

# ERICK DELAGE

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Dept. of Decision Sciences  
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## EDUCATION

Stanford University Ph. D. in Electrical Engineering	Stanford, CA <i>June 2009</i>
Stanford University M. S. in Electrical Engineering	Stanford, CA <i>June 2005</i>
McGill University B. Eng. in Computer Engineering	Montreal, Canada <i>December 2000</i>

## ACADEMIC HONORS

- 2020 : elected as a member of the College of New Scholars, Artists and Scientists of the Royal Society of Canada.
- 2015 : “Chenelière Éducation/Gaëtan Morin Research Award”, prize for the quality of research production as an associate professor.
- 2014 : Selected as Chairholder of the Canada Research Chair in Decision Making Under Uncertainty. (see <https://chairepdi.hec.ca/en/> for more details)
- 2011 : “Jeune Chercheur” prize for the quality of research production as an assistant professor.
- 2008 : First prize at INFORMS George Nicholson Best Student Paper, article [33].
- 2007 : Finalist for INFORMS George Nicholson Student Paper Competition, article [34]

## PROFESSIONAL EXPERIENCE

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- Full Professor, Decision Sciences Dept., **HEC Montréal**, June 2019 - present.
- Invited Professor, College of Management of Technology, **École polytechnique Fédérale de Lausanne**, June - August 2015.
- Associate Professor, Decision Sciences Dept., **HEC Montréal**, June 2014 - 2019.
- Assistant Professor, Decision Sciences Dept., **HEC Montréal**, June 2009 - 2014.

## TEACHING EXPERIENCE

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- Course Coordinator, **HEC Montréal**,
  - 2-657-97 : *Introduction to Operations Research*, Fall 2009/2010/2014, Winter 2010/2011/14.
  - 1-611-09 : *Modeling and Optimization*, Fall 2012/2013.
- Teacher, **HEC Montréal**.
  - 1-611-09 : *Modeling and Optimization* (B.A.A.), Fall 2012/2013.
  - 2-657-97 : *Introduction to Operations Research* (B.A.A), Fall 2009/2010/2011/2014, Winter 2010/2011/2013/2014.
  - 6-615-09 : *Decision Analysis* (M.Sc.), Fall 2010/2011/2012/2013/2014/2016/2017/2018/2019/2020, Winter 2022.
  - 53-683-02 : *Risk Analysis* (M.B.A.), Winter 2012/2013/2014.
  - 80-624-16A : *Quantitative Risk Management Using Robust Optimization* (PH. D.), Fall 2016/2017/2019, Winter 2021/2022.
- Teacher, **École polytechnique Fédérale de Lausanne**
  - MGT-638 : *Quantitative risk management using robust optimization* (Ph. D.), Summer 2015.

## SUPERVISED STUDENTS

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- *Nicolas Nossovitch*, Honor project (2011-2012)
- *Luca G. Gianoli*, Minor thesis (2012-2013)
- *Jonathan Y. Li*, Postdoctoral (2012-2013)
- *Ines Henchiri*, Research assistant (2014)
- *Pierre-Luc Carpentier*, Postdoctoral (2014)
- *Jean-François Fortin*, Master's (2011-2015)
- *Rui Zhang*, Postdoctoral (2014-2015), co-supervised with Jonathan Y. Li
- *Amir Ardestani-Jaafari*, Ph.D. (2012-2016)
- *Adrien Barbry*, Master's (2015-2017)
- *Thierry Bazier-Matte*, Master's (2015-2017)
- *Charles Gauvin*, Ph.D. (2013-2017), co-supervised with Michel Gendreau
- *Ahmed Saif*, Postdoctoral (2016-2017)
- *Robin Rivest*, Master's (2013-2019)
- *Abderrahim Fathan*, Research associate (2019-2020)
- *Shiva Zokae*, M. Sc. (2017-2021), co-supervised with Michel Gendreau
- *Parisa Keshavarz*, M. Sc. (2019-2021), co-supervised with Jonathan Y. Li

- *Saeed Marzban*, M. Sc. (2016-2021), co-supervised with Jonathan Y. Li
- *Sajad Aliakbari*, Ph. D. (2016-2022), co-supervised with Olivier Bahn
- *Wenjie Huang*, Postdoctoral (2020-2021, co-supervised with Zizhuo Wang)
- *Ernest Tafolong*, M. Sc. (2020-current), co-supervised with David Ardia
- *Mehran Poursoltani*, Ph. D. (2017-current)
- *Abhilash Chenreddy*, Ph. D. (2020-current)
- *Xin Wang*, Ph. D. (2020-current), co-supervised with Okan Arslan
- *Chun Peng*, Postdoctoral (2018-current)
- *Shanshan Wang*, Postdoctoral (2020-current, co-supervised with L. Coelho)
- *Utsav Sadana*, Postdoctoral (2021-current, co-supervised with Mehmet Gumus)

