Kumar Muthuraman
kumar.muthuraman@mccombs.utexas.edu
Deaprtment of Info. Risk and Op. Mgmt. and Department of Finance,
The University of Texas at Austin,
Austin, TX 78712. Ph: (512) 232 3732, Fax: (512) 471 0587

Education

2003, Ph.D.	Stanford University, Stanford, CA. Scientific Computing and Comp. Math., Dept. of Computer Science. Advisor: Sunil Kumar (Graduate School of Business).
2000, M.S.	Stanford University, Stanford, CA. Scientific Computing and Comp. Math., Dept. of Computer Science.
1998, B.Tech.	Central Electrochemical Research Institute, Karaikudi, India, Chemical and Electro-Chemical Technology.

Employment

Sep17-Present	Faculty Director, Center for Analytics and Transformative Technologies, UT-Austin
Sep17-Present	University Distinguished Teaching Professor
Sep15-Present	H. Timothy (Tim) Harkins Centennial Professor Dept of Information, Risk and Operations Mgmt. & Dept of Finance McCombs School of Business, University of Texas, Austin, TX.
Sep10-Aug15	Associate Professor Dept of Information, Risk and Operations Mgmt. Dept of Finance (from 2013) McCombs School of Business, University of Texas, Austin, TX.
Aug07-Aug10	Assistant Professor Dept of Information, Risk and Operations Mgmt., McCombs School of Business, University of Texas, Austin, TX.
Aug03-Aug07	Assistant Professor School of Industrial Engineering, Purdue University, West Lafayette, IN.
Aug99-Jul03	Graduate Research Assistant Operations, Information and Technology, Graduate School of Business, Stanford University, CA.

Honors and Awards

- Hank & Mary Harkins Foundation Award for Effective Teaching in Undergraduate Classes, 2018-2019.
- Inducted to the UT Academy of Distinguised Teachers, 2017.
- MBA Faculty Honor Roll, teaching award, Spring 2016, Spring 2017 (Houston).
- Outstanding Faculty MSBA Program, 2015, 2016, 2017, 2018.
- College of Business Adminstration, Research award, 2015.
- University of Texas System Regents Outstanding Teaching Award, 2014.
- Department nominee for the CBA Foundation Research award, 2013 and 2011.
- Undergraduate Faculty Honor Roll, teaching award. Spring 2012, Spring 2014 and Fall 2014.
- Honoree at the UT Academic Accolades 2012.
- IIE Transactions, Best Paper in Operations Engineering and Analysis, 2010.
- Chevron Centennial Fellowship in Business, 2010-present.
- CBA Foundation Research award for assistant professors, 2010.
- Department nominee for the CBA Foundation Research award for assistant professors, 2009.
- Invited Participant, U.S. Frontiers of Engineering Symposium of the National Academy of Engineering, 2006.
- Stanford School of Engineering Fellow, 1998.
- Rajiv Gandhi Research Fellow, 1997: Awarded by the Jawaharlal Nehru Center for Advanced Scientific Research, Indian Institute of Science, Bangalore, India.
- National Talent Search Scholar, 1992: Awarded by the Government of India.

Editorial Boards

- Operations Research Letters
  - Financial Engineering, Area Editor (2014-Present)
  - Financial Engineering, Associate Editor (2009-2013)
- IIE Transactions,
  - Financial Engineering, Associate Editor (2009-Present)
  - Stochastics, Associate Editor (2017-Present)

