William B. Haskell

wbhaskell@gmail.com   https://www.wbhaskell.com

INTERESTS

- Risk management
- Large-scale dynamic programming
- Network optimization
- Simulation/data-driven optimization
- Security and counter-terrorism

EDUCATION

Ph.D. Industrial Engineering and Operations Research   May 2011
University of California Berkeley
Dissertation: Aspects of optimization with increasing concave stochastic order constraints
Committee: Z. Max Shen (chair), J. George Shanthikumar, Rhonda Righter, and Venkat Anantharam

M.A. Mathematics   December 2010
University of California Berkeley
Thesis: Optimization with multivariate integral stochastic order constraints
Committee: Donald Sarason (chair), Steven Evans, and Z. Max Shen

M.S. Industrial Engineering and Operations Research   May 2007
University of California Berkeley

M.S. Econometrics   May 2006
University of Massachusetts Amherst
Thesis: Comparative statics for robust optimal solutions
Committee: L. Joe Moffitt (chair) and John K. Stranlund

B.S. Mathematics   December 2005
University of Massachusetts Amherst

EMPLOYMENT

Assistant Professor
Krannert School of Management, Purdue University   July 2019 - present

Assistant Professor
ISEM Department, National University of Singapore   August 2014 - June 2019

Postdoctoral Research Fellow
CS and EE Departments, University of Southern California   June 2013 - May 2014

Visiting Assistant Professor
ISE Department, University of Southern California   August 2011 - May 2013

Intern
NASA Ames Research Center   June 2010 - August 2010

Teaching Assistant
IEOR Department, University of California Berkeley   September 2009 - December 2010

Research Assistant
IEOR Department, University of California Berkeley   September 2008 - May 2011

Research Assistant
Resource Economics Department, University of Massachusetts Amherst   January 2005 - May 2006

AWARDS and HONORS

- Krannert Young Faculty Scholar Award. August 2019 - May 2020.
- National University of Singapore Young Investigator Award. National University of Singapore. May 2017 - June 2019.
- Berkeley Fellowship for Graduate Study. University of California Berkeley. September 2006 - May 2010.

JOURNAL ARTICLES

J20 S. Wang, S. Ng, and W. B. Haskell. A Multi-Level Simulation Optimization Approach for Quantile Functions. To appear in INFORMS Journal on Computing, 2020.

J19 B. Wei, W. B. Haskell, and S. Zhao. The CoMirror Algorithm with Random Constraint Sampling for Convex Semi-Infinite Programming. Annals of Operations Research, Vol. 295, Pages 809-841, 2020.

J18 B. Wei, W. B. Haskell, and S. Zhao. Randomized Primal-Dual Algorithms for Semi-Infinite Programming. *Mathematical Methods of Operations Research*, Pages 1 - 44, January 2020.

J17 Z. Chen, P. Yu, and W. B. Haskell. Distributionally Robust Optimization for Sequential Decision Making. *Optimization*, Vol. 68, No. 12, Pages 2397 - 2426, 2019.

J16 W. Huang and W. B. Haskell. Stochastic approximation for risk-aware Markov decision processes. Conditionally accepted in *IEEE Transactions on Automatic Control*.

J15 W. B. Haskell, R. Jain, H. Sharma, and P. Yu. A Universal Empirical Dynamic Programming Algorithm for Continuous State MDPs. *IEEE Transactions on Automatic Control*, Vol. 65, No. 1, Pages 115 - 129.

J14 W. B. Haskell and A. Toriello. Modeling stochastic dominance as infinite-dimensional constraint systems via Strassen's theorem. *Journal of Optimization Theory and Applications*, Vol. 178, No. 3, Pages 726 - 742, 2018.

J13 S. Zhao, W. B. Haskell, and M. Cardin. Decision Rule based Method for Flexible Multi-Facility Capacity Expansion Problem. *IISE Transactions*, Vol. 50, No. 7, Pages 553 - 569, 2018.

J12 R. Zhao, W. B. Haskell, and V. Tan. Stochastic LBFGS Revisited: Improved Convergence Rates and Practical Acceleration Strategies. *IEEE Transactions on Signal Processing*, Vol. 66, No. 5, Pages 129 - 138, 2018.

J11 P. Yu, W. B. Haskell, and H. Xu. Approximate value iteration for risk-aware Markov decision processes. *IEEE Transactions on Automatic Control*, Vol. 63, No. 9, Pages 3135 - 3142, 2017.

J10 G. Yu, W. B. Haskell, and Y. Liu. Resilient facility location against the risk of disruptions. *Transportation Research Part B*, Vol. 104, Pages 82 - 105, 2017.