## FUNDING

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### Principal Investigator:

- “Strategic Research Funding Program”, January 2022 - June 2024
  - Agency: Institut de Valorisation des données (IVADO)
  - Project title: “Integrated Machine Learning and Optimization for Decision Making under Uncertainty: Towards Robust and Sustainable Supply Chains”
  - Amount : 1 200 000\$ over 30 months
  - Principal investigator : Erick Delage
  - Co-investigator : Y. Adulyasak, E. Frejinger.
- “Ressource Allocation Competition”, May 2021 - May 2022
  - Agency: Compute Canada
  - Project title: “Cloud Computing for Canada Research Chair in Decision Making under Uncertainty”
  - Amount : 95 core year (value of 11 527\$)
  - Principal investigator : Erick Delage
  - Co-investigator : A. Georghiou, A. Ardestani-Jaafari, O. Bahn, J. Y. Li .
- “Canada Research Chair in Decision making under uncertainty”, June 2014 - June 2024
  - Agency: Natural Sciences and Engineering Research Council of Canada (NSERC)
  - Amount : 1 000 000\$ over the ten years
  - Principal investigator : Erick Delage
- “Discovery Grant”, June 2016 - June 2021
  - Agency: Natural Sciences and Engineering Research Council of Canada (NSERC)
  - Project title: “Optimizing decisions in situations with unresolved ambiguity”
  - Amount : 155 000\$ over the five years

- Principal investigator : Erick Delage
- “RGPAS Discovery Grant Program : Accelerator Supplements”, June 2016 - June 2019
  - Agency: Natural Sciences and Engineering Research Council of Canada (NSERC)
  - Project title: “Optimizing decisions in situations with unresolved ambiguity”
  - Amount : 120 000\$ over the three years
  - Principal investigator : Erick Delage

Collaborator:

- “NSFC-FRQSC Grant”, May 2020 -April 2023
  - Agency: Fonds de recherche Société et culture (FRQSC) and National Natural Science Foundation of China (NSFC)
  - Project title: “Data Driven Collaborative Design of Transportation and Power Supply Systems in the Development of Smart City”
  - Amount : 120 000\$ and 20 000 000 ¥ over three years
  - Principal investigator : Leandro Coelho and Wei Huang
  - Co-investigator : S. Li, Y. Ding, M. Darvish, L. Yu, X. Li, Y. Guo, Y. Lei
- “IVADO Grant”, May 2020 -April 2022
  - Agency: Institut de Valorisation des données (IVADO)
  - Project title: “Data-driven Demand Learning and Sharing Strategies for Two-Sided Online Marketplaces”
  - Amount : 150 000\$ over two years
  - Principal investigator : Mehmet Gumus
  - Co-investigator : A. Nalca, A. Georghiou
- “CREATE Grant”, June 2018 - June 2024
  - Agency: Natural Sciences and Engineering Research Council of Canada (NSERC)
  - Project title: “CREATE Program on Machine Learning in Quantitative Finance and Business Analytics”
  - Amount : 1 650 000\$ over six years
  - Principal investigator : Manuel Morales
  - Co-investigator : A. Tapp, C. Lemieux, C. Hyndman, F. Bastin, G. Gauthier, J. Yuan Yu, M. Bijvank, Y. Bengio, Y. Levin
- “IVADO Grant”, May 2018 - April 2020
  - Agency: Institut de Valorisation des données (IVADO)
  - Project title: “Valorisation des données et Optimisation Robuste pour guider la Transition Énergétique vers des réseauX intelligents à forte composante renouvelable”
  - Amount : 200 000\$ over the five years
  - Principal investigator : Olivier Bahn
  - Co-investigator : N. Mousseau, P. Caines, R. Malhamé, A. Haurie, F. Babonneau

**PUBLICATIONS**

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(Main author is presented in **bold**, otherwise contribution should be considered equally distributed among all authors.)

