, Washington DC.
- C-224. Wang, J.*; **Rakha, H.A.** (2018), "Virginia Tech Comprehensive Powered-based Fuel Consumption Model: Modeling Compressed Natural Gas Buses," 21st IEEE International Conference on Intelligent Transportation Systems (IEEE ITSC 2018), Maui, Hawaii, November 4-7. DOI: [10.1109/ITSC.2018.8569252](https://doi.org/10.1109/ITSC.2018.8569252).
- C-225. Kang, K.*; Elbery, A.*; **Rakha, H.A.**, Bichiou, Y.; Yang, H. (2018), "Optimal Lane Selection on Freeways within a Connected Vehicle Environment," 21st IEEE International Conference on Intelligent Transportation Systems (IEEE ITSC 2018), Maui, Hawaii, November 4-7.

⁸ Received the Best Paper Award.

- C-226. Almannaa, M.*; Elhenawy, M.*; Guo, F.; **Rakha, H.A.** (2018), "Incremental Learning Models of Bike Counts at Bike Sharing Systems," 21st IEEE International Conference on Intelligent Transportation Systems (IEEE ITSC 2018), Maui, Hawaii, November 4-7.
- C-227. Aljamal, M.*; **Rakha, H.A.**; Du, J.; El-Shawarby, I. (2018), "Comparison of Microscopic and Mesoscopic Traffic Modeling Tools for Evacuation Analysis," 21st IEEE International Conference on Intelligent Transportation Systems (IEEE ITSC 2018), Maui, Hawaii, November 4-7.
- C-228. Elouni, M.*; **Rakha, H.A.**; Bichiou, Y. (2019), "Implementation and Investigation of a Weather- and Jam Density-tuned Network Perimeter Controller," Transportation Research Board (TRB) 98th Annual Meeting, Washington DC, Jan. 13-17. [Paper: 19-04765]
- C-229. Alhadidi, T.*; **Rakha, H.A.** (2019), "Stochastic Modeling of Bus Passenger Boarding/Alighting Times," Transportation Research Board (TRB) 98th Annual Meeting, Washington DC, Jan. 13-17. [Paper: 19-02703]
- C-230. Chen, H.; **Rakha, H.A.**; El-Shawarby, I. (2019), "An Eco-Cooperative Adaptive Cruise Control System for Buses at Signalized Intersections: System Development and Field Testing," Transportation Research Board (TRB) 98th Annual Meeting, Washington DC, Jan. 13-17. [Paper: 19-01770]
- C-231. Chen, H.; **Rakha, H.A.** (2019), "Developing a Traffic Signal Eco-Cooperative Adaptive Cruise Control System for Battery Electric Vehicles," Transportation Research Board (TRB) 98th Annual Meeting, Washington DC, Jan. 13-17. [Paper: 19-00572]
- C-232. Bichiou, Y.; Elouni, M.*; **Rakha, H.A.** (2019), "A Novel Sliding Mode Network Perimeter Controller," Transportation Research Board (TRB) 98th Annual Meeting, Washington DC, Jan. 13-17. [Paper: 19-00476]
- C-233. Wang, J.*; Ghanem, A.*; **Rakha, H.A.**; Klenk, M. (2019), "A Rail Transit Simulation System for Multi-modal Eco-Routing Applications," Transportation Research Board (TRB) 98th Annual Meeting, Washington DC, Jan. 13-17. [Paper: 19-00256]
- C-234. Ghanem, A.*; **Rakha, H.A.** (2019), "Modeling Instantaneous Cyclist Acceleration and Deceleration Behavior," Transportation Research Board (TRB) 98th Annual Meeting, Washington DC, Jan. 13-17. [Paper: 19-00211]
- C-235. Elhenawy, M.*; Bichiou, Y.; **Rakha, H.A.** (2019), "A Heuristic Algorithm for Rebalancing Large-scale Bike Sharing Systems using Multiple Trucks," Transportation Research Board (TRB) 98th Annual Meeting, Washington DC, Jan. 13-17. [Paper: 19-00239]
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- C-237. Ahangari, S.; Moghaddam, Z.; Jeihani, M.; Celeste, C.; Chen, H.*; **Rakha, H.A.**; Kang, K.* (2019), "Investigating the Effectiveness of an Eco-Speed Control System in the Vicinity of Signalized Intersections using a Driving Simulator," Transportation Research Board (TRB) 98th Annual Meeting, Washington DC, Jan. 13-17. [Paper: 19-00716]
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- C-270. Yang, Z.*; Zheng, Z.; Kim, J.; **Rakha, H.A.** (2022), Cooperative Eco-driving System for Mixed Traffic on Urban Roads, 43rd Australasian Transport Research Forum 2022, Adelaide, Australia, September 28-30.⁹
- C-271. Aredah, A.*; Fadhoun, K.*; **Rakha, H.A.**; List, G. (2023) NeTrainSim: A Longitudinal Freight Train Dynamics Simulator for Electric Energy Consumption, Transportation Research Board (TRB) 102nd Annual Meeting, Washington DC, USA, January 8–12.
- C-272. Yang, Z.*; Zheng, Z.; Kim, J.; **Rakha, H.A.** (2023), An Autonomous Eco-driving Strategy for Mixed Traffic in the Vicinity of Signalized Intersection Using Deep Reinforcement Learning, Transportation Research Board (TRB) 102nd Annual Meeting, Washington DC, USA, January 8–12.
- C-273. Shafik, A.*; Eteifa, S.*; **Rakha, H.A.** (2023), Optimization of Vehicle Trajectories Considering Uncertainty in Actuated Traffic Signal Timings, Transportation Research Board (TRB) 102nd Annual Meeting, Washington DC, USA, January 8–12.

