Suvrajeet Sen (Overview)

- Ph.D. Industrial Engineering & Operations Research, Virginia Tech, 1982
- **Research Interests**
  - *Modeling with Optimization Technologies*
  - *Applications* (Infrastructure Systems: Electric Power and Markets, Telecommunications Networks, Traffic and Transportation)
- **Appointments**
  - *Professor,* Epstein Dept. of ISE, University of Southern California, (2012 – date). Courtesy appointment in Electrical Engineering - Systems.
  - *Professor*, Ohio State Univ. (2006 - 2013), Univ. of Arizona (1982-2006)
  - *Director,* Data-Driven Decisions Lab, and OR-Ohio (2006 - 2012)
  - *Director,* Center for Energy, Sustainability and Environment (2007- 2010)
  - *Program Director,* NSF/ENG (2003-2005)
  - Several Sabbatical Visits, including Oak Ridge, Stanford, Zurich
- **Honors and Awards**
  - *Fellow,* INFORMS (Inst. for Operations Res. & Mgmt. Science), 2005
  - *INFORMS Computing Society Award,* 2015 (with several collaborators)
  - *Distinguished Alumnus,* Univ. of Louisville
  - *Distinguished Speaker,* Penn State, Texas A&M, and invited speaker at over 50 universities world-wide.
  - *Keynote speaker* at International Conferences on Stochastic Programming (Vienne, Austria and Berlin, Germany), Service Systems (China), Infrastructures (India), Featured Speaker at German OR Conf., INFORMS OS Conference (Miami, FL), INFORMS CS Conference (Richmond, VA)
  - *Tutorial speaker* at INFORMS conferences (Boston, New Orleans, Salt Lake City, Maui). INFORMS Practice Speaker (Phoenix, Boston)
- **Professional Service**
  - *Editorial Board Member* of several INFORMS journals, including service as Optimization Area Editor of *Operations Research.*
  - *Founder,* INFORMS Optimization Society (1995)
  - *Past Chair,* INFORMS Telecommunications Section (1995)
  - *General Chair* (International Conference on SP, 2004), Program Chair (INFORMS, 1993)
  - *Chair* INFORMS Optimization Society *(2015 – 2016)*
- **Research Grants**
  - *Lead PI* for Federal grants totaling approximately $9 million.
- **Publications and Research Philosophy**

  Published in flagship journals of INFORMS and related societies (*Mathematical Optimization* and *SIAM).* In addition to leading algorithmic advances in Stochastic Optimization, this research has been adopted in commercial software supporting solvers for stochastic optimization models. State-of-the-art stochastic optimization methodologies not only address important infrastructure issues, but also motivate new algorithms for stochastic optimization. This symbiosis between new stochastic optimization algorithms and emerging applications makes this research rigorous and impactful.

CURRICULUM VITAE
Suvrajeet Sen

Education

B.E.(Hons.) Mechanical Engineering, Birla Inst. of Tech. and Sci. Pilani, India, 1977
M.E. Engineering Management, University of Louisville, Louisville, KY, 1979
Thesis: "Design of a multicommodity distribution network"
(Advisor: S.M. Alexander).
Ph.D. Industrial Engineering and Operations Research, VPI & SU, 1982
Dissertation: "The extreme point mathematical programming problem"
(Advisor: H.D. Sherali).

Major Field

Modeling and Optimization
Modeling Infrastructures: Power Systems, telecommunications, transportation
Optimization: Linear, integer, large scale and stochastic optimization.

Employment

1981 - 1982 *Research Associate*,
Dept. of IMSE, Pennsylvania State University
1982 - 1987 *Assistant Professor*,
SIE Dept. University of Arizona
1987 - 1994 *Associate Professor*,
SIE Dept. University of Arizona
1994 - 2006 *Professor*,
SIE Dept. University of Arizona
2006 - 2012 *Professor, Director of Data-Driven Decisions (3D) Lab, and OR-Ohio*
ISE Dept. Ohio State University
2007 - 2010 *Director*, Center for Energy, Sustainability & Environment, OSU
2012 – 2013 *Research Professor*, ISE Dept. Ohio State University
2012 – date *Professor of ISE, University of Southern California (Courtesy appt. in EE)*

Sabbaticals 1987-88 (Bellcore, Stanford Univ.)
1995-96 (Oak Ridge Nat. Labs., Univ. of Zurich)
2003 (EPSRC (U.K.) Funded Visitor to Brunel University, London)
2003 - 2005 *Program Director*, OR and SEE
Div. of Design, Manufacture and Industrial Innovation
National Science Foundation
2004 - 2005 *Chair*, NSF/Engineering Cyberinfrastructure Working Group
National Science Foundation

Honors and Awards

Fellow, (2005) Inst. for Operations Research and Management Science (INFORMS)
INFORMS Computing Society Prize, (2015) (awarded to the shared with collaborators)
Meritorious Service Award, Operations Research (INFORMS)
Outstanding Leadership and Service, NSF-Engineering Directorate
Distinguished Alumnus, University of Louisville
Who's Who in Science and Engineering
Honor Societies: Alpha Pi Mu, Tau Beta Pi
Distinguished Speaker, Penn State University, University of Louisville
Keynote/Featured Speaker at several international conferences in Austria, China, Germany, India, Netherlands, Switzerland (see also Major Invitations Section of Scholarly Presentations)
The 2015 ICS Prize is an annual award for best English-language paper on the interface of OR and Computing: awarded to Suvrajeet Sen, Dinakar Gade, Julia Higle, Simge Küçükyavuz, Lewis Ntaimo, and Hanif Sherali for their seminal work on stochastic mixed integer programming. (Awarded by the INFORMS Computing Society).

