Last updated 18 November 2021

Armann Ingolfsson – Curriculum Vita

Professor of Operations Management
Academic Director, Centre for Excellence in Operations
Alberta School of Business, University of Alberta, Edmonton, AB T6G 2R6
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Education

Massachusetts Institute of Technology
PhD in operations research, September 1994
SM in operations research, September 1991

University at Buffalo, NY
BS in industrial engineering, May 1989, Summa Cum Laude

Awards

1993 Harold L. Hazen Award for Teaching Effectiveness, Department of Electrical Engineering and Computer Science, MIT

2001 MacKenzie Distinguished Teaching Award, awarded by Business Student Association, Alberta School of Business, University of Alberta

2002 Third prize in the *Canadian Operational Research Society (CORS) Practice Prize Competitio*n, for "Simulation of Single Start Station for Edmonton EMS" (with E. Erkut and S. Budge)

2005 University of Alberta Unit Teaching Award, with T. Daniel and E. Erkut

2008 CORS Service Award

2010 Kuhn Award for an exceptional paper published in *Naval Research Logistics* during the previous three years, for "Ambulance location for maximum survival," by E. Erkut, A. Ingolfsson and G. Erdoğan, (**55**(1) 42–58)

2011 *Operations Research* Meritorious Service Award (for refereeing)

2012 MacKenzie Distinguished Teaching Award, awarded by Business Student Association, Alberta School of Business, University of Alberta.

2014–15: McCalla Professorship, University of Alberta.

2014 *Manufacturing & Service Operations Management* Meritorious Service Award (for refereeing)

Academic Experience

Alberta School of Business, University of Alberta, Edmonton, Canada
1995 – present
Full Professor of Operations Management, July 2016 – present
Roger H. Smith Professor of Business, April 2013 – March 2016
Academic Director, Centre for Excellence in Operations, July 2005 – present
Associate Professor of Operations Management, July 2003 – June 2016
Assistant Professor of Operations Management, October 1995 - June 2003
Visiting Professor of Management Science, January – May 1995

School of Business, University of Iceland, Reykjavik, Iceland
January 2001 and February 2012
Visiting Lecturer, MBA Programme

1994	**Division of Management, University of Akureyri, Iceland** *Lektor* (Assistant Professor) September – November 1994 *Docent* (Associate Professor) December 1994 – August 2000
1994	**Department of Civil and Environmental Engineering, MIT** *Research Assistant*: Risk assessment project jointly sponsored by MIT and the Japanese railway company JR East
1993	**Leaders for Manufacturing Program, MIT** *Technical Instructor*: Engineering Probability and Statistics
1991–1993	**Department of Electrical Engineering and Computer Science, MIT** *Teaching Assistant*: Logistical and Transportation Planning Methods *Teaching Assistant*: Applied Probability *Teaching Assistant*: Discrete Stochastic Processes
1989–1991	**Department of Mechanical Engineering, MIT** *Research Assistant*: VLSI Process Optimization and Control. Developed, analyzed, and tested a process control algorithm. A version of the algorithm has been used by AT&T and by Delco Electronics.

Refereed Articles: Research

[Citation counts from Web of Science / Scopus / Google Scholar.]

[FT50 = Financial Times Top 50 journal; DJ = Alberta School of Business list of Distinguished Journals]

[170 / NA / 290] Ingolfsson, A., E. Sachs. 1993. Stability and sensitivity of an EWMA controller. *Journal of Quality Technology* **25**(4) 271–287.

[228 / 274 / 486] Sachs, E., A. Hu, A. Ingolfsson. 1995. Run by run process control: Combining SPC and feedback control. *IEEE Transactions on Semiconductor Manufacturing* **8**(1) 26–43.

[130 / 147 / 245] Erkut, E., A. Ingolfsson. 2000. Catastrophe avoidance models for hazardous materials route planning. *Transportation Science* **34**(2) 165–179.

[42 / 47 / 105] [DJ] Ingolfsson, A., M. A. Haque, A. Umnikov. 2002. Accounting for time-varying queueing effects in tour scheduling. *European Journal of Operational Research* **139**(3) 585–597.

[40 / 57 / 105] Ingolfsson, A., E. Erkut, S. Budge. 2003. Simulation of single start station for Edmonton EMS. *Journal of the Operational Research Society* **54**(7) 736–746.

[2 / 2 / 8] Litchfield, J., A. Ingolfsson, J. Cheng. 2003. Rostering for a restaurant. *INFOR* **41**(3) 287–300.

[115 / 131 / 234] Erkut, E., A. Ingolfsson. 2005. Transport risk models for hazardous materials: Revisited. *Operations Research Letters* **33**(1) 81–89.

[85 / 97 / 184] Channouf, N., P. L'Ecuyer, A. Ingolfsson, A. N. Avramidis. 2007. The application of forecasting techniques to modeling emergency medical system calls in Calgary, Alberta. *Health Care Management Science* **10**(1) 25–45.

[49 / 63 / 129] Deslauriers, A., P. L'Ecuyer, J. Pichitlamken, A. Ingolfsson, A. N. Avramidis. 2007. Markov chain models of a telephone call center with call blending. *Computers & Operations Research* **34**(6) 1616–1645.

[59 / 73 / 129] [DJ] Ingolfsson, A. E. Akhmetshina, S. Budge, Y. Li, X. Wu. 2007. A survey and experimental comparison of service-level-approximation methods for non-stationary $M(t)/M/s(t)$ queueing systems with exhaustive discipline. *INFORMS Journal of Computing* **19**(2) 201–214.

[107 / 130 / 206] Erdoğan, G., E. Erkut, A. Ingolfsson. 2008. Ambulance location for maximum survival. *Naval Research Logistics* **55**(1) 42–58.

[4 / 3 / 5] Grassmann, W. K., M. L. Puterman, P. L'Ecuyer, A. Ingolfsson. 2008. Four Canadian contributions to stochastic modeling. *INFOR* **46**(1) 3–14.