J9 W. B. Haskell, J. G. Shanthikumar, and Z. Shen. Primal-dual algorithms for optimization with stochastic dominance. *SIAM Journal on Optimization*, Vol. 27, No. 1, Pages 34 - 66, 2017.

J8 W. B. Haskell, J. G. Shanthikumar, and Z. Shen. Aspects of optimization with stochastic dominance. *Annals of Operations Research*, Vol. 253, No. 1, Pages 247 - 273, 2017.

J7 J. Woodruff, W. B. Haskell, and A. Toriello. *Optimized Financial Systems* Helps Customers Meet their Personal Finance Goals with Optimization. *Interfaces*, Vol. 46, No. 4, Pages 345 - 359, 2016.

J6 W. B. Haskell, L. Fu, and M. Dessouky. Ambiguity in risk preferences in robust stochastic optimization. *European Journal of Operational Research*, Vol. 254, No. 1, Pages 214 - 225, 2016.

J5 W. B. Haskell, R. Jain, and D. Kalathil. Empirical Dynamic Programming. *Mathematics of Operations Research*, Vol. 41, No. 2, Pages 402 - 429, 2016.

J4 W. B. Haskell and R. Jain. A convex analytic approach for risk-aware Markov decision processes. *SIAM Journal on Control and Optimization*, Vol. 53, No. 3, Pages 1569 - 1598, 2015.

J3 A. Toriello, W. B. Haskell, and M. Poremba. A dynamic traveling salesman problem with stochastic arc costs. *Operations Research*, Vol. 62, No. 5, Pages 1107 - 1125, 2014.

J2 W. B. Haskell and R. Jain. Stochastic dominance-constrained Markov decision processes. *SIAM Journal on Control and Optimization*, Vol. 51, No. 1, Pages 273 - 303, 2013.

J1 W. B. Haskell, J. G. Shanthikumar, and Z. Shen. Optimization with a class of multivariate integral stochastic order constraints. *Annals of Operations Research*, Vol. 206, No. 1, Pages 147 - 162, 2013.

CONFERENCE PAPERS

C21 W. Huang, H. Pham, and W. B. Haskell. Model and algorithm for time-consistent risk-aware Markov games. *Association for the Advancement of Artificial Intelligence (AAAI)*, 2020.

C20 R. Zhao, W. B. Haskell, and V. Tan. An Optimal Algorithm for Stochastic Three-Composite Optimization. *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2019.

C19 S. Wang, S. Ng, and W. B. Haskell. Quantile Simulation Optimization with Stochastic Co-Kriging Model. *Winter Simulation Conference*, 2018.

C18 S. Zhao, W. B. Haskell, and M. A. Cardin. An Approximate Dynamic Programming Approach for Multi-Facility Capacity Expansion Problem with Flexibility Design. *IISE Annual Conference Proceedings*, 2017.

C17 H. Le and W. B. Haskell. Sequential smoothing framework for convex concave saddle point problems with application to large-scale constrained optimization. *Allerton Conf. on Communication, Control, and Computing*, 2017.

C16 W. B. Haskell and R. Jain. Inexact iteration of averaged operators for non-strongly convex stochastic optimization. *Allerton Conf. on Communication, Control, and Computing*, 2017.

C15 P. Yu, W. B. Haskell, and H. Xu. Dynamic Programming for Risk-aware Sequential Optimization. *Proc. of the IEEE Control and Decision Conf. (CDC)*, 2017.

C14 J. Isohatala and W. B. Haskell. Risk-aware semi-Markov decision processes. *Proc. of the IEEE Control and Decision Conf. (CDC)*, 2017.

C13 W. Huang and W. B. Haskell. Risk-aware Q-Learning for Markov Decision Processes. *Proc. of the IEEE Control and Decision Conf. (CDC)*, 2017.

C12 W. B. Haskell, P. Yu, R. Jain, and H. Sharma. Randomized function fitting for empirical dynamic programming. *Proc. of the IEEE Control and Decision Conf. (CDC)*, 2017.

C11 W. B. Haskell and R. Jain. A random monotone operator framework for strongly convex stochastic optimization. *Proc. of the IEEE Control and Decision Conf. (CDC)*, 2017.

C10 R. Zhao, W. B. Haskell, and V. Tan. Stochastic LBFGS Revisited: Improved Convergence Rates and Practical Acceleration Strategies. *Conf. on Uncertainty in Artificial Intelligence (UAI)*, 2017. (Acceptance Rate: 30.9%)

C9 W. B. Haskell, R. Jain, and H. Sharma. A Dynamical Systems Framework for Stochastic Iterative Optimization. *Proc. of the IEEE Control and Decision Conf. (CDC)*, 2016.