Publications

Journal papers - Published/Accepted

1. L. Zhao, D. Chakrabarti and K. Muthuraman, "Portfolio Construction by Mitigating Error Amplification: The Bounded-Noise Portfolio", accepted, **Operations Research**.
2. D. Wang, K. Muthuraman and D. Morrice, "Coordinated Patient Appointment Scheduling for a Multi-Station Healthcare Network", accepted, **Operations Research**.
3. D.Wang, D. J. Morrice, K. Muthuraman, J. Bard, L. Leykum, S. Noorily, "Coordinated Scheduling for a Multi-server Network in Outpatient Pre-operative Care in Production and Operations Management". **Production and Operations Management**, 27(3), 2018.
4. T. Aouam, R. Rardin and K. Muthuraman, "Robust optimization policy benchmarks and modeling errors in natural gas", **European Journal of Operations Research,** 250(3), 2016.
5. H. Feng, Q. Wu, K. Muthuraman and V. Deshpande, "Replenishment Policies for Multi-Product Stochastic Inventory Systems with Correlated Demand and Joint-Replenishment Costs", **Production and Operations Management**, 24(4). 2015.
6. K. Muthuraman, S. Seshadri and Q. Wu, "Inventory management with Stochastic Lead Times", **Mathematics of Operations Research**, 40(2), 2015.
7. A. Chockalingam and K. Muthuraman, "An Approximate Moving Boundary Method for American Options", **European Journal of Operations Research**, 240(2), 2015.
8. D. Mitchell, H. Feng and K. Muthuraman, "Impulse Control of Interest Rates", **Operations Research,** 62(3), 2014.
9. D. Mitchell, J. Goodman and K. Muthuraman, "Boundary Evolution Equations for American Options", **Mathematical Finance** 24(3), 505-532, 2014.
10. D. Mitchell, P. Brockett, R. Mendoza and K. Muthuraman, "Modeling and Forecasting Mortality Rates", **Insurance: Mathematics and Economics**, 52 (2), 2013.
11. S. Chakraborty, K. Muthuraman and M. Lawley , "Sequential Clinical Scheduling with Patient No-show: The Impact of Pre-defined Slot Structures", **Socio-Economic Planning Sciences**, 47(3), 2013.
12. S. Ruangpatana, P. Preckel, D. Gotham, K. Muthuraman, M. Velastegui, T. Morin, N. Uhan, "Diversification of Fuel Costs Accounting for Load Variation", **Energy Policy**, 42, 400-408, 2012.
13. A. Chockalingam and K. Muthuraman, "American Options Under Stochastic Volatility", **Operations Research**, 59(4), 793-809, 2011.

14. A. Turkcan, B. Zeng, K. Muthuraman, M. Lawley, "Sequential Clinical Scheduling with Service Criteria", **European Journal of Operations Research**, 214, 780-795, 2011.
15. J. Lin, K. Muthuraman, M. Lawley, "Optimal and Approximate Algorithms for Sequential Clinical Scheduling with No-show", **IIE Transactions on Healthcare Systems Engineering***,* 1, 20-36, 2011.
16. H. Feng, K. Muthuraman, "A Computational Method for Stochastic Impulse Control Problems", **Mathematics of Operations Research***,* 35(4), 2010.
17. F. Lin, K. Muthuraman and M. Lawley, "An optimal control theory approach to non-pharmaceutical interventions", 10(32), **BMC Infectious Diseases***,* 2010.
18. A. Chockalingam and K. Muthuraman, "Pricing American options when asset prices jump", **Operations Research Letters**, 38(2), 82-86, 2010.
19. S. Chakraborty, K. Muthuraman and M. Lawley, "Sequential clinical scheduling with patient no-shows and general service time distributions", **IIE Transactions***,* 42(5), 354-366, 2010. Winner of the best paper in Operations Engineering and Analysis.
20. V. Parmeshwaran and K. Muthuraman, "FTR option formulation and pricing", **Electric Power Systems Research***,* 79(7), 1164-1170, 2009.
21. D. Gotham, K. Muthuraman, P. Preckel, R. Rardin, S. Ruangpattana, "A load factor based mean-variance analysis for fuel diversification", **Energy Economics**, 31(2), 249-256, 2009.
22. K. Muthuraman, T. Aouam and R. Rardin, "Regulation of natural gas distribution using policy benchmarks", **Operations Research**, 56 (5), 1131-1145, 2008.
23. K. Muthuraman, "A moving boundary approach to American option pricing", **Journal of Economic Dynamics and Control**, 32(11), 3520-3537, 2008.
24. K. Muthuraman and H. Zha, "Simulation based portfolio optimization for large portfolios with transaction costs", **Mathematical Finance**, 18(1), 115-134, 2008.
25. K. Muthuraman and M. A. Lawley, "Stochastic overbooking model for outpatient clinical scheduling with no-shows", **IIE Transactions**, 40(9), 2008. Among the Top 10 most cited articles of 2008-2010 in IIE Transactions.
26. K. Muthuraman and S. Kumar, "Solving free-boundary problems with applications in finance", **Foundations and Trends in Stochastic Systems**, 1(4), 259-341. 2008. This paper is also published as a book, cited in books section.
27. K. Muthuraman, "A computational scheme for optimal investment-consumption with proportional transaction costs", **Journal of Economic Dynamics and Control**, 31(4), 1132-1159, 2007.
28. Kopach, R., P-C. DeLaurentis, M. Lawley, K. Muthuraman, L. Ozsen, R. Rardin, H. Wan, P. Intrevado, X. Qu, and D. Willis, "Effects of Clinical Characteristics on Successful Open Access Scheduling," **Healthcare Management Science**, 10(2), 111-125, 2007.

