

Prof. Richard Larson's career has focused his operations research and systems expertise on a wide variety of problems, in both public and private sectors. He is author, co-author or editor of six books and author or co-author of over 175 scientific articles, primarily in the fields of urban service systems (esp. emergency response systems), disaster planning, pandemics, queueing, logistics, technology-enabled education, smart-energy houses and workforce planning. His first book, *Urban Police Patrol Analysis* (MIT Press, 1972) was awarded the [Lanchester Prize](#) of the Operations Research Society of America (ORSA). He is co-author, with Amedeo Odoni, of the widely used *Urban Operations Research*, Prentice Hall, 1981 (over 1,000 citations). Prof. Larson's research on queues has not only resulted in new computational techniques (e.g., the Queue Inference Engine – an early example of data-driven research – and the Hypercube Queueing Model – 740 citations), but has also been covered extensively in national and international media.

Two recent papers, co-authored with his students, have won Best-Paper-of-the-Year awards: "Modeling the Effects of H1N1 Influenza Vaccine Distribution in the U.S." (with Anna Teytelman), *Value in Health*, 2012; and "STEM crisis or STEM surplus? Yes and yes" (with Ms. Yi Xue), *Monthly Labor Review*, U.S. Bureau of Labor Statistics, the Lawrence M. Klein Award, US Department of Labor, 2015 (and covered in the *New York Times*).

Prof. Larson served as president of ORSA, (Operations Research Society of America, 1993-4), and is past-president of [INFORMS](#) (2005), Institute for Operations Research and the Management Sciences. Prof. Larson served as co-director of the [MIT Operations Research Center](#) (over 15 years in that post).

Dr. Larson has served on many government boards. For example, with the Institute of Medicine, he served as an invited member of the Board on Health Sciences Policy (2008-2010) and on the Standing Committee on Emergency Management and Medical Response Integration (2009 – 2015).

He has been consultant to numerous companies and government agencies, having multiple major projects with the U.S. Postal Service and the City of New York.

He is a member of the National Academy of Engineering and is an INFORMS Founding Fellow. He has been honored with the INFORMS President's Award and the Kimball Medal. In 2017, he was given the first-ever Lifetime Achievement Daniel Berg Medal for "*making significant contributions to technology innovation, service systems and strategic decision making,*" New Delhi, India.

From 1995 to mid 2003, Prof. Larson served as director of MIT's CAES, Center for Advanced Educational Services. His position at CAES focused on bringing technology-enabled learning to students living on the traditional campus and to those living and working far from the university, perhaps on different continents. He was founding director of LINC, Learning International Networks Consortium, an MIT-based international project that has held eight international symposia.

Currently Prof. Larson is principal investigator of the [MIT BLOSSOMS Initiative](#). He continues to be actively engaged in research, especially on how Operations Research can provide insights in the monitoring and control of Covid-19 and on analyzing proposed major structural changes in the US education system.

Richard C. Larson rclarson@mit.edu

TITLE: Mitsui Professor (Post-Tenure), Massachusetts Institute of Technology, Institute for Data, Systems, and Society

EDUCATION: SB (1965), SM (1967), PhD (1969), Electrical Engineering from MIT

CITIZENSHIP: Citizen of the United States of America

PRINCIPAL FIELDS OF INTEREST: Advanced technology and pedagogy for distance and local learning; operations research applied to private and public service systems; transportation and logistics; psychology of queueing; queueing theory, disease dynamics, workforce analysis.