C8 Y. Quan, W. B. Haskell, and M. Tambe. Robust Strategy against Unknown Risk-averse Adversaries in Security Games. *International Conf. on Autonomous Agents and Multiagent Systems (AAMAS)*, 2015. (Acceptance Rate: 27%)

C7 M. Brown, W. B. Haskell, M. Tambe. Robust patrol generation for fishery protection. *Conf. on Decision and Game Theory for Security (GameSec)*, 2014.

C6 W. B. Haskell, D. Kar, F. Fang, M. Tambe, S. Cheung, and E. Denicola. Robust protection of fisheries with COmPASS. *Innovative Applications of Artificial Intelligence (IAAI)*, 2014.

C5 W. B. Haskell, R. Jain, and D. Kalathil. Empirical Value Iteration for Approximate Dynamic Programming. *American Control Conf. (ACC)*, 2014.

C4 Y. Quan, W. B. Haskell, A. Jiang, and M. Tambe. Online Planning for Optimal Protector Strategies in Resource Conservation Games. *International Conf. on Autonomous Agents and Multiagent Systems (AAMAS)*, 2014. (Acceptance Rate: 12%)

C3 J. Kwak, P. Varakantham, W. B. Haskell, D. Kar, and M. Tambe. Building THINC: User Incentivization and Meeting Rescheduling for Energy Savings. *International Conf. on Autonomous Agents and Multiagent Systems (AAMAS)*, 2014. (Acceptance Rate: 12%)

C2 W. B. Haskell and R. Jain. Dominance-constrained Markov decision processes. *Proc. of the IEEE Control and Decision Conf. (CDC)*, 2012.

C1 A. Sadovsky, H. Swenson, W. B. Haskell, and J. Rakas. Optimal time advance in terminal area arrivals: Throughput vs. fuel savings. *Digital Avionics Systems Conference (DASC)*, 2011.

BOOK CHAPTERS

B1 W. B. Haskell and F. Ordonez. Mixed-integer optimization methods for solving Stackelberg security games. *Improving Homeland Security Decisions*. Cambridge University Press, 2017.

FUNDED RESEARCH

F9 National University of Singapore, "Randomized algorithms for large-scale constrained optimization", 2018 - 2021, S$100,000. (Principal Investigator)

F8 National University of Singapore, "Practical considerations for large-scale competitive decision making", 2017 - 2020, S$464,350. (Principal Investigator)

F7 Singapore Ministry of Education, "Practicable robust Markov decision processes", 2016 - 2018, S$325,288. (Principal Investigator)

F6 Agency for Science, Technology and Research, "ABCD: Analyzing Big Corrupted Data", 2016 - 2018, S$211,995. (Principal Investigator)

F5 Singapore Ministry of Education, "Practical algorithms for large-scale sequential optimization", 2016 - 2019, S$574,680. (Principal Investigator)

F4 Singapore Ministry of Education, "Risk-aware learning and optimization", 2016 - 2019, S$154,000. (Principal Investigator)

F3 Temasek Defence Systems Institute, "Dynamic security games and learning", 2015 - 2017, S$45,600. (Principal Investigator)

F2 Singapore Ministry of Education, "Resilient supply chains in interconnected infrastructure networks", 2015 - 2018, S$170,000. (Principal Investigator)

F1 Singapore Ministry of Education, "Theory and methods for risk-aware sequential decision making", 2014 - 2017, S$179,999. (Principal Investigator)

CONFERENCE PRESENTATIONS

- Randomized Primal-Dual Algorithms for Semi-Infinite Programming. INFORMS Annual Meeting, Phoenix, November 2018.

- New function fitting methods in approximate dynamic programming. International Conference on Innovative Research in Science, Technology and Management (ICIRSTM), Singapore, September 2018.

- Preference Elicitation and Robust Optimization with Multi-Attribute Quasi-Concave Choice Functions. International Symposium on Mathematical Programming (ISMP), Bordeaux, July 2018.

- Empirical dynamic programming and randomized function fitting. INFORMS International, Taipei, June 2018.

- A Random Monotone Operator Framework for Strongly Convex Stochastic Optimization. IEEE Conference on Decision and Control (CDC), Melbourne, December 2017.

- Inexact iteration of averaged operators for non-strongly convex stochastic optimization. Allerton Conference on Communication, Control, and Computing, Monticello, October 2017.