[128 / 153 / 282] Ingolfsson, A., E. Erkut, S. Budge. 2008. Optimal ambulance location with random delays and travel times. *Health Care Management Science* **11**(3) 262–274.

[41 / 50 / 87] [FT50] Budge, S., A. Ingolfsson, E. Erkut. 2009. Approximating vehicle dispatch probabilities for emergency service systems with location-specific service times and multiple units per location. *Operations Research* **57**(1) 251–255.

[27 / 28 / 59] [FT50] Castillo, I., A. Ingolfsson, T. Sim. 2009. Social optimal location of facilities with fixed servers, stochastic demand, and congestion. *Production and Operations Management* **18**(6) 721–736.

[29 / 36 / 64] Erkut, E., A. Ingolfsson, T. Sim, G. Erdoğan. 2009. Computational comparison of five maximal covering models for locating ambulances. *Geographical Analysis* **41**(1) 43–65.

[65 / 75 / 130] [FT50] Budge, S., A. Ingolfsson, D. Zerom. 2010. Empirical analysis of ambulance travel times: The case of Calgary Emergency Medical Services. *Management Science* **56**(4) 716–723.

[8 / 9 / 12] Day, T. E., M. W. Li, A. Ingolfsson, N. Ravi. 2010. The use of queueing and simulative analyses to improve an overwhelmed pharmacy call center. *Journal of Pharmacy Practice* **23**(5) 492–495.

[29 / 35 / 74] Erdoğan, G., E. Erkut, A. Ingolfsson, G. Laporte. 2010. Scheduling ambulance crews for maximum coverage. *Journal of the Operational Research Society* **61**(4) 543–550.

[41 / 46 / 126] [DJ] Ingolfsson, A., F. Campello, X. Wu, E. Cabral. 2010. Combining integer programming and the randomization method to schedule employees. *European Journal of Operational Research* **202**(1) 153–163.

[3 / 4 / 7] Sadeghi, N., A. Robinson Fayek, A. Ingolfsson. 2011. A simulation-based approach for estimating project completion time of stochastic resource constrained project networks. *ASCE Journal of Computing in Civil Engineering* **26**(4) 558–560.

[12 / 17 / 26] [DJ] Delasay, M., B. Kolfal, A. Ingolfsson. 2012. Maximizing throughput in finite-source parallel queue systems. *European Journal of Operational Research* **217**(3) 554–559.

[6 / 6 / 9] [DJ] Ingolfsson, A., L. Tang. 2012. Efficient and reliable computation of birth-death process performance measures. *INFORMS Journal on Computing* **24**(1) 29–41.

[59 / 66 / 135] [FT50] Alanis, R., A. Ingolfsson, B. Kolfal. 2013. A Markov chain model for an EMS system with repositioning. *Production & Operations Management* **22**(1) 216–231.

[21 / 31 / 73] [DJ] Ta. C.H., A. Ingolfsson, J. Doucette. 2013. A linear model for surface mining haul truck allocation incorporating shovel idle probabilities. *European Journal of Operational Research* **231**(3) 770–778.

[4 / 4 / 7] Abolfazl Soltani, S., A. Ingolfsson, D. A. Zygun, H. T. Stelfox, L. Hartling, R. Featherstone, D. Opgenorth, S. M. Bagshaw. 2015. Quality and performance measures of strain on intensive care capacity: A protocol for a systematic review. *Systematic Reviews* **4**(158). doi:10.1186/s13643-015-0145-9

[13 / 14 / 50] [FT50] Delasay, M., A. Ingolfsson, B. Kolfal. 2016. Modeling load and overwork effects in queueing systems with adaptive service rates. *Operations Research* **64**(4) 867–885. doi:10.1287/opre.2016.1499

[18 / 16 / 42] [FT50] Campello, F., A. Ingolfsson, R. Shumsky. 2017. Queueing models of case managers. *Management Science* **63**(3) 882–900. doi:10.1287/mnsc.2015.2368. doi:10.1287/mnsc.2015.2368.

[26 / 26 / 31] Rewa, O. G., H. T. Stelfox, A. Ingolfsson, D. A. Zygun, R. Featherstone, D. Opgenorth, S. M. Bagshaw. 2018. Indicators of intensive care unit capacity strain: a systematic review. *Critical Care* **22**(1), 86. doi: 10.1186/s13054-018-1975-3

[13 / 14 / 62] [DJ] Delasay, M, Ingolfsson, A., Kolfal, B., Schultz, K. 2019. The load effect on service times. *European Journal of Operational Research* **279**(3) 673–686. doi: 10.1016/j.ejor.2018.12.028

[0 / 1 / 2] [DJ] Ingolfsson, A, Almehdawe, E., Pedram, A., Tran, M. 2019. Comparison of fluid approximations for service systems with state-dependent service rates and return probabilities. *European Journal of Operational Research* **283**(2) 562–575 doi:/10.1016/j.ejor.2019.11.041.

[0 / 0 / 1] [FT50] Rastpour, A., Kolfal, B., Ingolfsson, A. 2020. Modeling Red and Yellow Alert durations for ambulance systems. *Production and Operations Management*, **29**(8) 1972–1991 dx.doi.org/10.1111/poms.13190.

[1 / 1 / 4] Bagshaw, S. M., Tran, D. T., Opgenorth, D., Wang, X., Zuege, D. J., Ingolfsson, A., Stelfox, H. T., Nguyen, X. T. 2020. Assessment of costs of avoidable delays in intensive care unit discharge. *JAMA Network Open* **3**(8). doi:10.1001/jamanetworkopen.2020.13913.

[NA / NA / 1] [DJ] Rastpour, A., Ingolfsson, A., & Sandikçi, B. 2021. Algorithms for queueing systems with reneging and priorities modeled as quasi-birth-death processes. *INFORMS Journal on Computing*, accepted for publication.