29. K. Muthuraman and S. Kumar, "Multi-dimensional portfolio optimization with proportional transaction costs," **Mathematical Finance**, 16(2), 301-335, 2006.
30. S. Kumar, and K. Muthuraman, "A numerical method for solving singular stochastic control problems", **Operations Research**, 52(4), 563-582, 2004.
31. V. S. Ramanan, M. Muthukumar, S. Gnanasekaran, M. J. R. Venkataramana and B. Emmanuel, "Green's functions for the Laplace equation in a 3-layer medium, boundary element integrals and their application to cathodic protection", **Engineering Analysis with Boundary Elements**, 23(9), 777-786, 1999.
32. S. K. Rangarajan, V. Yegnanarayanan, and M. Muthukumar, "Current losses in a bipolar cell - II: An analysis of the Butler-Volmer regime", **Electrochimica Acta**, 44(2), 491-502, 1998.

Journal papers - Under Review/Revision

33. L. Zhao, D. Chakrabarti and K. Muthuraman, "Unified Classical and Robust Optimization for Least Squares", submitted to **Operations Research**.
34. Q. Wu, K. Muthuraman and S. Seshadri, "Inventory Management with Financing Costs and Constraints", in revision for **Production and Operations Management**.

Book Chapters

35. K. Muthuraman and Q. Wu, "Solving Impulse-Control Problems with Control Delays", Topics in Numerical Methods for Finance. Volume 19, 2012, pp 23-36.

Conference Proceedings

36. S. Chakraborty, K. Muthuraman and M. Lawley , "Planning Intervention for Hemodialysis Patients - A Stochastic Control Approach", forthcoming in the Proceedings of the 2010 IIE Research Conference, June 2010.
37. K. Muthuraman, H. Feng and V. Deshpande, "Policies for Multi-Product Stochastic Inventory Systems with Joint-Replenishment Costs", Proceedings of the National Science Foundation Awardees Conference, Honolulu, Jun 2009.
38. S. Chakraborty, K. Muthuraman and M. Lawley, "Sequential Appointment Scheduling Under Patient No-Show Over Continuous Time Horizon", Proceedings of the National Science Foundation Awardees Conference, Honolulu, Jun 2009.
39. S. Ruangpattana, DJ. Gotham, K. Muthuraman, PV. Preckel, RL. Rardin, "Applying Load Factors to the Mean-Variance Analysis for Fuel Diversification", Proceedings of the 10th International Conference on Probabilistic Methods Applied to Power Systems, 2008.

