

## MELVYN SIM

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### Education

Massachusetts Institute of Technology, Cambridge MA  
PhD in Operations Research, June 2004  
Thesis: Robust Optimization  
Advisor: Dimitris J. Bertsimas, MIT

Singapore-MIT-Alliance  
S.M. (HPCES), July 2000.

National University of Singapore  
M.Eng. (EE), July 1996.

National University of Singapore  
B.Eng. (EE) awarded First Class Honors, July 1995.

### Academic and Professional Experience

1. Dean's Chair Associate Professor, July 2009 - Present
2. Deputy Head, Decision Sciences, May 2009 - Present
3. Associate Professor (with tenure), Decision Sciences, July 2008 - Present
4. NUS Risk Management Institute Affiliated Researcher, 2007 - Present
5. Fellow, Singapore-MIT-Alliance, 2004 - Present
6. Assistant Professor, Decision Sciences, NUS, 2004 - 2008
7. Senior Tutor, Decision Sciences, NUS, 2000 - 2004
8. Research Engineer, Singapore Ministry of Defense, 1997 - 1999

### Area of Expertise

1. Optimization under Uncertainty – Robust Optimization
2. Decisions under Uncertainty – Risk and Satisficing Measures
3. Modeling and Optimization of Operations/Supply chains
4. Financial Risk Management and Portfolio Optimization
5. Engineering Control and Optimization

### Honors and Awards

1. NUS Young Researcher Award, 2009
2. Recognition list for NUS Business School Outstanding Researcher Award, 2008/2009

3. Nominee for University Young Researcher Award, 2008/09
4. Nominee for Outstanding University Researcher Award, 2008/09
5. First place, INFORMS Junior Faculty Interest Group (JFIG) Best Paper Competition, November 2007
6. NUS Business School Outstanding Researcher Award, 2007/2008
7. Department of Decision Sciences Outstanding Researcher Award, 2005/2006
8. Nominee for University Young Researcher Award, 2005/06
9. Second place, INFORMS George Nicholson Student Paper Competition, Oct 2004
10. Second place, INFORMS George Nicholson Student Paper Competition, Nov 2002
11. NUS Overseas Graduate Scholarship, June 2000

## Research Grants

Principle investigator for the following projects:

1. ExxonMobil Research and Engineering Company grant. Project: A Robust Optimization Approach to the Inventory Routing Problem with Uncertainties. 2009-2010. Approved Budget of US\$50,000. Co-PI with Adam Ng
2. NUS grant. Project: Robust Optimization: A tractable approach to optimization under uncertainty. 2004-2007. Approved Budget of S\$21,000
3. NUS grant. Project: A unifying framework of stochastic optimization and robust optimization. 2005- 2009. Approved Budget of S\$71,400
4. Singapore-MIT Alliance grant. Project: Robust Optimization. 2005 – 2010. Approved Budget of S\$700,000. Co-PI with Dimitris Bertsimas, MIT.

## Software

1. ROME – Robust Optimization Made Easy. Co-developed with Joel Goh.  
<http://robustopt.com>

## Publications

### Journal Articles- International Refereed

1. J. Goh and M. Sim, Distributionally Robust Optimization and its Tractable Approximations. Accepted in Operations Research Oct 2009.
2. W. Chen, M. Sim, Goal Driven Optimization. Operations Research, 2009, 57(2), 342-357.
3. C. Wang, C-J. Ong and M. Sim, Model Predictive Control Using Segregated Disturbance Feedback. Accepted in IEEE Transactions on Automatic Control, June 2009.
4. C-T. See and M. Sim, Robust Approximation to Multi-Period Inventory Management. Accepted in Operations Research, 2009.
5. W. Chen, M. Sim, J. Sun and C-P Teo, From CVaR to Uncertainty Set: Implications in Joint Chance Constrained Optimization. Accepted in Operations Research, 2009.
6. C. Wang, C-J. Ong and M. Sim, Convergence properties of constrained linear system under MPC control law using affine disturbance feedback. Automatica, July 2009, 45(7), 1715-1720.