Refereed Articles: Teaching

[1 / NA / 4] Ingolfsson A., D. Zalkind. 1999. The teachers' forum: Two looks at the spinner experiment. *Interfaces* **29**(6) 112–122.

[NA / NA / 4] Erkut, E. A. Ingolfsson. 2000. Let's put the squares in least-squares. *INFORMS Transactions on Education* **1**(1) 47–50.

[NA / NA / 28] Ingolfsson, A., T. A. Grossman, Jr. 2002. Graphical spreadsheet simulation of queues. *INFORMS Transactions on Education* **2**(2) 27–39.

[NA / NA / 3] Ingolfsson, A. 2004. Simulating NHL games to motivate student interest in OR/MS. *INFORMS Transactions on Education* **5**(1) 37–46.

Refereed Book Chapters

[NA / NA / 3] Ingolfsson, A. 2010. Ice hockey. *Wiley Encyclopaedia of Operations Research and Management Science.*

[NA / NA / 1] Caron, R. J., A. Ingolfsson, V. Quan. 2011. The Canadian Operational Research Society / Société Canadienne de Recherche Opérationelle. *Wiley Encyclopedia of Operations Research and Management Science*.

[NA / 31 / 57] Ingolfsson, A. 2012. EMS planning and management. *Operations Research and Health Care Policy,* G. Zaric, ed., Springer.

[NA/ NA/ 7] Delasay, M., Ingolfsson, A., & Schultz, K. 2016. Inventory is people: How load affects service times in emergency response. Accepted for publication in *Cross-Functional Inventory Research*, published by World Scientific.

Refereed Conference Proceedings

[NA / 2 / 9] Sachs, E., A. Ingolfsson, S. Ha. 1990. Run by run process control. *Electronic Manufacturing Technology Symposium Proceedings.*

[0 / NA / 15] Sachs, E., A. Ingolfsson, S. Ha. 1990. Tuning a process while performing SPC: An approach based on the sequential design of experiments. *Advanced Semiconductor Manufacturing Conference and Workshop Proceedings.*

[1 / 12 / 27] Sachs, E., A. Hu, A. Ingolfsson, P. Langer. 1991. Modeling and control of an epitaxial silicon deposition process with step disturbances. *Advanced Semiconductor Manufacturing Conference and Workshop Proceedings*.

[3 / 12 / 21] Hu, A., E. Sachs, A. Ingolfsson, P. Langer. 1992. Run-by-run process control: performance benchmarks. *Semiconductor Manufacturing Science Symposium*.

[NA / NA / NA] Grossman, Jr., T. A., A. Ingolfsson. 2000. Graphical spreadsheet simulation of queues. *Decision Sciences Institute Annual Meeting*, Innovative Approaches for Teaching with Spreadsheets Mini-Conference, Orlando, Florida.

Non-refereed Articles

Ingolfsson, A. 1999. Singing nuns, werewolves and rats. *OR/MS Today* (August) 18.

Erkut E., A. Ingolfsson. 2001. Online exams put to the test. *OR/MS Today* (August) 26–29.

Erkut E., A. Ingolfsson. 2002. Managing the student supply chain. *OR/MS Today* (August) 36–41.

Cochran, J. J., J. R. Hardin, A. Ingolfsson, G. Zaric. 2008. Online journal gets a makeover. *OR/MS Today* (August) 54–57.

Research Reports and Unpublished Manuscripts

[NA / NA / 3] Ingolfsson, A. 1994. Estimating the probability of rare events. *Cooperative JR East/MIT Research Program on Risk Assessment*, Report 13.

[NA / NA / 0] Ingolfsson, A. 1994. Exploratory analysis of level crossing accident patterns. *Cooperative JR East/MIT Research Program on Risk Assessment*, Report 14.

[NA / NA / 7] Erkut, E., A. Ingolfsson, S. Budge, D. Haight, J. Litchfield, O. Akyol, G. Holmes, J. Cheng. 2005. Final report: The impact of ambulance system status management. Presented to the Emergency Response Department, City of Edmonton.

[NA / NA / 31] Ingolfsson, A. 2005. Modeling the $M(t)/M/s(t)$ queue with an exhaustive discipline.

[NA / NA / 0] Stanton, M., D. Haight, A. Ingolfsson. 2005. Modeling prostate cancer treatment in Alberta: A study of current and future needs and trends by simulation modeling. Presented to Alberta Health and Wellness.

[NA/ NA / 0] Stanton, M., D. Haight, A. Ingolfsson. 2006. Modeling hip and knee replacements in Alberta: A study of current and future needs and trends by simulation modeling. Presented to Alberta Health and Wellness.

[NA / NA / 19] Erkut, E, A. Ingolfsson, S. Budge. 2008. Maximum availability/reliability models for selecting ambulance station and vehicle locations: a critique.

[NA / NA / 0] Ingolfsson, A. M. Stanton, D. Haight. 2009. Final report: Infrastructure planning models for emergency medical services. Presented to Infrastructure Canada.

[NA / NA / 0] Beason, R. D., Ingolfsson, A., Davidson, P., Hollman, C., Chen, Y., & Fu, X. 2016. Economic impact assessment: Phase one. Prepared for Edmonton Fire Rescue Services.

[NA / NA / 0] Beason, R. D., Ingolfsson, A., Davidson, P., Hollman, C., Sharma, D., & Block, K. 2017. Economic impact assessment for Edmonton Fire Rescue Services. Value at risk, value protected and cost-benefit analysis: A survey driven approach. Prepared for Edmonton Fire & Rescue Services.

Submitted Articles

[NA / NA / 0] Ding, L., Cribben, I., Ingolfsson, A., & Tran, M. (2021). Do NHL goalies get hot in the playoffs? A multilevel logistic regression analysis. [Submitted, last revision February 2021.]

[NA / NA / 0] Rezaei, M., & Ingolfsson, A. (2020). Assessment of exponential smoothing methods for spatio-temporal forecasting of EMS call volumes. [Submitted, last revision September 2020.]