**ARTICLES IN REFEREED PUBLICATIONS**

1. **C. Peng**, E. Delage, “Data-Driven Optimization with Distributionally Robust Second-Order Stochastic Dominance Constraints”, accepted in *Operations Research*, 2022.
2. U. Sadana, E. Delage, “The Value of Randomized Strategies in Distributionally Robust Risk Averse Network Interdiction Games”, accepted in *INFORMS Journal on Computing*, 2022.
3. S. Aliakbari Sani, A. Maroufmashat, F. Babonneau, O. Bahn, E. Delage, A. Haurie, N. Mousseau, K. Vaillancourt, “Energy Transition Pathways for Deep Decarbonization of the Greater Montreal Region: An Energy Optimization Framework”, *Energies*, Vol 15, No. 10:3760, 2022.
4. **S. A. Sani**, O. Bahn, E. Delage, R. F. Tchuendom, “Robust Integration of Electric Vehicles Charging Load in Smart Grid’s Capacity Expansion Planning”, *Dynamic Games and Applications*, No. 12, pp 1010–1041, 2022.
5. **C. Nicolas**, S. Tchung-Ming, O. Bahn, E. Delage, “Robust Enough? Exploring Temperature-Constrained Energy Transition Pathways under Climate Uncertainty”, *Energies*, Vol. 14, No. 24: 8595, 2021.
6. **S. Aliakbari Sani**, O. Bahn, E. Delage, “Affine Decision Rule Approximation to Immunize against Demand Response Uncertainty in Smart Grids’ Capacity Planning”, *European Journal of Operational Research*.
7. E. Delage, S. Guo, H. Xu, “Shortfall Risk Models When Information of Loss Function Is Incomplete”, *Operations Research*.
8. M. Poursoltani, E. Delage, “Adjustable Robust Optimization Reformulations of Two-Stage Worst-case Regret Minimization Problems”, *Operations Research*.
9. S. Marzban, E. Delage, J. Y. Li, “Equal Risk Pricing and Hedging of Financial Derivatives with Convex Risk Measures”, *Quantitative Finance*, Vol. 22, No. 1, pp 47-73, 2022.
10. V. A. Nguyen, F. Zhang, J. Blanchet, E. Delage, Y. Ye, “Distributionally Robust Local Non-parametric Conditional Estimation”, *NeurIPS 2020*.
11. E. Delage, A. Saif, “The Value of Randomized Solutions in Mixed-Integer Distributionally Robust Optimization Problems”, *INFORMS Journal on Computing*, Vol. 34, No. 1, pp.333-353, 2022.
12. **A. Saif**, E. Delage, “Data-Driven Distributionally Robust Capacitated Facility Location Problem”, *European Journal of Operational Research*, Vol. 291, No. 3, pp 995-1007, 2021.
13. **F. Rodrigues**, A. Agra, C. Requejo, E. Delage, “Lagrangian duality for robust problems with decomposable functions: the case of a robust inventory problem”, *INFORMS Journal on Computing*, Vol. 33, No. 2, pp 685-705, 2021.
14. A. Ardestani-Jaafari, E. Delage, “Linearized Robust Counterparts of Two-stage Robust Optimization Problem with Applications in Operations Management”, *INFORMS Journal on Computing*, Vol. 33, No. 3, pp 1138-1161, 2021.