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- P-2. Rakha H.A. and Van Aerde M. (1995), "Statistical Analysis of Day-to-Day Variations in Real-Time Traffic Flow Data," 74th Transportation Research Board Annual Meeting, Washington DC, January, CD-ROM [Paper # 950805].
- P-3. Stewart J.A., Rakha H.A., and Van Aerde M. (1995), "An Analysis of the Temporal and Spatial Variability of Free-Speed along a Freeway Segment", 74th Transportation Research Board Annual Meeting, Washington DC, January, CD-ROM [Paper # 95804].
- P-4. Carter M., Rakha H.A., and Van Aerde M. (1996) "Variability of Traffic Flow Measures across Lanes," Transportation Research Board 75th Annual Meeting, Washington DC, January, CD-ROM [Paper # 960745].
- P-5. Rakha H.A. (1999) "Integrating Graduate and Continuing Education Courses: Lessons Learned," Presented at the Symposium for Learning Centered Environments, Blacksburg, December 2-3, [No proceedings for the conference].
- P-6. Van Aerde M. and Rakha H.A. (1999), "The Metropolitan Model Deployment Initiative: Evaluating Throughput and Efficiency Impacts," Presented at the Intelligent Transportation Systems of America (ITSA) conference, April, [Not included in the conference proceedings].
- P-7. Rakha H.A. and Van Aerde M. (1999), "The Metropolitan Model Deployment Initiative: Evaluating Energy and Emissions Impacts," Presented at the Intelligent Transportation Systems of America (ITSA) conference, April, [Not included in the conference proceedings].
- P-8. Van Aerde M. and Rakha H.A. (1999), "Car-Following with and without AVCSS: Field Results," Presented at the Intelligent Transportation Systems of America (ITSA) conference, April, [Not included in the conference proceedings].
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- P-10. Rakha H.A., Van Aerde M., Ahn K.* and Trani A. (2000), "Requirements for Evaluation of Environmental Impacts of Intelligent Transportation Systems using Speed and Acceleration Data," Presented at the Transportation Research Board 79th Annual Meeting, Washington DC, January, CD-ROM [Paper # 00-1133].
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- P-14. Ding Y.* and Rakha H.A. (2001), "Identifying Trip-Based Explanatory Variables for Estimating Hot-Stabilized Light-Duty Gasoline Vehicle Fuel Consumption and Emission Rates," Third International Conference on Air Quality Proceedings, Loutraci, Greece, March, CD-ROM, [Paper # UAP.1.5].
- P-15. Rakha H.A. and Ding Y.* (2001), "Impact of Vehicle Stops on Hot Stabilized Light-Duty Vehicle Energy and Emission Rates," Presented at the Transportation Research Board 80th Annual Meeting, Washington DC, January, CD-ROM [Paper # 01-2483].
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- P-17. **Rakha H.A.**, Dion F., and Sin H.* (2001), "Field Evaluation of Energy and Emission Impacts of Traffic Flow Improvement Projects using GPS Data: Issues and Proposed Solutions," Presented at the Transportation Research Board 80th Annual Meeting, Washington DC, January, CD-ROM [Paper # 01-2427].
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- P-19. **Rakha H.A.**, Ahn K.*, Trani A. (2002), "Applications of Automobile Emissions Modeling to Airport System Planning," Transportation Research Circular, Transportation Research Board 80th Annual Meeting Workshop.
- P-20. **El-Zarif J.***, Hobeika A., and **Rakha H.A.** (2002), "Simulating No-Passing Zone Violations on a Vertical Curve of a Two-lane Rural Road", Presented at the Transportation Research Board 81st Annual Meeting, Washington DC, January, CD-ROM [Paper # 02-2459].
- P-21. **Rakha H.A.** and Crowther B.* (2002), "Comparison of Greenshields, Pipes, and Van Aerde Car-following and Traffic Stream Models," Presented at the Transportation Research Board 81st Annual Meeting, Washington DC, January, CD-ROM [Paper # 02-2143].
- P-22. **Rakha H.A.** and Yu B. (2003), "Truck Performance Curves Reflective of Truck & Pavement Characteristics," Transportation Engineering and Safety Conference, Penn State, December.
- P-23. **Rakha H.A.**, Katz B.*, and Al-Kaisy A. (2003), "Field Evaluation of Weigh-in-Motion Screening on Truck Weigh Station Operations," IEEE Intelligent Vehicle Symposium, Columbus, Ohio, June 9-11, Paper # 74.
- P-24. **Dion F.**, **Rakha H.A.**, Zhang Y., and Collura J. (2003), "Transit Signal Priority Impacts along a Fixed-Time Signalized Arterial," IEEE Intelligent Vehicle Symposium, Columbus, Ohio, June 9-11, Paper # 450.
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- P-26. Sherali H., **Desai J.***, **Rakha H.A.** and El-Shawarby I. (2003), *A Discrete Optimization Approach for Locating Automatic Vehicle Identification Readers for the Provision of Roadway Travel Times*. Transportation Research Board 82nd Annual Meeting, Washington D.C., CD-ROM [Paper # 03-2596].
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- P-30. **Rakha H.A.** and Ahn K.* (2003), "The INTEGRATION Modeling Framework for Estimating Mobile Source Emissions." Forth International Conference on Urban Air Quality Proceedings, Prague, Czech Republic, March, CD-ROM, [Paper # 00028].
- P-31. **Rakha H.A.**, Ahn K.*, and Trani A. (2003), "The VT-Micro Framework for Modeling of Hot Stabilized Light Duty Vehicle and Truck Emissions." Forth International Conference on Urban Air Quality Proceedings, Prague, Czech Republic, March, CD-ROM [Paper # 000029].
- P-32. **Rakha H.A.**, Pasumarthy P., and Adjerid S. (2004), "Modeling Longitudinal Vehicle Motion: Issues and Proposed Solutions," Proceedings of the Transport Science and Technology Congress, Greece, September, CD-ROM [PAN103].
- P-33. **Rakha H.A.** and Farzaneh M. (2004), "Macroscopic Modeling of Traffic Dispersion: Issues and Proposed Solutions," Proceedings of the Transport Science and Technology Congress, Greece, September, CD-ROM [PAN101].
- P-34. **Rakha H.A.**, Ahn K., and El-Shawarby I. (2004), "Heavy Duty Vehicle Emission Model Development Using In-