AWARDS AND HONORS:

- 1972 Lanchester Prize of the Operations Research Society of America (ORSA) for *Urban Police Patrol Analysis*.
- Twice selected as US national contributor to meetings of IFORS (International Federation of Operational Research Societies).
- *Who's Who in America* (1982).
- American Men and Women in Science, 1994.
- "1991 Distinguished Lecturer," Decision Sciences Department, Wharton School of the University of Pennsylvania.
- 1991 Cecil T. Holmes Mathematics Lecturer, Bowdoin College.
- Elected to National Academy of Engineering (1993).
- Philip M. Morse Lectureship, Institute for Operations Research and the Management Sciences (INFORMS), 1997-9.
- Omega Rho Lectureship, 1999. Honorary Member, Omega Rho.
- Invited testimony before the U.S. Congress, House Committee on Science, 2000.
- Sir Edward Youde Memorial Fund Visiting Professor, Univer. Hong Kong, 2002.
- Invited contributor to 50th Anniversary issue of *Operations Research*, 2002.
- INFORMS Fellow (2002).
- Kimball Medal of INFORMS (2002).
- INFORMS Presidents Award (2003)
- Harold Larnder Prize in Operations Research, Canada (2004)
- Mitsui Professorship, MIT (2004 -)
- Franz Edelman Laureate, May 2006
- IBM Research Awards, Sept. 2006, 2010, 2014, 2015
- Invited member, Institute of Medicine, Board on Health Sciences Policy. 2008-2010.
- Invited member, Institute of Medicine, Standing Committee on Emergency Management and Medical Response Integration. 2009 - 2015.
- Best paper-of-the-year award (with Anna Teytelman), *Value in Health*, 2012.
- Lawrence M. Klein Award, US Department of Labor: Best paper-of-the-year (with Yi Xue), *Monthly Labor Review*, 2015.

- Honorable Mention for Best Paper of the Year: *Service Science*, 2016.
- Awarded first-ever Lifetime Achievement Daniel Berg Medal for “making significant contributions to technology innovation, service systems and strategic decision making,” New Delhi, India, 2017.

OF SPECIAL INTEREST: Founder and President of Public Systems Evaluation, Inc., a non-profit technical services corporation (1974-1985). Co-founder and Chairman of ENFORTH Corporation (1980-1990). Chairman of Queues Enforth Development, Inc. (1990-2000). Chairman, Structured Decisions Corporation (2000-present). Co-founder and co-director, Forum for the Internet and the University.

ACADEMIC APPOINTMENTS: Assistant Professor, Electrical Engineering (7/1/69 – 6/30/71). Assistant Professor, Urban Studies & Planning and Electrical Engineering (7/1/71 – 6/30/72). Assoc. Professor, Urban Studies & Planning and Elec. Engineering & Computer Sci. (7/1/72 – 6/30/79). Professor, Elec. Eng. and Urban Studies & Planning (7/1/79 – 6/30/88). Professor, Elec. Eng., (7/1/88 – 6/30/03). Professor in Department of Civil and Environmental Engineering and in the Engineering Systems Division (7/1/03 – 8/31/09). Professor in the Engineering Systems Division (9/1/09 – 6/30/15). Professor in Institute for Data, Systems, and Society (IDSS) (7/1/15 – 1/15/18). Professor (Post-Tenure), Institute for Data, Systems, and Society (IDSS) (1/16/18 - present). Mitsui Professorship awarded in 2004. Visiting Assoc. Professor of Operations Research, Depart. Industrial Engineering & Operations Research, University of Cal. at Berkeley (2/1/76 – 12/15/76). Visiting Professor of Operations Research, Technical University of Denmark, Lyngby, Denmark (1/1/81 – 6/30/81). Co-director, Operations Research Center, MIT (7/1/77 – 9/1/86, 9/1/91 – 8/31/95). Director, Center for Advanced Educational Services (9/1/95 – 6/30/03). Founder and Director, MIT LINC, 2001 – 2015. Founding Director, Center for Engineering Systems Fundamentals, 2005 – 2016.