[NA / NA / 0] Samiedaluie, S., Tilson, A. & Ingolfsson, A. (2020). Models of the impact of triage nurse standing orders on emergency department length of stay. [Submitted, last revision August 2020.]

Invited Presentations (since 2011)

Campello, F., A. Ingolfsson, 2011, Exact necessary staffing requirements based on comparisons with infinite-server models, *Centre for Supply Chain Management, Wilfrid Laurier University*.

Holmes, G., A. Ingolfsson, R. Patterson, E. Rolland. 2012. Model specification and data aggregation for emergency services station location. *University of Connecticut, Edwards School of Business, University of Saskatchewan,* and *Department of Management Sciences, University of Waterloo*.

Ingolfsson, A. 2012. EMS planning and management. Keynote presentation at *CanQueue 2012*, 14th annual workshop for Canadian queueing practitioners and theorists, London, ON.

Ingolfsson, A. 2012–13. Should analytics professionals be certified? *Analytics, Big Data, and the Cloud conference*, in 2012 and in 2013, Edmonton.

Delasay, M., A. Ingolfsson, B. Kolfal, 2012–14, Modeling load and overwork effects in queueing systems with adaptive service rates. *Sauder School of Business, University of British Columbia*; *Kellogg School of Business, Northwestern University;* and *Tepper School of Business, Carnegie Mellon University*.

Ingolfsson, A. 2014. “Forecasting EMS demand, response times, and workload” and “EMS performance evaluation with analytical stochastic models”. Keynote presentations at *1st International Workshop on Planning of Emergency Services: Theory and Practice* (Amsterdam, The Netherlands).

Rastpour, A., A. Ingolfsson, B. Kolfal. 2014. Modeling red and yellow alert durations for ambulance systems. *Booth School of Business, University of Chicago* and *University of Regina*. Invited finalist presentations in *CORS Student Paper Competition* at the CORS/INFORMS International Meeting, Montreal (June 2015, 1st place) and in the *INFORMS Health Applications Society Student Paper Competition* at the INFORMS Healthcare Meeting, Nashville (July, honourable mention).

Delasay, M., A. Ingolfsson, B. Kolfal, K. Schultz. 2014–17. The load effect on service times. *Rotterdam University* and *Eindhoven University* (The Netherlands); *Buckingham University* and *Cardiff Business School* (UK); *University of Cologne* (Germany); *University of Lugano* (Switzerland); *Air Force Institute of Technology*; *Tepper School of Business, Carnegie Mellon University*; *Sungkyunkwan University* (Korea); Keynote address at *International Workshop on Behavioral Operations Management*, Shanghai, China.

Ingolfsson, A. 2015. Testing and grading in the OR/MS/analytics classroom. *INFORMS Teaching Effectiveness Colloquium*, Philadelphia.

Ingolfsson, A. 2015–16. Administration and grading of online exams for analytics courses. Tutorial at *CORS/INFORMS International Meeting*, Montreal, seminar at *University of Akureyri*, Iceland.

Campello, F., A. Ingolfsson, R. Shumsky. 2016. Queueing models of case managers. *University of Akureyri*, Iceland.

Delasay, M., A. Ingolfsson, B. Kolfal, K. Schultz. 2017. How load affects service times in emergency medical service. Keynote speaker at *International workshop on planning of emergency and healthcare systems*, Amsterdam, Netherlands and seminar at *University of Calgary*.

Ingolfsson, A., Almehdawe, E., Pedram, A., Tran, M. 2018. Comparison of fluid approximations for service systems with state-dependent service rates and return probabilities. *University of Waterloo*.

Rezaei, M., & Ingolfsson, A. 2020. Assessment of exponential smoothing methods for spatio-temporal forecasting of EMS call volumes. *Stony Brook University*.

Samiedaluie, S., Tilson, A. & Ingolfsson, A. 2020. Models of the impact of triage nurse standing orders on emergency department length of stay. *McGill University*.

Other Presentations (since 2011)

Rastpour, A., A. Ingolfsson, B. Kolfal, A. Kercher, 2011–2021. Modeling EMS yellow alert periods as partial busy periods. *CanQueue (National Workshop on Queueing Theory and Related Fields)*, Banff, *Alberta Research Conference on Operations*, Calgary, AB, *CORS Annual Conference*, Niagara Falls, ON, *INFORMS Annual Meeting*, Phoenix AZ, *CORS Annual Meeting*, Vancouver, BC, *INFORMS Healthcare Meeting*, Chicago, IL, *INFORMS Annual Meeting*, Minneapolis MN, *CORS Annual Meeting*, Ottawa ON, *CanQueue workshop*, Surrey BC, *CORS Annual Conference*, virtual.

Delasay, M., A. Ingolfsson, B. Kolfal, 2011–2013. Modeling load and overwork effects in queueing systems with adaptive service rates. *Alberta Research Conference on Operations*, Edmonton, AB, *POMS Annual Conference*, Reno, *CanQueue (National Workshop on Queueing Theory and Related Fields)*, Banff, *Alberta Research Conference on Operations*, Calgary, AB, *CORS Annual Conference*, Niagara Falls, ON, *INFORMS Annual Meeting*, Phoenix AZ, *Alberta Research Conference on Operations*, Edmonton, *CORS Annual Meeting*, Vancouver, BC, *INFORMS Healthcare Meeting*, Chicago, IL, *INFORMS Annual Meeting*, Minneapolis MN.

Campello, F., A. Ingolfsson, R. Shumsky, 2011–2015. Queueing models of case managers. *Alberta Research Conference on Operations*, Edmonton, AB, *CanQueue*, 14th annual workshop for Canadian queueing practitioners and theorists, London, ON, *INFORMS Healthcare Meeting*, Chicago, IL, *INFORMS Annual Meeting*, Minneapolis MN, *CORS Annual Meeting*, Ottawa ON, CanQueue workshop, Surrey BC; *INFORMS Healthcare Meeting*, Nashville, TN.