40. S. Chakraborty, K. Muthuraman and M. Lawley, "Sequential clinical scheduling with general service times and no-show patients", Proceedings of the National Science Foundation Awardees Conference, Knoxville, Jan 2008.
41. K. Muthuraman, H. Feng and V. Deshpande, "Multi-Product Inventory Systems with Correlated Demand and Joint-Replenishment Costs", Proceedings of the National Science Foundation Awardees Conference, Knoxville, Jan 2008.
42. A. Chockalingam and K. Muthuraman, "American Option Pricing Under Stochastic Volatility: A Simulation based approach", Proceedings of the 2007 Winter Simulation Conference, 992 – 997, Dec 07.
43. K. Muthuraman and M. Lawley, "Stochastic overbooking model for outpatient clinical scheduling with no-shows", Proceedings of the POMS 18th Annual Conference, Dallas, May 2007.
44. D. Gotham, K. Muthuraman, R. Rardin and S. Ruangpattana, "A Load Factor Based Mean-Variance Analysis for Fuel Diversification", Proceedings of the 3rd Annual Carnegie Mellon Conference on the Electricity Industry, Mar 2007.
45. P. DeLaurentis, R. Kopach, R. Rardin, M. Lawley, K. Muthuraman, H. Wan, L. Ozsen and P. Intrevado, "Open access appointment scheduling—an experience at a community clinic", Proceedings of the 2006 IIE Research Conference, May 2006.
46. S. Kumar and M. Muthuraman, "A numerical method for solving singular Brownian control problems", Proceedings of the 39th IEEE Conference on Decision and Control, Sydney, Australia, Dec 2000.

Books

- K. Muthuraman and S. Kumar, "Solving free-boundary problems with applications in finance", *Series: Foundations and Trends in Stochastic Systems*, Now Publishers, 2008.

Proposals and grants

- McCombs Research Excellence Grant, for the "A Data-Driven Approach to Detect Life Changing Events". Co-PI with Naveed Chehrazi, $12,207. Oct 2015.
- Supply Chain Management Center of Excellence, "Inventory Financing Decision and Trade Credit Cost", $5000. Co-PI with Q. Wu and S. Seshadri, Dec 2012.
- National Science Foundation, "Moving Boundary Methods for Stochastic Control Problems". PI, $200,000. May 2011-2016.
- McCombs Research Excellence Grant 2010, for the "Texas Quantitative Finance Festival". Co-PI with Stathis Tompaidis, $10,000. Feb 2010.
- National Science Foundation, "Patient Scheduling for Primary Care Clinics: Theory and Implementation". Co-PI with M. Lawley and L. Sands, $459,335. Aug 07-Jul 11.

- National Science Foundation, "Cyberinfrastructure experience for graduate students: Computational Methods for Multi-Product Stochastic Inventory Control Inventory Control". An extension award. PI, $15,000. Aug 06-Jul 08.
- National Science Foundation, "Computational Methods for Multi-Product Stochastic Inventory Control". PI, $136,292. Aug 06-Jul 08.
- National Science Foundation, "Understanding Indian enterprise systems: graduate research capability and future potential: A US-India perspective", collaborative proposal with New York University, Co-PI with Sridhar Seshadri, Ananth Iyer and Ganesh Shastri. $100,000. Sep 06-Aug 07.
- Purdue Research Foundation, Special Incentive Research Grant, "FTR options market design". PI, $14,285. Jan 06-Dec 06.
- Purdue Research Foundation, Special Incentive Research Grant, "Electric power grid gap funding". PI, $5,980. Jan 06-Dec 06.
- Purdue Research Foundation, David Ross Research Grant, "The impact of large variances in time-to-failure on an enterprise system", PI, $14,912. Aug 05-Dec 06.
- Regenstrief Center for Healthcare Engineering, "Core program research with the Indiana University Medical Group on patient flow and scheduling", Co-PI with Ron Rardin, L. Ozsen, J. A. Stuart and Hong Wan. $58,883. Mar 05-Dec 06.