7. K. Natarajan, M. Sim and Joline Uichanco, Tractable Robust Expected Utility and Risk Models for Portfolio Optimization. Accepted in Mathematical Finance, Dec 2008.
8. K. Natarajan, D. Pachamanova and M. Sim, Constructing risk measures from uncertainty. Operations Research , 57(5), 1129-1141, 2009.
9. D. Brown and M. Sim, Satisficing Measures for Analysis of Risky Positions. Management Science, 55(1), 71-84, 2009.
10. C. Wang, C-J. Ong and M. Sim, Constrained Linear System with Disturbances: Stability under Disturbance Feedback. Automatica, October 2008, 44(10), 2583-2587.
11. K. Natarajan, D. Pachamanova and M. Sim, Incorporating Asymmetric Distributional Information in Robust Value-at-Risk Optimization. Management Science, March 2008, 54(3), 573-585.
12. X. Chen, M. Sim, P. Sun and J. Zhang, A Linear-Decision Based Approximation Approach to Stochastic Programming. Operations Research, 56(2) 2008, 344-357.
13. X. Chen, M. Sim and P. Sun, A Robust Optimization Perspective on Stochastic Programming. Operations Research, 55(6), 1058-1071, 2007.
14. X. Chen, M. Sim, D. Simchi-Levi and P. Sun, Risk Aversion in Inventory Management. Operations Research, 55(5), 828-842, 2006.
15. D. Bertsimas and M. Sim, Tractable Approximations to Robust Conic Optimization Problems Dimitris Bertsimas. Mathematical Programming, 107(1), 5 – 36, 2006.
16. D. Bertsimas, D. Pachamanova and M. Sim, Robust Linear Optimization under General Norms. Operations Research Letters, 32(6), 510-516, 2004.
17. D. Bertsimas and M. Sim, Price of Robustness. Operations Research, 52(1), 35-53, 2004.
18. D. Bertsimas and M. Sim, Robust Discrete Optimization and Network Flows. Mathematical Programming, 98, 49-71, 2003.
19. H-C Lau, K-M Teo and M. Sim, Vehicle Routing Problem with time-Windows and a Limited Number of Vehicles. European Journal of Operational Research, 148(3), 559-569, 2003.
20. C.S. Chang and S.S Sim, Optimising Train Movements through Coast Control using Genetic Algorithms. IEE Proceedings-Electric Power Applications, 44(1), 65-73, 1997.

#### Conference Articles- International Refereed

21. Lau, HC, T Ou and M Sim, Robust Temporal Constraint Network, AI in Logistics and Supply Chain Management (2005). Hong Kong: IEEE Computer Society. (IEEE International Conference on Tools with Artificial Intelligence, 14 Nov 2005 - 16 Nov 2006, Hong Kong.

#### Chapters in Books

22. The Price of Robustness for Linear Optimization Problems, Encyclopedia of Optimization. Edited by C. Floudas and P. Pardalos, 2009.
23. Approximations to Robust Conic Optimization Problems, Encyclopedia of Optimization. Edited by C. Floudas and P. Pardalos, 2009.

#### Papers under Review

24. N.G. Hall, Z. Long, J. Qi and M. Sim, A Satisficing Model for Project Selection. Submitted. Dec 2009.
25. J. Goh and M. Sim, Robust Optimization Made Easy with ROME. Submitted. July 2009.
26. David Brown, Enrico De Giorgi and Melvyn Sim, A Satisficing Alternative to Prospect Theory. Working Paper 2009.
27. J. Goh, KG Lim, M. Sim and W. Zhang, Portfolio Value-at-Risk Optimization for Asymmetrically Distributed Asset Returns. Submitted. April 2009.
28. M. Ang, Y-F. Lim and M Sim, A Linear Storage-Retrieval Policy for Robust Warehouse Management. Submitted, Nov 2008.
29. D. Bertsimas and M. Sim, Robust Discrete Optimization and Downside Risk Measures. Working Paper, 2004.
30. M. Ang, M. Chou, M. Sim, R. So, A Robust Optimization Framework for Analyzing Distribution Systems with Transshipment, Revised and Submitted to Manufacturing & Service Operations Management, 2008.
31. K. Natarajan, M. Sim and Joline Uichanco, Asymmetry and Ambiguity in Newsvendor Problems. Submitted, July 2008.
32. C-K. Low, D. Pachamanova and M. Sim, Skewness-Aware Asset Allocation: Relation to Utility Theory and Empirical Evidence. Submitted, 2008.