Rastpour, A., R Hagtvedt, A. Ingolfsson, 2011–2016. Predicting spatial patterns of heart attack incidence in Alberta. *Alberta Research Conference on Operations*, Edmonton, AB, *INFORMS Health Care Meeting*, Montreal, *INFORMS Annual Meeting*, Charlotte, NC, *INFORMS Annual Meeting*, Philadelphia.

Haerian, L., A. Ingolfsson, 2012. Scheduling and routing ambulances that provide inter-facility patient transfers. *Alberta Research Conference on Operations*, Calgary, AB, *CORS Annual Conference*, Niagara Falls, ON, *INFORMS Annual Meeting*, Phoenix AZ.

Ingolfsson, A. 2012. EMS planning and management. *INFORMS Annual Meeting*, Phoenix AZ.

Ingolfsson, A, 2012. Should analytics professionals be certified? *CORS Annual Conference*, Niagara Falls, ON.

Alanis, R., F. Campello, A. Ingolfsson, B. Kolfal. 2013. Optimizing compliance tables for ambulance repositioning. *CORS Annual Meeting*, Vancouver, BC, *INFORMS Healthcare Meeting*, Chicago, IL.

Ingolfsson, A. 2013. A guide to INFORMS Transactions on Education for readers and authors. *CORS Annual Meeting*, Vancouver, BC.

Alp, O., I. Cribben, A. Ingolfsson, M. Samorani. 2014. Optimising and testing traffic-based staff schedules for a retail chain. *IFORS Meeting*, Barcelona, Spain.

Alp, O., I. Cribben, A. Ingolfsson, M. Samorani. 2014. Using customer counts to improve retail labor scheduling. *INFORMS Annual Meeting*, San Francisco, CA.

Delasay, M., A. Ingolfsson, B. Kolfal, K. Schultz. 2014–17. Load effect on service times. *INFORMS Annual Meeting*, San Francisco CA, *POMS Annual Meeting*, Atlanta GA, *DSI Annual Meeting*, Washington DC, *INFORMS Annual Meeting*, Houston TX.

Ingolfsson, A., T. Roeder, T. C. Y. Chan, K. Willoughby. 2014. Panel discussion: Publishing in INFORMS Transactions on Education. *INFORMS Annual Meeting*, San Francisco, CA.

Ingolfsson, A. 2015. Development of the Queueing Toolpak, Version 5. *CanQueue workshop*, Halifax.

Delasay, M., A. Ingolfsson. 2015–2016. The influence of emergency medical services load on paramedics on-scene clinical decisions. *INFORMS Healthcare Meeting*, Nashville, *CORS Annual Conference*, Banff.

Rastpour, A., A. Ingolfsson, B. Sandicki. 2015–2021. Modeling queueing systems with abandonment and priorities as quasi-birth-death processes. *CORS/INFORMS International Meeting*, Montreal, *INFORMS Annual Meeting*, Philadelphia, *CORS Annual Conference*, Banff, *CanQueue* workshop, Edmonton, *CanQueue workshop*, Toronto, ON, *CORS Annual Conference*, virtual.

Delasay, M. A. Ingolfsson, K. Schultz. 2016. Inventory Is people: How load affects service times in emergency response. *CORS Annual Conference*, Banff.

Rastpour, A., M. Begen, A. Ingolfsson, G. Zaric. 2016. Dynamic programming for ambulance fleet management. *CORS Annual Conference*, Banff.

Soltani, M., A. Ingolfsson. 2016. Fitting and validating simulation models of ICUs. *CORS Annual Conference*, Banff.

Soltani, M., Ingolfsson*, A., Zygun, D. A., Stelfox, H. T., Hartling, L., Featherstone, R., Opgenorth, D., & Bagshaw, S. M. 2016. Quality and performance measures of strain on intensive care capacity: A protocol for a systematic review. *CORS Annual Conference*, Banff.

Almehdawe, E., A. Ingolfsson, M. Tran. 2016–19. A delay-differential equation model of a service system with state-dependent service rates and return probabilities. *CORS Annual Conference*, Banff, *CanQueue* workshop, Windsor, ON, INFORMS Healthcare Meeting, Rotterdam, Netherlands, CORS Annual Conference, Saskatoon, SK.

Delasay, M., A. Ingolfsson, B. Kolfal, K. Schultz. 2017. How load affects service times in emergency medical service. *IFORS/CORS Conference*, Quebec City, QC.

Rezaei, M., M. Samorani, A. Ingolfsson. 2017. The effects of patient unpunctuality on the performance of appointment scheduling systems. *POMS 2017 Annual Conference*, Seattle.

Ding, L., I. Cribben, A. Ingolfsson, M. Tran. 2018–19. The Hot Hand Theory in hockey: A multilevel logistic regression analysis. *CORS Annual Conference*, Halifax, NS, *Joint Statistical Meetings*, Vancouver, BC, *International Hockey Analytics Conference*, Ottawa, ON, *CMStatistics 2019*, London, UK, *CORS Annual Conference*, virtual.

Rezaei, M., A. Ingolfsson. 2018–19. Forecasting emergency medical call volumes over time and space. *CORS Annual Conference*, Halifax, NS, *Canadian Healthcare Optimization Workshop*, Saskatoon, SK.

Delasay, M., A. Ingolfsson, A. Rastpour. 2018–21. Evaluating capacity planning methods for loss systems: Application to emergency medical services. *INFORMS Annual Conference*, Phoenix, AZ, *POMS Annual Conference*, Washington, DC, *CanQueue Workshop*, Toronto, ON, *INFORMS Annual Conference*, virtual, *CORS Annual Conference*, virtual, *POMS Annual Conference*, virtual.

Samiedaluie, S., Tilson, A. & Ingolfsson, A. 2020–21. Models of the impact of triage nurse standing orders on emergency department length of stay. *INFORMS Annual Conference*, virtual, *CORS Annual Conference*, virtual.