Students advised or co-advised

Ph. D:

- Long Zhao, Graduating 2019. UT Austin. Thesis title: "Essays on Data-Driven optimization: Utilizing the forgotten subspace", Assistant Professor, Business School, National University of Singapore.
- Vishwakant Malladi, Graduated 2018. UT Austin. Thesis title: "Dependence in Operations: Modeling and Applications", Assistant Professor, The Indian School of Business.
- Ester Wang, Graduated 2016. UT Austin. Thesis title: "Coordinating Healthcare Networks", Consultant, JD.com Research.
- Dan Mitchell, Graduated 2014, UT Austin. Thesis title: "Computational Methods for Stochastic Control Problems with Applications in Finance", Assistant Professor at University of Minnesota.
- Qi Wu, Graduated 2013, UT Austin. Thesis title: "Inventory Management and Financing Decisions", Assistant Professor at Weatherhead School of Management, Case Western Reserve University.
- Haolin Feng, Graduated in 2009. Thesis title: "Computational methods for Stochastic Impulse Control Problems". Purdue University. Associate Professor at Lingnan College of Business, Sun Yat-Sun University, China.

- Arun Chockalingam, Graduated 2008. Thesis title: "Moving Boundary Approaches for American Security Valuation". Purdue University. Currently an Assistant Professor at the Industrial Engineering and Innovation Sciences department, Eindhoven University of Technology, Netherlands.
- Tarik Aouam, Graduated 2005. Thesis title: "Incentive contracts using simulation benchmarks for natural gas local distribution companies regulation". Purdue University. Currently Associate Professor, Faculty of Economics and Business Administration, Ghent University, Belgium.

Other Ph. D doctoral committees:

- Haoran Wang, University of Texas, 2018
- Emre Yucel, University of Texas, 2018
- Xiao Han, University of Texas, 2017
- Seung Jae Park, University of Texas, 2014
- Wen Chen, University of Texas 2013
- Shuo-Li Chuang, University of Texas 2013
- Ying He, University of Texas 2013
- Tianyang Wang, University of Texas 2011
- Ben (Chunyu) Yang, University of Texas 2010
- Tara Rengarajan, University of Texas 2010
- Suriya Ruangpattana, IE, Purdue University, 2010
- Jamie Wieland, IE, Purdue University, 2008
- Sukgon Kim, IE, Purdue University, 2007
- Sangwook Hwang, IE, Purdue University, 2006
- Rapeeporn Wongsiriroj, IE, Purdue University, 2006
- Basak Uluca, IE, Purdue University, 2005
- Veeradech Siriariyaporn, IE, Purdue University, 2005
- Francisco Piera, Electrical Engineering, Purdue University, 2005

Other Academic activities

- INFORMS O.R. & Analytics Student Team Competition Judging committee 2018, 2019.
- Co-organizer, Texas Quantitative Finance Festival 2013.
- Technical Program Committee, 1st IEEE Global Conference on Signal and Information Processing, 2013.
- Cluster Co-Chair, Quantitative Finance, INFORMS Annual Meeting 2011.
- Scientific Committee, Conference on Mathematical Finance and PDEs 2011.
- Chair of contributed sessions, INFORMS Annual meeting 2010.
- Co-organizer, Texas Quantitative Finance Festival 2010.
- Judge for the *Manufacturing and Service Operations Management Society's* student paper competition.
- Ad hoc reviewer for over 16 journals including Operations Research,

Management Science, Mathematical Finance, Mathematics of Operations Research, Quantitative finance, SIAM Journal of Applied Mathematics, SIAM Journal on Control and Optimization, Journal of Economic Dynamics and Control, IIE Transactions, Operations Research Letters and Journal of Banking and Finance.