Papers in Refereed Journals

- 2020 Larson, R. C., Oded Berman, Mehdi Nourinejad. Sampling Manholes to Home in on SARS-CoV-2 Infections. To appear *PLOS ONE*.
- 2020 Larson, R. C., Soheil Sibdari. From Rote to Wrote: College Admission via Secure ePortfolios. *Creative Education* Vol.11 No.9, September 2020
<https://www.scirp.org/journal/paperinformation.aspx?paperid=102728>
- 2019 Prabhu, Deepa Fernandes and R. C. Larson. Scaling the Maternal and Newborn Survival Initiative (MANSI): Rural India. *International Journal of System Dynamics Applications (IJSDA)*, 2019, vol. 8, issue 1, 94-111.
- 2018 Ghaffarzadegan, Navid, Ran Xu, Richard C. Larson, Joshua Hawley. Symptoms versus Root Causes: A Needed Structural Shift in Academia to Help Early Careers. *BioScience*, Volume 68, Issue 10, October 2018, Pages 744–745, <https://doi.org/10.1093/biosci/biy092>

- 2018 Ghaffarzadegan, Navid, Richard C. Larson, "SD Meets OR: A New Synergy to Address Policy Problems," *System Dynamics Review* vol34, no 1-2 (January – June 2018):327-353. (60th anniversary special issue)
- 2018 Cammarata, Louis, Richard C. Larson, "Project-Based Methods for Assessment of Active Learning STEM Video Lessons," *International Journal on Innovations in Online Education*, Begell House Publishers 2(1) 2018.
- 2018 Andalib, Maryam, Navid Ghaffarzadegan, Richard Larson, "The Postdoc Queue: A Labour Force in Waiting," *Systems Research and Behavioral Science*, Published online in Wiley Online Library (wileyonlinelibrary.com) DOI: 10.1002/sres.2510. 2018.
- 2017 Ghaffarzadegan, Navid, Yi Xue, Richard C. Larson, "Work-education mismatch: An endogenous theory of professionalization." *European Journal of Operational Research*. Vol. 261, #3, 16 September 2017, pp. 1085-1097. <https://doi.org/10.1016/j.ejor.2017.02.041>
- 2017 Majumder, Maimuna S, John S Brownstein, Stan N Finkelstein, Richard C Larson, Lydia Bourouiba, "Nosocomial amplification of MERS-coronavirus in South Korea, 2015." *Transactions of The Royal Society of Tropical Medicine and Hygiene*, Volume 111, Issue 6, 1 June 2017, Pages 261-269, Published: 16 October 2017. <https://doi.org/10.1093/trstmh/trx046>
- 2016 Larson, Richard C., "Commentary—Smart Service Systems: Bridging the Silos." *Service Science* 8(4):359-367. <http://dx.doi.org/10.1287/serv.2016.0140> 2016.
- 2016 Hashmi, Sahar, Lisa D'Ambrosio, David V. Diamond, Mohammad S. Jalali, Stan N. Finkelstein, Richard C. Larson. "Preventive behaviors and perceptions of influenza vaccination among a university student population." *Journal of Public Health*, pp. 1–7, doi:10.1093/pubmed/fdv189, Published by Oxford University Press. 2016.
- 2016 Belenky, Alexander S., Richard C. Larson, Leonid A. Roginskiy, "Storing electricity in a country's electrical grid as a key energy problem of the 21st century," Information Technology and Quantitative Management (ITQM 2016), *Procedia Computer Science* 91 873 – 881. 2016.
- 2016 Larson, Richard C., M. Elizabeth Murray, "STEM Education: Inferring Promising Systems Changes from Experiences with MIT BLOSSOMS," *Systems Research and Behavioral Science*, Published online in Wiley Online Library (wileyonlinelibrary.com) DOI: 10.1002/sres.2411. 2016.
- 2016 Ghaffarzadegan, Navid, Richard Larson and Joshua Hawley, "Education as a Complex System," *Systems Research and Behavioral Science*, Published online in Wiley Online Library (wileyonlinelibrary.com) DOI: 10.1002/sres.2405. 2016.