Ding, L., Kolfal, B. & Ingolfsson, A. 2021. The relationship between expected service times and service rates for state-dependent queues. *CanQueue Workshop*, Montreal, QC

Asgari, A., Samiedaluie, S. & Ingolfsson, A. 2021. Model validation for the call centre of a non-profit organization. *CanQueue Workshop*, Montreal, QC

Selected Sponsored Research Projects

"Forecasting teacher demand in the province of Alberta," sponsored by Alberta Education, $141,000 (2005–2008).

Principal Investigator. Co-investigator: Dan Haight.

Involved modeling and forecasting K-12 student and teacher populations by age, grade, and jurisdiction for the province of Alberta. Important modeling components included a teacher lifecycle simulation model, an age, gender, and jurisdiction-specific population forecasting model, and a spreadsheet interface to display both historical data and forecasts for student and teacher populations.

The project was nominated for the Alberta Premier's Award of Excellence. The results have been presented to the Minister and Deputy Minister of Education, and the Alberta Teacher's Association.

"Quantifying the benefits of EMS regionalization," sponsored by the Calgary Health Region, $60,000 (2005–2006).

"Performance, deployment and operations of the EMS represented in the Capital Region," sponsored by Capital Health Region, $145,000 (2007–2008).

Principal Investigator. Co-Investigators: Dan Haight, Ramon Alanis.

These two projects involved collection, coding, and cleaning of data from multiple EMS operators in two of the largest of Alberta's nine health regions, quantifying current performance, establishing performance standards for different areas (urban, rural, and wilderness), and modeling the benefits of operating the EMS service in each health region without regard for municipal boundaries.

"Performance evaluation and optimization for service systems." NSERC Discovery Grant, $19,000 per year (2007–2012)

"Shared computing facility for optimization modelling." NSERC Research Tools and Instruments grant, $71,400 (2007)

Lead applicant. Co-applicants from business, engineering, geography, and computer science at the University of Alberta.

Used to purchase a server and software for optimization modeling.

"Deployment modeling," sponsored by City of Calgary Emergency Medical Services (EMS) department, $210,000 (2007–2010).

Principal Investigator.

Co-Investigators and collaborators: Erhan Erkut, Dawit Zerom, Susan Budge, Dan Haight, Gunes Erdogan, Gilbert Laporte, Pierre L'Ecuyer, Thanos Avramidis, Nabil Channouf, Ramon Alanis.

Detailed performance analysis for Calgary EMS, including call-volume forecasting, travel-time analysis, root-cause analysis for calls with long response times, and analysis of real-time repositioning strategies. Analysis methods included discrete event simulation, Markov modeling, optimal facility location models, tabu search, statistical analysis, and spatial analysis using GIS. This project and earlier projects with Edmonton EMS led to several articles in refereed journals.

"Infrastructure planning models for emergency medical service," Infrastructure Canada, Peer Reviewed Research Projects, $131,000 (2007–2009).

Principal Investigator. Co-Investigators: Tarja Joro, Susan Budge, Dan Haight.

This study, which leveraged the projects sponsored by Calgary EMS and by the Calgary and Capital Health regions, investigated various funding formulas for EMS services when funding is provided at the provincial level, and used Data Envelopment Analysis to compare the efficiency of various EMS operators. An EMS Planning conference was held in Edmonton in August 2008, with the aim of transferring knowledge from this and other EMS research projects to EMS practitioners. In addition to 20 EMS practitioners, the conference was attended by academics interested EMS planning from New Zealand, the USA, and the Netherlands.

"Forecasting EMS and fire call volumes," sponsored by Seattle Fire and EMS, $10,000 (2007–2008).

Principal Investigator. Co-Investigators: Dan Haight, Fernanda Campello, Ke-Li Xu.

Consultation and training with Seattle Fire and EMS to assist them with forecasting annual call volumes by geographic division, as a function of population and other demographic variables.

"EMS patient transfers, deployment, and system status management," sponsored by City of Calgary Public Safety Commission, $540,000 (2009–2012).

Principal Investigator. Co-Investigators: Dan Haight, Laleh Haerien.

Development and testing of methods for scheduling patient transfers and repositioning ambulances to improve coverage of emergency transfers.

"Healthcare operations & information management." NSERC CREATE Grant, $300,000 per year (2009–2015)

Program Director: Vedat Verter, McGill University

A collaborative program between several Canadian universities to train PhD students and postdoctoral fellows to contribute to healthcare research and policy. As a co-applicant, I supervised a PhD student (Mohammad Delasay) that received funding from this program and I participated by co-teaching PhD courses and lecturing at summer schools.

"Health care aides & technology," sponsored by Alberta Health and Wellness, $800,000 (2011–12).

Principal Investigator: Lili Liu, Department of Occupational Therapy

As one of the project team members, I supervised the work of a postdoctoral fellow (Laleh Haerien) on the development of methods to improve scheduling of patients visits by health care aides.

"Health care operations management." NSERC Discovery Grant, $21,000 per year (2012–19)

"Deployment modeling." Sponsored by Calgary Fire Department, $90,000 (2013)

Principal Investigator. Co-Investigator: Dan Haight

"Identifying and Evaluating Intensive Care Unit Capacity Strain in Alberta." Alberta Innovates Health Solutions, Partnerships for Research and Innovation in the Health System program, $743,818 (2014–2018)

Principal investigator: Sean Bagshaw, University of Alberta

Co-principal investigator: Tom Stelfox, University of Calgary

Member of Steering Committee and participant in Phase IV: Discrete event simulation.

"Economic Impact of Edmonton Fire Rescue Services, Phase 1." City of Edmonton, $38,400 (2015)

"Economic Impact of Edmonton Fire Rescue Services, Phase 2." City of Edmonton, $38,400 (2016-17)

Co-Principal investigator, with Richard D Beason, University of Alberta

"Service operations management." NSERC Discovery Grant, $32,500 per year (2019–24)

Blended learning award for OM 352. University of Alberta, $15,000.