Teaching

Semester	Course	Enrollment	Course* evaluation	Instructor * evaluation
Spr 18	MIS 381N Stochastic Control and Optim.	65	4.8	4.9
Spr 18	STA 287 Business Anal. and Decision Anal.	40	4.3	4.4
Spr 18	STA 287 Business Anal. and Decision Anal.	40	4.3	4.3
Spr 17	MIS 381N Stochastic Control and Optim.	53	4.8	4.9
Spr 17	STA 287 Business Anal. and Decision Anal.	45	4.5	4.7
Spr 17	STA 287 Business Anal. and Decision Anal.	49	4.4	4.5
Fall 16	FIN 372/STA 372-6 Opti. Methods in Finance	36	4.6	4.7
Fall 16	STA 371G Statistics and Modeling	69	4.4	4.9
Fall 16	STA 371G Statistics and Modeling	70	4.3	4.8
Spr 16	MIS 381N Stochastic Control and Optim.	58	4.9	5.0
Spr 16	STA 287 Decision Analysis	40	4.5	4.6
Spr 16	STA 287 Decision Analysis	39	4.1	4.4
Fall 15	FIN 372/STA 372-6 Opti. Methods in Finance	33	4.6	4.9
Fall 15	STA 371G Statistics and Modeling	58	4.1	4.6
Fall 15	STA 371G Statistics and Modeling	58	4.2	4.5
Spr 15	MIS 381N Stochastic Control and Optim.	50	4.9	4.9
Spr 15	STA 287 Decision Analysis	48	4.3	4.5
Spr 15	STA 287 Decision Analysis	49	4.1	4.4
Fall 14	STA 371G Statistics and Modeling	59	4.5	4.9
Fall 14	STA 371G Statistics and Modeling	53	4.3	4.8
Fall 14	FIN 372/STA 372-6 Opti. Methods in Finance	25	4.6	4.8
Spr 14	FIN 372/RM 376 Quant. Methods for Finance	35	4.5	4.9
Fall 13	STA 371G Statistics and Modeling	69	4.5	4.8
Fall 13	STA 371G Statistics and Modeling	64	4.4	4.7
Fall 13	MIS 381N Decision Analysis & Optimization	52	4.6	4.7
Spr 13	STA 371H Statistics and Modeling	40	4.4	4.7
Spr 13	STA 371H Statistics and Modeling	41	4.4	4.6
Spr 13	STA 371G Statistics and Modeling	67	4.2	4.7
Spr 12	STA 371H Statistics and Modeling	27	4.6	4.9
Spr 12	STA 371H Statistics and Modeling	35	4.4	4.8
Spr 12	STA 371H Statistics and Modeling	34	4.5	4.7
Spr 11	STA 371H Statistics and Modeling	32	4.5	4.8
Spr 11	STA 371H Statistics and Modeling	34	4.4	4.8
Spr 11	STA 371H Statistics and Modeling	33	4.3	4.5
Fall 09	STA 371H Statistics and Modeling	46	3.8	3.8
Fall 09	STA 371H Statistics and Modeling	46	3.6	3.9
Fall 09	STA 371H Statistics and Modeling	44	3.6	3.6

Spr 09	STA 309 Elementary Business Statistics	50	4.2	4.5
Spr 09	OM 380.15 Optimization I	5	4.6	4.2
Fall 08	STA 309 Elementary Business Statistics	72	4.0	4.4
Fall 08	STA 309 Elementary Business Statistics	52	3.8	4.0
Spr 08	OM 380.14 Optimization I	5	4.5	4.8
Spr 07	IE 343 Engineering Economics	168	3.9	4.0
Fall 06	IE 590A Introduction to Financial Engr.	31	4.3	4.4
Fall 06	IE 343 Engineering Economics	80	4.1	4.3
Spr 06	IE 536 Stochastic Models in OR - I	30	4.1	4.3
Spr 06	IE 343 Engineering Economics	178	4.2	4.3
Fall 05	IE 343 Engineering Economics	167	4.2	4.5
Spr 05	IE 690D Intermediate Financial Engr.	15	4.1	4.1
Spr 05	IE 343 Engineering Economics	175	4.1	4.4
Spr 04	IE 690D Intermediate Financial Engr.	29	4.8	4.7
Fall 03	IE 343 Engineering Economics	119	3.7	3.9

*Rated on a scale 1(very poor) to 5(excellent).