15. **C. Peng**, E. Delage, J. Li, “Probabilistic Envelope Constrained Multiperiod Stochastic Emergency Medical Services Location Model and Decomposition Scheme”, *Transportation Science*, Vol. 54, No. 6, pp 1471-1494, 2020.
16. **T. Bazier-Matte**, E. Delage, “Generalization Bounds for Regularized Portfolio Selection with Market Side Information”, *INFOR: Information Systems and Operational Research*, Vol. 58, No. 2, pp 374-401, 2020.
17. **A. Barbry**, M. Anjos, E. Delage, “Robust self-scheduling of a price-maker energy storage facility in the New York electricity market”, *Energy Economics*, Vol. 78, pp 629-646, 2019.
18. E. Delage, D. Kuhn, W. Wiesemann, ““Dice”-sion Making under Uncertainty: When Can a Random Decision Reduce Risk?”, *Management Science*, Vol. 65, No. 7, pp 3282-3301, 2019.
19. **C. Gauvin**, E. Delage, M. Gendreau, “A successive linear programming algorithm with non-linear time series for the reservoir management problem”, *Computational Management Science*, Vol. 15, No. 1, pp 55-86, 2018.
20. **C. Gauvin**, E. Delage, M. Gendreau, “A Stochastic Program with Tractable Time Series and Affine Decision Rules for the Reservoir Management Problem”, *European Journal of Operations Research*, Vol. 267, No. 2, pp 716-732, 2018.
21. E. Delage, L. G. Gianoli, B. Sansò, “A Practicable Robust Counterpart Formulation for Decomposable Functions: A Network Congestion Case Study”, Vol 66, No. 2, pp. 535-567, 2018.
22. **C. Gauvin**, E. Delage, M. Gendreau “Decision rule approximations for the risk averse reservoir management problem”, *European Journal of Operations Research*, Vol. 261, No. 1, pp. 317-336, 2017.
23. E. Delage, J. Y. Li “Minimizing Risk Exposure when the Choice of a Risk Measure is Ambiguous”, *Management Science*, Vol. 64, No. 1, pp. 327-344, 2018.
24. M. Denault, E. Delage, J.-G. Simonato “Dynamic portfolio choice: a simulation-and-regression approach”, *Optimization and Engineering*, Vol. 18, no. 2, pp 369-406, 2017.
25. **A. Ardestani-Jaafari**, E. Delage “The Value of Flexibility in Robust Location-transportation Problems”, *Transportation Science*, Vol. 52, No. 1, pp 189-209, 2018.
26. A. Ardestani-Jaafari, E. Delage “Robust Optimization of Sums of Piecewise Linear Functions with Application to Inventory Problems”, *Operations Research*, Vol. 64, No. 2, pp. 474-494, 2016.
27. E. Delage, D. Iancu “Robust Multistage Decision Making”, *TutORials in Operations Research*, pp. 20-46, 2015.
28. B. Armbruster, E. Delage “Decision Making under Uncertainty when Preference Information is Incomplete”, *Management Science*, Vol. 61, No. 1, pp. 111-128, 2015.
29. **E. Delage**, Y. Ye “The Value of Stochastic Modeling in Two-Stage Stochastic Programs with Cost Uncertainty”, *Operations Research*, Vol. 62, No. 6, pp. 1377-1393, 2014.
30. **J. Cheng**, E. Delage, A. Lissner “Distributionally Robust Stochastic Knapsack Problem”, *SIAM Journal on Optimization*, Vol. 24, No. 3, pp. 1485-1506, 2014.
31. J. G. Carlsson, E. Delage, Y. Ye “Robust Partitioning for Stochastic Multi-vehicle Routing”, *Operations Research*, Vol. 61, No. 3, pp. 727-744, 2013.

32. S. Agrawal, E. Delage, M. Peters, Z. Wang, Y. Ye, “Unified Framework for Dynamic Parimutuel Information Market Design”, *Operations Research*, Vol. 59, no. 3, pp. 550-568, 2011.
33. **E. Delage**, Y. Ye, “Distributionally Robust Optimization under Moment Uncertainty with Application to Data-Driven Problems”, *Operations Research*, Vol. 58, No. 3, pp. 596-612, 2010.
34. **E. Delage**, S. Mannor, “Percentile Optimization for Markov Decision Processes with Parameter Uncertainty”, *Operations Research*, Vol. 58, No.1, pp. 203-213, 2010.

## PATENTS

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### Wireless Communication (OFDM technology)

- J. Labs, R. Janicek, **E. Delage**, et al. “Synchronizing Method and Apparatus”. *Patent CA 2433139, US 7352778, US 20040264510*, Wavesat Inc.
- J. Labs, S. Gagnon, **E. Delage**. “Method and Apparatus for Estimating Frequency Offset for an OFDM Burst Receiver”. *Patent US 20040264584*, Wavesat Inc.

## INVITED TALKS

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### “Distributionally Robust Conditional Optimization via Optimal Transport”

- *63rd Annual Conference*, University of Southampton, UK, September 16th, 2021.

### “Equal Risk Pricing and Hedging of Financial Derivatives with Convex Risk Measures”

- *Actuarial Science & Financial Mathematics Seminar Series*, University of Waterloo, Waterloo, Canada, May 7th, 2021.

### “Worst-case regret minimization in a two-stage linear program ”

- *Robust Optimization Webinars*, Tilburg University, Tilburg, Netherland, April, 2020.
- *CDM Seminars*, École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland, August, 2019.
- *Mini-symposia of the XV International Conference on Stochastic Programming*, Trondheim, Norway, August, 2019.
- *BIRS Workshop on Models and Algorithms for Sequential Decision Problems Under Uncertainty*, Banff, January, 2019.