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- P-36. Dion F. and **Rakha H.A.** (2004), “The VT-Meso Framework for Estimating Hot Stabilized Light Duty Vehicle Fuel Consumption and Emission Rates,” 14th CRC On-Road Vehicle Emissions Workshop, San Diego, March, CD-ROM.
- P-37. **Rakha H.A.** and Zhang Y.* (2004), “The INTEGRATION 2.30 Framework for Modeling Lane-Changing Behavior in Weaving Sections,” Accepted for Presentation at the Transportation Research Board 83rd Annual Meeting, Washington D.C., CD-ROM [Paper 04-3422].
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- P-39. Van Aerde M. and **Rakha H.A.** (2005), “Microsimulation of Traffic with and without Adaptive Cruise Control: Model Logic,” 9th International Conference on Mechatronics Technology, Kuala Lumpur, Malaysia, December, CD-ROM.
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- P-41. Yu B.* and **Rakha H.A.** (2005), Estimating Roadway Grades using Global Positioning Systems, 15th CRC On-Road Vehicle Emissions Workshop, San Diego, March, CD-ROM.
- P-42. **Rakha H.A.** and Zhang W.* (2005), Estimating Traffic Stream Space-mean Speed and Reliability from Dual and Single Loop Detectors, Transportation Research Board 84th Annual Meeting, Washington D.C., CD-ROM [Paper 05-0850].
- P-43. **Rakha H.A.**, Medina A., Ahn K., El-Shawarby I., and Arafah M. (2005), Evaluating Alternative Lane Management Strategies along I-81, Transportation Research Board 84th Annual Meeting, Washington D.C., CD-ROM [Paper 05-2086].
- P-44. **Rakha H.A.** (2006), “INTEGRATION Dynamic Traffic Assignment and Simulation Software: Model Logic,” First ITS-Arab Conference, Dec. 4-5, Dubai, United Arab Emirates.
- P-45. **Rakha H.A.** (2006), “Estimation of Dynamic Roadway Travel Times using AVI Systems: Issues and Algorithms,” First ITS-Arab Conference, Dec. 4-5, Dubai, United Arab Emirates.
- P-46. Farzaneh M.* and **Rakha H.A.** (2006), Impact of Differences in Driver Desired Speed on Steady-State Traffic Stream Behavior, Transportation Research Board 85th Annual Meeting, Washington D.C., CD-ROM [Paper 06-0926].
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- P-48. **Rakha H.A.**, Ingle A.*, Hancock K., and Al-Kaisy A. (2007), “Estimating Truck Equivalencies for Freeway Sections,” Transportation Research Board 86th Annual Meeting, Jan. 22-25, Washington D.C.
- P-49. **Rakha H.A.**, Pecker C.*, and Cybis H. (2007), “Calibration Procedure for Gipps’ Car-following Model,” Transportation Research Board 86th Annual Meeting, Jan. 22-25, Washington D.C.
- P-50. El-Shawarby I., **Rakha H.A.**, Inman V., and Davis G. (2007), “Evaluation of Driver Deceleration Behavior at Signalized Intersections,” Transportation Research Board 86th Annual Meeting, Jan. 22-25, Washington D.C.
- P-51. El-Shawarby I., **Rakha H.A.**, Inman V., and Davis G. (2007), “Age and Gender Impact on Driver Behavior at the Onset of a Yellow Phase on High-Speed Signalized Intersection Approaches,” Transportation Research Board 86th Annual Meeting, Jan. 22-25, Washington D.C.
- P-52. Setti J.R., **Rakha H.A.**, and El-Shawarby I. (2007), “Analysis of Brake Perception-Reaction Times on High-Speed Signalized Intersection Approaches,” Transportation Research Board 86th Annual Meeting, Jan. 22-25, Washington D.C.