Lead Instructor. Other instructors: Saied Samiedaluie, Sam Ito.

Software Development

Developed the *Queueing ToolPak* (an MS-Excel add-in for waiting line analysis). Version 4.0 available for free from http://queueingtoolpak.org/ .

An *OR/MS Today* software survey described the add-in as making "queueing theory computations effortless" and as being "vastly superior to the queueing theory template spreadsheets previously available."

Graduate Student Supervision
[OIS = Operations & Information Systems]

Supervision:

- Md. Amanul Haque, MBA/MEng 1998, co-supervisor [Current position: Professor at Penn State]
- Susan Budge, PhD in Mgmt. Science, 2004, supervisor
- Annie Niu PhD in Mgmt. Science, 2008, co-supervisor [Current position: Associate Professor at Webster University]
- Ramon Alanis, PhD in OIS, 2012, co-supervisor [Current position: Senior Operations Researcher at Alberta Health Services]
- Fernanda Campello, PhD in OIS, 2013, supervisor
- Mohammad Delasay, PhD in OIS, 2014, co-supervisor [Current position: Assistant Professor at Stony Brook University]
- Amir Rastpour, PhD in OIS, 2015, co-supervisor [Current position: Assistant Professor at University of Ontario Institute of Technology]
- Laleh Haerien, postdoctoral fellow in OIS, supervisor 2011–12 [Current position: Systems Analyst at Mackenzie Investments]

- Fernanda Campello, postdoctoral fellow in OIS, co-supervisor 2013–14 [Current position: Senior Data Scientist at Dell EMC]
- [name withheld], PhD in OIS, withdrew in 2015, supervisor
- Mostafa Rezaei, PhD in OIS, 2019, supervisor. [Current position: Assistant Professor at ESCP Business School]
- Maryam Zakeri, PhD in OIS, exp. 2022, co-supervisor
- Likang Ding, PhD in OIS, exp. 2022, co-supervisor
- Shirin Geranmayeh, PhD in Engg. Mgmt., exp. 2023, co-supervisor

Committee membership:

- Jianjun Zhang, PhD in Earth & Atmosph. Sciences 1998, exam comm.
- Burcin Bozkaya, PhD in Mgmt. Science 1998, supervisory comm.
- Jinsheng Huang, PhD in Mech. Engg. 2001, exam comm.
- Yongyue Li, PhD in Mgmt. Science, 2005, exam comm.
- Edgar Cabral, PhD in Mgmt. Science, 2005, exam comm.
- Ramin Moghaddass, PhD in Engg. Mgmt., 2013, supervisory comm.
- Mayank Pandey, PhD in Engg. Mgmt., 2014, supervisory comm.
- Naimeh Sadeghi, PhD in Civil Engg., 2015, supervisory comm.
- Hooman Hidaji, PhD in OIS, 2017, supervisory comm.
- Mohamad Soltani, PhD in OIS, transferred, supervisory comm.
- Freddy Andrés Pérez Mantilla, PhD in Engg., University of the Andes, 2019, supervisory comm.
- Agust Thorbjornsson, PhD in Engg., Reykjavik University, exp. 2021, supervisory comm.
- Arash Asgari, PhD in OIS, 2023, supervisory comm.
- Yasser Zeinali, PhD in OIS, 2024, supervisory comm.
- Mehrnaz Behrooz, PhD in OIS, 2024, supervisory comm.

Arms-length examiner for U of A students:

- Jun Zhang, MSc in Engg. Mgmt. 2005
- Abdallah Al-Shammari, PhD in Chem. Engg., 2006
- Wei Ping Zeng, PhD in Earth & Atmosph. Sciences, 2007
- Brody Todd, MSc in Engg. Mgmt., 2010
- Chen Liu, PhD in Comp. Sci., 2012
- Brody Todd, PhD in Engg. Mgmt., 2013
- Jo-Louise Huq, PhD in Business, 2013
- Cuong Duc Dao, PhD in Engg. Mgmt., 2016
- Mustafa Babadagli, PhD in Engg. Mgmt., 2016

External examiner for students outside the U of A:

- Pattita Suwanruji, PhD in Manuf. Engg., University of Calgary, 2004
- Mihaz F. Zibran, MSc in Comp. Sci., Univ. of Lethbridge, 2007

- Sachin Pendarkar, MSc in Community Health Sciences, University of Calgary, 2011
- Chandandeep Grewal, PhD in Manuf. Engg., University of Calgary, 2012
- Pegah Abbasi, MSc in Finance, University of Saskatchewan, 2012
- Eman Almehdawe, PhD in Management Sciences, University of Waterloo, 2012
- Reza Mahjoub, PhD in Business, Western University, 2014
- Deriya Demirtas, PhD in Industrial Engineering, University of Toronto, 2016
- Caroline Jagtenberg, PhD in Mathematics, VU University Amsterdam, 2017
- Akbar Karimi, PhD in Industrial Engineering, Université de Montréal, 2019
- Mona Imanpoor Yourdshahy, PhD in Business, Sauder School of Business, University of British Columbia, 2020
- Eugene Furman, PhD in Business, Schulich School of Business, York University, 2020

Teaching at University of Alberta

BComm Courses:

Mgtsc 312: Probability and Statistics for Business (required course)
Course coordinator 2007–2011
Most recent instructor rating (2010) 4.7/5.0

OM 352: Introduction to Operations Management (required course)
Course coordinator 2005–2021
Most recent instructor rating (2019): 4.7-4.8/5.0

OM 422: Simulation and Computer Modeling (elective course)
Most recent instructor rating (2013): 4.2/5.0

OM 426: Service Operations Management (elective course)
Most recent instructor rating (2004): 3.8/5.0

MBA Courses

Mgtsc 531: Decision Analysis (required course)
Most recent instructor rating (2005): 3.8/5.0