### “Utility-based Shortfall Risk Models when Preference Information is Incomplete ”

- *Quantitative Finance Webinar*, Stoney Brook University, Stoney Brook, USA, April, 2020.
- *FIELDS Workshop on Frontier Areas in Financial Analytics*, Toronto, April, 2019.
- *Epstein Institute Seminar*, University of Southern California, Los Angeles, USA, April, 2019.
- *Mechanical Engineering Department’s Seminar*, University of Texas, Austin, Texas, USA, April, 2019.

- *23rd International Symposium on Mathematical Programming*, Bordeaux, France, July 2018
- *Workshop on Robust Optimization*, Avignon, France, June 2018.

“Dice”-sion Making under Uncertainty: When Can a Random Decision Reduce Risk?”

- *Management Science Research Center Seminar*, Desautels Faculty of Management, McGill University, March, 2018.
- *Workshop on Data-drive Optimization*, Shanghai, December, 2017.

“Measuring the Value of Randomized Solutions in Distributionally Robust Optimization”

- *BIRS Workshop on Distributionally Robust Optimization*, Banff, March, 2018.

“Optimiser les décisions dans un contexte d’incertitude et de données”

- *Les Midis de la Recherche*, HEC Montréal, March, 2017.

“Preference Robust Optimization for Decision Making under Uncertainty”

- *IEOR-DRO Seminar*, Columbia University, September, 2016.
- *Semi-plenary*, 5th International Conference on Continuous Optimization, Tokyo, August, 2016.

“The Value of Distribution Information in Distributionally Robust Optimization”

- *EURANDOM Workshop on Robust Optimization in Applied Probability*, Eindhoven, November 2015.

“Tutorial on Robust Multistage Decision Making”

- *INFORMS Annual Meeting*, Philadelphia, November 2015.

“Linearized Robust Counterparts of Two-Stage Distribution Problems”

- *Invited Seminar*, Tilburg University, Netherland, January 2018.
- *FIELDS : Workshop on Modern Convex Optimization*, Toronto, July 2017.
- *CDM Seminar series*, EPFL, Switzerland, July 2015.
- *DSL-Seminar series*, MIT, Boston, February 2015.

“Addressing Model Ambiguity in the Expected Utility Framework”

- Semi-plenary presented at British-French-German Conference on Optimization, June 2015
- OR Center Seminar, MIT, November 2014



**SERVICE**

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- Organizer (Conference cluster) - *Financial engineering cluster of CORS Annual meeting 2014/2020/2021*
- Organizer (Conferences) - *CRM Workshop on Optimization under Uncertainty 2021, Optimization Days 2011/2020, BIRS Workshop on Distributionally Robust Optimization 2018, EUROPT 2017, 10th International Conference on Computational Management Science*
- Organizer (Sessions) - *CORS/INFORMS International Conference 2015, 10th International Conference on Computational Management Science, International Symposium of Mathematical Programming 2012/2018, Optimization Days 2011/2013/2015/2016/2018/2022, INFORMS Annual Meeting 2021.*
- Editor (Invited) - *Special issue on robust optimization in Computational Management Science*
- Editor (Associate) - *Management Science, Operations Research, Manufacturing & Service Operations Management, Open Journal of Mathematical Optimization, Pacific Journal of Optimization, Computational Management Science*
- Reviewer (Journals) - *Operations Research, Mathematics of Operations Research, INFORMS Journal on Computing, Management Science, Mathematical Programming, SIAM Journal on Optimization, Transportation Science, Applied Mathematics and Computation, International Transactions in Operational Research, ACM Transactions on Knowledge Discovery from Data, European Journal of Operations Research, Wiley Encyclopedia of Operations Research and Management Science, Journal of the Operational Research Society, Journal of Global Optimization, Four Operations Research, NeurIPS, Optimization Methods & Software, Operations Research Letters, Signal Processing*
- Evaluator (Grants) - *Natural Sciences and Engineering Research Council of Canada, MITACS Élévation*
- Evaluator (Prize) - *INFORMS George Nicholson Student Paper Competition 2011/2019/2020, CORS Best Student Paper Competition 2016*
- External juries for Ph. D. thesis : Lê Nguyễn Hoàng (Polytechnique de Montréal), Bart Van Parys (ETH Zürich), Philip Mar (University of Toronto), Franciscus Johannes Cornelius Tarcisius de Ruiter (Tilburg University), Viet Anh Nguyen (École Polytechnique Fédérale de Lausanne), Chun Cheng (Polytechnique Montréal), Fan Zhang (Stanford University).