- P-53. **Rakha H.A.**, El-Shawarby I., Arafeh M., and Dion F. (2007), "Estimating Path Travel-Time Reliability," Transportation Research Board 86th Annual Meeting, Jan. 22-25, Washington D.C.
- P-54. **Rakha H.A.** and Gao Y. (2008), "Calibration of Steady-state Car-following Models using Macroscopic Loop Detector Data" Symposium on the Fundamental Diagram: 75 years ("Greenshields75" Symposium), July 8-10.
- P-55. **Rakha H.A.**, Medina A., Ahn K., El-Shawarby I., and Arafeh M. (2008), "Evaluating Alternative Truck Management Strategies along I-81," Urbistics Conference, Hammamet, Tunisia, March 9-12.
- P-56. Dion, F. and **Rakha H.A.** (2008), "Integrating Transit Signal Priority and Adaptive Traffic Signal Control," Urbistics Conference, Hammamet, Tunisia, March 9-12.
- P-57. **Rakha H.A.**, Yue H., and Dion F. (2008), "VT-MESO Model Framework for Estimating Hot Stabilized Light Duty Vehicle Fuel Consumption and Emission Rates," Urbistics Conference, Hammamet, Tunisia, March 9-12.
- P-58. El-Shawarby I., **Amer A.***, and **Rakha H.A.** (2008), "Evaluation of Driver Stopping Behavior on High-Speed Signalized Intersection Approaches," Transportation Research Board 87th Annual Meeting, Jan. 13-17, Washington D.C. (Paper 08-1941).
- P-59. **Medina A.**, **Rakha H.A.**, Arafeh M., Dua D., Abdel-Salam A., and Abbas M. (2008), "Safety Impacts of Access Control Standards on Crossroads in the Vicinity of Highway Interchanges," Transportation Research Board 87th Annual Meeting, Jan. 13-17, Washington D.C. (Paper 08-1113).
- P-60. **Ahn K.**, **Rakha H.A.**, and El-Shawarby I. (2008), "Environmental Impacts of Catalytic Converter Malfunctions," Transportation Research Board 87th Annual Meeting, Jan. 13-17, Washington D.C. (Paper 08-0500).
- P-61. **Rakha H.A.**, **Farzaneh M.***, Arafeh M., and Sterzin E. (2008), "Inclement Weather Impacts on Freeway Traffic Stream Behavior," Transportation Research Board 87th Annual Meeting, Jan. 13-17, Washington D.C. (Paper 08-0476).
- P-62. **Rakha H.A.**, **Amer A.***, and El-Shawarby I. (2008), "Modeling Driver Behavior within Signalized Intersection Approach Decision-Dilemma Zone," Transportation Research Board 87th Annual Meeting, Jan. 13-17, Washington D.C. (Paper 08-0475).
- P-63. **Rakha H.A.** and **Wang W.*** (2009), "Procedure for Calibrating Gipps Car-Following Model" Transportation Research Board 88th Annual Meeting, Jan. 11-15, Washington D.C. (Paper 09-0225).
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- P-65. **Park S.*** and **Rakha H.A.** (2009), "Environmental Impacts of High-Emitting Vehicles" Transportation Research Board 88th Annual Meeting, Jan. 11-15, Washington D.C. (Paper 09-0311).
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Invited Keynote Presentations or Lectures