- Sequential smoothing framework for convex-concave saddle point problems with application to large-scale constrained optimization. Allerton Conference on Communication, Control, and Computing, Monticello, October 2017.

- Simulation-based methods for robust Markov decision processes. International Conference on Continuous Optimization (ICCOPT), Tokyo, August 2016.

- Two methods for risk-aware sequential decision-making. International Conference on Stochastic Programming (ICSP), Buzios, June 2016.

- Learning with stochastic dominance. International Symposium on Mathematical Programming (ISMP), Pittsburgh, July 2015.

- Empirical dynamic programming - optimization and equilibrium computation. SoCal NEGT Symposium, Los Angeles, November 2013.

- Ambiguity in risk preferences in optimization and control. INFORMS Annual Meeting, Minneapolis, October 2013.

SELECTED INVITED TALKS

- Mitigating the curse of dimensionality through simulation. Purdue University, SCOM Department, January 2019.

- Perspectives on risk-aware dynamic programming. The Ohio State University, ECE Department, July 2018.

- Markov chain methods for analyzing algorithms. Georgia Institute of Technology, ISyE Department, September 2017.

- Randomized algorithms for constrained convex optimization. Georgia Institute of Technology, ISyE Department, November 2016.

- Risk-aware online optimization. Singapore Management University, IS Department, April 2016.

- New convergence analysis for approximate dynamic programming. University of Southern California, CS Department, May 2015.

- Risk-aware Markov decision processes. Nanyang Technological University, CS Department, September 2014.

- Risk management in sequential decision making. National University of Singapore, ISE Department, April 2014.

- Stochastic dominance for dynamic risk management. University of Southern California, EE Department, April 2013.

POSTDOCTORAL RESEARCH FELLOWS

- Pham Viet Hai, 2017 - 2019 (NUS Young Investigator Award)

- Wei Bo, 2017 - 2019 (Agency for Science, Technology and Research)

- Jukka Isohatala, 2017 - 2019 (Ministry of Education Tier II)

- He Zhou, 2017 - 2018 (Ministry of Education Tier II)

- Chen Zhi, 2017 - 2018 (Ministry of Education Tier II)

- Yu Pengqian, 2017 - 2018 (Ministry of Education Tier II)

- Le Thi Khan Hien, 2016 - 2018 (Agency for Science, Technology and Research)

- Yu Guodong, 2015 - 2017 (Ministry of Education Tier I)

DOCTORAL STUDENTS

- Wu Jian, 2020 - present (Main supervisor)
- Zhao Xuejun, 2019 - present (Main supervisor)
- Zhang Xun, 2017 - present (Co-supervisor w/ Ye Zhisheng)
- Zhao Sixiang, 2015 - 2019 (Co-supervisor w/ Michele Cardin)
- Huang Wenjie, 2014 - 2019 (Main supervisor)
- Yang Zhiyue, 2014 - 2017 (Co-supervisor w/ Tan Chin Hon)

MASTERS STUDENTS

- Zhao Renbo, 2016 - 2018 (Co-supervisor w/ Vincent Tan)
- Sun Menghua, 2015 - 2017 (Co-supervisor w/ Adam Ng)

TEACHING

- ISEM 2100 - undergraduate stochastic processes   National University of Singapore
  Spring 2016 (4.1/5), Spring 2017 (4.2/5), Spring 2018 (4.1/5)
- ISEM 6001 - graduate mathematical programming   National University of Singapore
  Spring 2015 (5/5), Spring 2016 (4.4/5), Spring 2017 (4.5/5), Spring 2018 (4.8/5)
- ISEM 6509 - graduate dynamic programming   National University of Singapore
  Fall 2018 (4.6/5)
- ISE 330 - undergraduate linear programming   University of Southern California
  Spring 2013 (4.5/5)
- ISE 331 - undergraduate stochastic processes   University of Southern California
  Spring 2012 (4.3/5)
- ISE 520 - graduate nonlinear programming   University of Southern California
  Fall 2011 (4.8/5), Fall 2012 (4.6/5)
- ISE 536 - graduate linear programming   University of Southern California
  Fall 2011 (4.8/5), Spring 2012 (4.8/5), Fall 2012 (4.9/5), Spring 2013 (4.7/5)

PROFESSIONAL SERVICE

- Senior Editor for Production and Operations Management (2018 - present)
- Associate Editor for Journal of Management Science and Engineering (2018 - present)
- Reviewer for: IEEE Transactions on Automatic Control; SIAM Journal on Optimization; Mathematics of Operations Research; Operations Research; Probability in the Engineering and Informational Sciences; and Mathematical Programming