Mgtsc 541: Production and Operations Management (elective course)
Most recent instructor rating (2007): 4.3/5.0

PhD Courses (no ratings collected because of small class sizes)

Mgtsc 701: Seminar on Mathematical Programming
Mgtsc 703: Advanced Applications of Operations Research
Mgtsc 704: Seminar on Stochastic Modeling
OM 701: Introduction to Operations Management Research

OM 702: Advanced Research Topics in Operations Management:

- Health Care Operations Management (co-taught twice by video-conference to students at University of Alberta, McGill University, and University of Toronto; sponsored by an NSERC CREATE grant)
- Queueing Science (taught twice)

Awards to Students

2005 INFORMS George B. Dantzig Dissertation Award, Honourable Mention to Dr. Susan Budge (supervisor)

2007 MITACS Industrial Internship awarded to Ramon Alanis ($15,000, co-sponsored by Edmonton EMS, co-supervisor)

2008 Internship awarded to Fernanda Campello ($7,500, sponsored by Edmonton Police Services, supervisor)

2010 CORS Student Paper Competition, Graduate Category, First Prize to Ramon Alanis (co-supervisor)

2015 CORS Student Paper Competition, Graduate Category, First Prize to Amir Rastpour (co-supervisor)

University of Alberta Service

1996–2002: Board member, Canadian Institute of Nordic Studies

2001–2003, 2006, 2009–2019: Alberta School of Business PhD Policy Committee

2004–2010: Alberta School of Business Research Ethics Board

2008 and 2017: Alberta School of Business Research Awards Committee

2008–2009: Learning Management Systems Review Committee

2010–2012: Alberta School of Business Undergraduate Studies Policy Committee

2011–2017: Faculty of Science Council

2014–2015: Centre for Effective Business Management of Addiction Treatment Steering Committee

2016–2020: Alberta School of Business IT Governance Committee

2016, May–June: Acting Associate Dean for Business PhD program

2017–2019: Alberta School of Business Faculty Evaluation Committee; elected member

Professional Organization Service to INFORMS (Institute for Operations Research and

1996–1999: Vice President Publications of INFORMS Forum on Education
1996–1999: Editor of "Issues in Education" column in *OR/MS Today*
2003: Cluster Chair for education and distance learning, EURO/INFORMS Conference
2004: Local Arrangements Chair, CORS/INFORMS Conference
2011: Cluster Chair for CORS-sponsored cluster, INFORMS healthcare conference

Management Sciences)

2016–2018: Chair, Continuing Education Committee
2018-2020: Co-Chair, MSOM 2020 Society Annual Conference, was to be held in Banff, canceled because of COVID-19 pandemic

Professional Organization Service to CORS (Canadian Operational Research Society)

1998–2003, 2007–present: University of Alberta CORS Diploma Coordinator and Member of CORS Education Committee
2005–present: President of CORS Edmonton section

CORS Annual Conferences:

- 2000: Program Chair
- 2005: Cluster Chair for Education
- 2006 and 2011: Cluster Chair for Stochastic Models
- 2010: Cluster Chair for Healthcare Operations
- 2010: Conference Chair
- 2016: Cluster Chair for Analytics and for Practitioner's Day
- 2019: Cluster Chair for Education and for Queueing Theory
- 2020 (delayed to 2021 because of COVID-19 pandemic): Cluster Chair for Sports & Entertainment

Judging Committees:

- 2003–2004, 2012–2013, 2018: Practice Prize
- 2003, 2007–2009: Student Paper Competition
- 2007–2008: Student Modeling Competition, co-sponsored by Visual8 Corporation
- 2016–2017: Healthcare operational research Special Interest Group (SIG) Student Presentation Competition,
- 2016, 2020: Queueing SIG Student Paper Competition

Executive Council:

- 2003–2007: Chair, CORS Education Committee, National CORS Diploma Coordinator
- 2005–2007: Member of CORS Executive Council
- 2009–2010: Vice President
- 2010–2011: President
- 2011–2012: Past President

Other:

- 2014–2016: President, Healthcare operational research SIG
- 2013–2014: Publications Committee member
- 2014: *INFOR* Publisher Search Committee member

Other Professional Organization Service

EURO 2006 Conference

- Cluster Chair for Education
- Cluster Chair for Operations Management and Revenue Management

2006, 2018, 2021 CanQueue (Annual Conference for Canadian Queueing Theorists and Practitioners): Chair or Co-chair

Editorial Activities

INFORMS Transactions on Education

- 1999–2005: Associate Editor
- 2006–2012: Senior Editor
- 2013–2015: Editor-in-Chief
- 2016–2021: Editorial Board

Guest Editor (one of four) for special issue on Behavioral Queueing Science for *Operations Research* (FT50 journal): 2019-present.

Associate Editor:

- 2005–2008: *IIE Transactions*
- 2005–present: *Journal for Quantitative Analysis in Sports*
- 2007–present: *INFOR*
- 2018–present: *Queueing Models and Service Management*
- 2012–2013: *TOP*
- 2019–present: *Healthcare Management Science*

Ad-hoc referee for many journals, including:

- *Automatica*
- *Computers & Operations Research*
- *European Journal of Operational Research*
- *Health Care Management Science*,
- *IIE Transactions*
- *INFORMS Journal on Computing*
- *Interfaces*
- *Journal of the Operational Research Society*
- *Journal of the American Statistical Association*
- *Management Science*
- *Manufacturing & Service Operations Management*
- *Naval Research Logistics*
- *Performance Evaluation*
- *Production and Operations Management*
- *Operations Research*
- *Queueing Systems*
- *Technometrics*
- *Transportation Science*

Review of grant applications for *NSERC*, *SSHRC*, *CIHR*, *Canada Research Chairs* program, and various other Canadian and international agencies.

2014–2017: Member of the NSERC Civil, Industrial and Systems Engineering Discovery Grant Evaluation Group.