March 2022	KEYNOTE SPEAKER , 2022 IEEE International Conference on Smart Mobility (ICSM’22), Al Alamein, Egypt, March 6-7, 2022.
September 2021	KEYNOTE SPEAKER , 5th International Conference on SmartRail, Traffic and Transportation Engineering (ICSTTE 2021), Frankfurt, Germany. September 17-19, 2021.
April 2021	KEYNOTE SPEAKER , 7th International Conference Vehicle Technology and Intelligent Transport Systems, Online. April 28-30.
June 2017	KEYNOTE SPEAKER , 5 th IEEE International Conference on Models and Technologies for Intelligent Transportation Systems, Napoli, Italy.
December 2016	INVITED PRESENTATION , Transportation Engineering and Safety Conference, Pennsylvania State University.
May 2014	KEYNOTE SPEAKER , Texas Sothern University, USA.
September 2012	INVITED PRESENTER , University of Twente, Netherlands.
April 2011	INVITED PRESENTER , Catholic University of Leuven, Leuven, Belgium.
April 2011	INVITED PRESENTER , McGill University, Montreal, Canada, Graduate Seminar.
February 2010	INVITED PRESENTER , University of California, Irvine, CA.
July 2004	INVITED PRESENTER , University of Maryland, MA.
February, 2001	INVITED PRESENTER , US-Japanese Consortium on Traffic Signals. Title of presentation “Modeling the Impacts of Integrating Transit Signal Priority and SCOOT Adaptive Signal Control: The Columbia Pike Case Study.” Tokyo, Japan.

Intellectual Properties

Microscopic Vehicle Energy and Emission Models - Invention 00.019 VTIP (2000): Models will be used by Jamar

Technologies as part of their PC-Travel software.

TEACHING AND STUDENT ADVISING

- Dr. Rakha taught 40 undergraduate and graduate courses at Virginia Tech and co-taught two undergraduate courses at Queen's University.
- Dr. Rakha has supervised 17 postdocs that have moved on to faculty and industry positions. He is currently mentoring 2 Research Scientists, 1 Senior Research Associate, and 3 Research Associates.
- Dr. Rakha advised 35 Ph.D. and 47 M.Sc. students to graduation at Virginia Tech.
- Dr. Rakha is currently advising 4 Ph.D. students and 1 MS student.

SPONSORED RESEARCH AND GRANT AWARDS

Dr. Rakha's funding includes more than 110 research projects from private, federal, state, and international organizations. A summary of the funding breakdown is provided in the table below.

Category	Total Funding	Responsible Share
Category I (External):	\$ 42,196,557	\$ 17,849,795
Category II (Internal):	\$ 1,937,941	\$ 1,658,147
Category III (Equipment):	\$ 947,000	\$ 941,000
Total:	\$ 45,081,498	\$ 20,448,942

1. External funding refers to funding from agencies outside of Virginia Tech.
2. Internal funding refers to funding from within Virginia Tech.
3. The equipment category refers to equipment donations that were given as match for federal projects.