- 2016 Larson, Richard C., "Cross-Sectional Surveys: Inferring Total Eventual Time in Current State Using Only Elapsed Time-to-Date," *Socio-Economic Planning Sciences*. September 24, 2016, <http://dx.doi.org/10.1016/j.seps.2016.09.005>
- 2015 Xue, Yi, Richard C. Larson, "STEM crisis or STEM surplus? Yes and yes," *Monthly Labor Review*, U.S. Bureau of Labor Statistics, May 2015. Given Best-Paper-of-the-Year Award from the Lawrence M. Klein Fund. Available online <http://www.bls.gov/opub/mlr/2015/article/stem-crisis-or-stem-surplus-yes-and-yes.htm> (cited in numerous places including Amicus brief for the Fisher vs. University of Texas Supreme Court case)
- 2015 Finkelstein, Stan N., Richard C. Larson, Karima Nigmatulina, Anna Teytelman, "Engineering Effective Responses to Influenza Outbreaks," *Service Science*, May 2015. 7(2): 119-131. <http://dx.doi.org/10.1287/serv.2015.0099> (presented February 13 at the AAAS 2015 Annual Meeting in San Jose, CA)
- 2015 Ghaffarzadegan, Navid, Richard C. Larson, "Posttraumatic Stress Disorder: Five Vicious Cycles That Inhibit Effective Treatment," *The United States Army Medical Department Journal*, Oct.-Dec. 2015. Available online <http://1.usa.gov/1mrJDvk>
- 2014 Ghaffarzadegan, Navid , Joshua Hawley, Richard Larson and Yi Xue. "A Note on PhD Population Growth in Biomedical Sciences," *Systems Research and Behavioral Science*, John Wiley & Sons Ltd., Open Access, 2014.
- 2014 Shaw, Cole, Richard Larson, Soheil Sibdari. "An Asynchronous, Personalized Learning Platform — Guided Learning Pathways (GLP)," *Creative Education*, 2014, 5, 1189-1204. Published Online July 2014 in SciRes. <http://www.scirp.org/journal/ce> Licensed under the Creative Commons Attribution International License (CC BY).
- 2014 Hird, Mackenzie, Richard Larson, Yuko Okubo, Kanji Uchino. "Lesson Study and Lesson Sharing: An Appealing Marriage," ; *Creative Education*, 2014, 5, 769-779. Published Online June 2014 in SciRes. <http://www.scirp.org/journal/ce> Licensed under the Creative Commons Attribution International License (CC BY).
- 2013 Teytelman, A. and R. C. Larson "Multi-regional dynamic vaccine allocation during an influenza epidemic," *Service Science* (2013) ISSN 2164-3970 (online).
- 2013 Leow, Woei Ling, Richard C. Larson, James Kirtley. "Occupancy-Moderated

¹ <http://www.scotusblog.com/wp-content/uploads/2015/11/Dupont-Amicus-Brief-FINAL.pdf>

- Zonal Space-Conditioning Under A Demand-Driven Electricity Price," *Energy and Buildings* 60 (2013) 453-463.
- 2013 Larson, Richard C., Navid Ghaffarzadegan, Yi Xue, "Too Many Ph.D. Graduates or Too Few Academic Job Openings: The Basic Reproductive Number R_0 in Academia," *Systems Research and Behavioral Science* (2013) published online DOI: 10.1002/sres.2210.
- 2012 "Magnified Effects of Changes in NIH Research Funding Levels," R. C. Larson, Navid Ghaffarzadegan, Mauricio Gomez Diaz, *Service Science*, V. 4, No. 4, December 2012, pp. 382-395.
- 2012 Larson, Richard C. and Mauricio Gomez Diaz, "Nonfixed Retirement Age for University Professors: Modeling Its Effects on New Faculty Hires," *Service Science*, V. 4, No. 1, March 2012, p. 69-78.
- 2012 Teytelman, A. and R. C. Larson "Modeling Influenza Progression Within a Continuous-Attribute Heterogeneous Population," *European Journal of Operational Research*, 220 (2012) 238-250.
- 2012 Larson, R. C., and A. Teytelman, "Modeling the Effects of H1N1 Influenza Vaccine Distribution in the U.S.," *Value in Health*, 15 (2012), pp. 158-166. Best-Paper-of-the-Year Award, *Value in Health*.
- 2011 Finkelstein, S. N., K. J. Hedberg, J. A. Hopkins, S. Hashmi and R. C. Larson, "Vaccine availability in the United States during the 2009 H1N1 outbreak," *American Journal of Disaster Medicine*, 6 (1), pp. 23-30.
- 2010 Larson, R. C. and Katsunobu Sasanuma, "Urban Vehicle Congestion Pricing: A Review," *Journal of Industrial and Systems Engineering*, 3 (4), pp. 227-242.
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- 2009 Chiu, Samuel, Richard C. Larson. "Bertrand's Paradox Revisited: More Lessons about that Ambiguous Word, *Random*," *Journal of Industrial and*