#### **Membership of conference committees**

1. INFORMS George Nicholson Student Paper Competition Committee Member, 2008.
2. INFORMS George Nicholson Student Paper Competition Committee Member, 2007.
3. Stream organizer on robust optimization, International Conference on Continuous Optimization, McMaster University, Canada, Aug 2007
4. Local Organizing Committee Chair for the Third Sino-Japanese Optimization Meeting, 2005.

#### **Editorial services**

1. Associate Editor, IIE Transactions, 2009 - Present
2. Associate Editor, Mathematical Programming Computations. 2008 - Present.
3. Associate Editor, Management Science (Optimization), 2009 - Present.

#### **Invited presentations**

1. Invited lecturer on Robust Optimization, City University of Hong Kong, Hong Kong, Dec 2009.
2. Invited lecturer on Robust Optimization, Helsinki University of Technology, Helsinki, Finland, March 2009.
3. Plenary Speaker, 3rd Nordic Optimization Symposium, Stockholm, Sweden, March, 2009.
4. Invited speaker, International Forum on Management Science and Operations Research, Jinan, China, June 2009.
5. Invited speaker, International Symposium on Supply Chain Management, Sanya, China, Dec 2008.

6. Invited speaker, Integrated Risk Management in Operations and Global Supply Chain Management, Singapore Management University, August 2008.
7. Invited lecturer on Robust Optimization, Shanghai Jiao Tong University, China, May 2008.
8. Invited seminar speaker, Hong Kong University of Science and Technology, Oct, 2007.
9. Co-lecturer with Ahraon Ben-Tal, Robust Optimization Summer School organized by the Institute of Systems Analysis and Computer Science (IASI) , Italy, July 2007. The summer school has attracted over 70 international participants from various universities and industries.
10. Semi-plenary Speaker, International Conference on Continuous Optimization, McMaster University, Canada, Aug 2007.
11. Invited speaker, Symposium on Optimization & Applications, Hong Kong University, June 2006.
12. Invited speaker, Workshop on Large-Scale Robust Optimization, Sandia Labs, Santa Fe, NM, Aug 2005.
13. Invited speaker at Schloss Dagstuhl, Germany, Jan 2005.
14. Invited speaker, Nicholson award, INFORMS, Denver, Oct 2004.
15. Invited speaker, Nicholson award, INFORMS San Jose, Nov 2002.

### **Modules taught**

1. BDC5111: Linear Programming
2. DSC2003: Management Science
3. DSC2006: Operation Management
4. CE5231: Tech and Tools (Singapore-MIT-Alliance (SMA))
5. BDC6400A Selected Topics in DS – Robust Optimization

### **Research students supervised**

#### Graduated PhD students

1. Wenqing Chen, PhD candidate, Decision Sciences. Thesis topic “Goal Driven Optimization”. Graduated 2007. Working in Land Transport Authority, Singapore. Co-supervised with Sun Jie, NUS Business School.

#### Current PhD students

1. Chuen-Teck See, PhD candidate, Industrial and Systems Engineering. Co-supervised with Kim-Leng Poh, Industrial and Systems Engineering, NUS.
2. Chen Wang, PhD candidate, Mechanical Engineering. 2006-Present. Co-supervised with Ong Chong Jin, Mechanical Engineering, NUS.
3. Jin Qi, PhD candidate, Decision Science, NUS Business School.
4. Zhuoyu Long, PhD candidate, Decision Science, NUS Business School.

#### Graduated Master Students

1. Thomas Ou, The Logistic Institute, Asia Pacific. Graduated 2007.
2. Joline Uichanco, Singapore-MIT-Alliance. Graduated 2008.
3. Jeremy Chan, Singapore-MIT-Alliance. Graduated 2008.

### **Service as reviewer**

1. Operations Research

2. Mathematics of Operations Research
3. Mathematical Programming
4. Naval Research Logistics
5. European Journal of Operations Research
6. Networks
7. Journal of Combinatorial Optimization
8. Mathematical Methods of Operations Research
9. Management Science
10. Discrete Optimization

### **Service to the University**

1. Chair, Department Evaluation Committee, July 2009 - Present
2. Chair, Department Teaching Committee, July 2009 - Present
3. Member, Faculty PhD Committee, NUS Business School, July 2009 – Present
4. Deputy Head, Department of Decision Sciences, May 2009 - Present
5. Member, Department PhD Committee, Jan 2008 – Present.
6. Member, Department Search Committee, July 2007 – Present.
7. Department of Decision Sciences Seminar Coordinator, July 2004 – July 2007.