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- 2009 Finkelstein, Stan, Shiva Prakash, Karima Nigmatulina¹, Tamar Klaiman, Richard C. Larson, "PANDEMIC INFLUENZA: NON-PHARMACEUTICAL INTERVENTIONS AND BEHAVIORAL CHANGES THAT MAY SAVE LIVES." *International Journal of Health Management and Information (IJHMI)*, 1 (1), pp. 1-18.
- 2009 Livengood, Daniel, Richard C. Larson. "The Energy Box: Locally Automated Optimal Control of Residential Electricity Usage," *Service Science* 1(1), pp.1-16. http://www.sersci.com/ServiceScience/paper_details.php?id=13
- 2008 Larson, R. C., "Service Science: At the Intersection of Management, Social, & Engineering Sciences," *IBM Systems Journal*, Vol. 47, No. 1, pp. 41-52.
- 2008 Eshghi, K., R. C. Larson, "Disasters: lessons from the past 105 years," *Disaster Prevention and Management*, Vol. 17, No. 1, pp. 62-82.
- 2008 Larson, R. C. and M. E. Murray, "Open Educational Resources for Blended Learning in High Schools: Overcoming Impediments in Developing Countries," *Journal of Asynchronous Learning Networks*, V. 12, No. 1, Feb. 2008
- 2008 Nigmatulina, Karima R. and R. C. Larson, "Living with Influenza: Impacts of Government Imposed and Voluntarily Selected Interventions," *European Journal of Operational Research*. V.195, #2, June 2009, 613 - 627 (print). Published on line 21 February 2008.
- 2008 Larson, R. C. and M. E. Murray, "Distance Learning as a Tool for Poverty Reduction and Economic Development: A Focus on China and Mexico," *Journal of Science Education and Technology*, Vol. 17, No. 2, April 2008, 175 – 196.
- 2007 Larson, R. C. "Simple Models of Influenza Progression within a Heterogeneous Population," *Operations Research*, Vol. 55, No. 3, pp. 399-412, 2007.
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- 2006 Larson, R. C. and M. D. Metzger, M. F. Cahn, "Responding to Emergencies: Lessons Learned and the Need for Analysis," *Interfaces*, Nov.-Dec. 2006.

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- 2003 Berman, Oded and Richard C. Larson, 'A Queueing Control Model for Retail Services Having Back Room Operations and Cross-Trained Workers," *Computers and Operations Research*, Nov. 2003.
- 2002 Larson, R.C., "Public Sector Operations Research: A Personal Perspective," *Operations Research* (50) 1 pp. 135-145. (invited article in 50th Anniversary Issue).
- 2001 Berman, Oded and Richard C. Larson, "Deliveries in an Inventory / Routing Problem Using Stochastic Dynamic Programming," *Transportation Science* 35 (2) pp. 192-213.
- 1997 Berman, Oded, Richard Larson, Edieal Pinker, "Scheduling Workforce and Workflow in a High Volume Factory," *Management Science*,, vol. 43, no. 2, February 1997, pp. 158-172.
- 1997 Richetta, O. and Richard C. Larson 1997. "Modeling the Increased Complexity of New York City's Refuse Marine Transport System," *Transportation Science* 31, pp. 272-293.
- 1996 Penfield, Paul, Jr. and Richard C. Larson, "Education Via Advanced Technologies," *IEEE Transactions on Education*, Special Issue on the application of information technologies to engineering and science education, vol. 39, no. 3, August, 1996; pp. 436-443.
- 1995 Webb, Ian and Richard C. Larson, "Period and Phase of Customer Replenishment: A New Approach to the Strategic Inventory/Routing Problem," *European Journal of Operations Research*, vol. 85, no.1, August, 1995, pp. 132-148.
- 1995 Berman, Oded, Dimitris Bertsimas and Richard Larson, "Locating Discretionary Service Facilities, II: Maximizing Market Size , Minimizing Inconvenience," *Operations Research*, Vol.43, No.4, 1995, pp 623.
- 1995 Jones, Lee K. and Richard C. Larson, "Efficient Computation of Probabilities of Events Described by Order Statistics and Applications to Queue Inference." *ORSA Journal on Computation.*, vol. 7, no. 1, Winter 1995, pp. 89-100.
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- 1993 Sacks, Stephen R., Richard C. Larson and Christian Schaack, "Minimizing the Cost of Dispatch Delays by Holding Patrol Cars in Reserve," *Journal of Quantitative Criminology*, 9 (2):203-224, 1993.
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- 1993 Berman, O., and R. C. Larson, "Optimal Workforce Configuration Incorporating Absenteeism and Daily Workload Variability." *Socio-Economic Planning Sciences.*, 27 (2):91-96.
- 1992 Berman, O., N. Fouska, and R. C. Larson, "Optimal Locations for Discretionary Service Facilities." *Transportation Science*, 26(3):201-211, 1992.
- 1992 Larson, R.C., "Queueing Theory." An invited article in the *1992 McGraw Hill Yearbook of Science and Technology*, pp. 377-379, McGraw Hill, Inc., 1992. (updated in 1999)
- 1991 Constantopoulos, P., F. Schweppe, and R. C. Larson, "ESTIA: A Real-Time Computer Control Scheme for Space Conditioning Usage Under Spot Electricity Pricing." *Computers and Operations Research*, 18(8):751-765, 1991.
- 1990 Larson, R.C., "The Queue Inference Engine: Deducing Queue Statistics From Transactional Data." *Management Science* 36(5):586-601, May 1990.
- 1989 Schaack, C., and R. C. Larson, "An N Server Cutoff Priority Queue Where Arriving Customers Request a Random Number of Servers." *Management Science* 35(5):614-634, May 1989.
- 1988 Larson, R. C., "Transporting Sludge to the 106 Mile Site: An Inventory / Routing Algorithm for Fleet Sizing and Logistics System Design." *Transportation Science* 22(3):186-198, August 1988.
- 1988 "Operations Research: The Next Decade." A CONDOR Report (Committee On the Next Decade of Operations Research), (one of numerous co-authors). *Operations Research* 36(4):619-637, July-August 1988.
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- 1987 Berman, O., R. C. Larson and C. Parkan, "The Stochastic Queue p-Median Problem," *Transportation Science* 21(3): 207-216, 1987.
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- 1986 Schaack, C. and R. C. Larson, "An N Server Cutoff Priority Queue." *Operations Research* 34(2):257-266, March-April 1986.
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- 1985 Chiu, S. and R. C. Larson, "Locating an N Server Facility in a Stochastic Environment." *Computers and Operations Research* 17(6):509-516, 1985.
- 1985 Berman, O., and R. C. Larson, "Optimal 2-Facility Network Distracting in the Presence of Queueing." *Transportation Science* 19(3):261-277, August 1985.
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