College and Departmental Service at Univ. of Arizona (most significant)

Member, SIE Peer Review Committee, (1994 - 98)
Leader, ELITE Project Team (1996 - 1998)
Member, SIE Undergraduate Committee (1996 - 2000)
Chair, Arizona Software Institute, 1998 - 99.
Chair, of the SIE Search Committee, 1997 - 2001
Organizer, SIE Seminar Series, 1999-2002, 2005-2006
Member, College Promotion and Tenure Committee (2000 - 2002)

University-wide Service at Univ. of Arizona (most significant)

Member, Program Assessment and Instructional Priorities Team.
Affiliate Member, Program in Applied Mathematics (1989 -)
Member, Search Committee for Digital Arts Director, Fine Arts College (1998-2000)
Member, Committee for Information Technology Initiative (Prop. 301)

Service at Univ. of Southern California

Member, Appointments, Promotion and Tenure Committee, VSoE (2012-2014)
Member, Engineering Faculty Council, VSoE (Fall 2012)
Member, Graduate Studies Committee, Epstein Dept (2012-2013)
Chair, Faculty Recruitment Committee, Epstein Dept (2014 – 2016)

Extramural Service

Area Editor (Optimization), *Operations Research* (1996 - 2000)
Associate Editor, *Operations Research* (1991 - 1995), (2003 - ongoing)
Associate Editor, *ORSA Journal on Computing*, (1995 - 2001)
Associate Editor, *J. of Telecommunications Systems*, (1996 - 2001)
Advisory Editor, *Journal of Service Science and Informatics* (2004 - ongoing)
Advisory Editor, *Asia Pacific Journal of Operations Research* (2003 – ongoing)
Guest Editorships: special issues of *Interfaces*, *Annals of Operations Research*, *IIE Transactions*, *Computational Optimization and Applications*.
General Chair, NSF Tutorials on Stochastic Programming, 1996.
General Chair, IFIP Workshop on Stochastic Programming, 1996.
Program Chair, INFORMS Telecommunications Conference, Boca Raton, FL, 1998.
General Chair, Tenth International Conference on Stochastic Programming, October 2004.
General Chair, INFORMS Midwest Conference, Columbus, OH 43210.
Founder, INFORMS Optimization Section, 1995.
Chair-Elect, INFORMS Optimization Society 2014.
Chair, INFORMS Optimization Society, 2015-2016
Chair INFORMS (formerly ORSA/TIMS) Telecommunications Technical Section, 1995-96. (Chair-Elect: 1994-95).
Member, INFORMS Strategic Planning Committee, 2004
Member, Committee on Stochastic Programming (COSP) (by invitation), 2000-2004.
Member, Committee on Stochastic Programming (COSP) Awards, 2013, 2016.
Member, INFORMS Nicholson Student Paper Prize, 2005, 2015.
Member, IFIP Working Group 7.7 (by invitation)
Program Co-Chair, ORSA/TIMS Meeting, Phoenix, 1993.
Member of Program Committee for ORSA Telecommunications Conference, 1995.
Member of International Program Committee for International Conferences on Stochastic Programming, Israel (1995), Vancouver (1998), Berlin (2001).
Tutorials Chair, International Conference on Stochastic Programming, Halifax (2010)
External Examiner, University of South Africa (1991), Massey University, New Zealand (1994), University of Zurich, Switzerland (1995), University of Copenhagen, Denmark (1998), University of Rome (2001-2002), Brunel University (2006).
Referee

National Science Foundation (Panelist), National Research Council (National Academy of Eng.), Australian Research Council, NSERC (Canada), International Science Foundation (for former Eastern Block nations) and the following journals *Annals of Operations Research, Computational Optimization and Applications, Discrete Optimization, European Journal of Operations Research, IEEE Transactions on Automatic Control, IIE Transactions, Interfaces, Journal of Design and Manufacturing, Journal of Global Optimization, Journal of Network and Systems Management, Journal of Economic Dynamics and Control Large Scale Systems, Management Science, Mathematical Programming, Mathematics of Operations Research, Naval Research Logistics, Networks, INFORMS Journal on Computing, Operations Research, Optimal Control Applications and Methods, Production Planning and Control, Power Systems Computing, SIAM Journal on Control and Optimization, SIAM Journal on Optimization, Telecommunications Systems.*

Referee for P&T at the following Universities:
Arizona State, California-Davis, Colorado, Florida, Georgia Tech., Illinois, Lehigh, Louisiana State, Michigan, Northwestern, Missouri, Penn State, Southern California, Stanford, Texas, Washington, Wisconsin
Invited Speaker at the following Universities:
Arizona, Arizona State, Auburn, Auckland (New Zealand), British Columbia (Vancouver, Canada), Brunel (U.K), Univ.at Buffalo (SUNY Buffalo), UC-Davis, Cambridge (U.K), Charles Univ. (Prague,Czech), Carnegie Mellon University, Copenhagen (Denmark), Florida, Georgia Tech., Groningen (Netherlands), George Washington University, Guelph University (Canada), Humboldt University (Berlin, Germany), IIT Mumbai (India), IIT Delhi (India), IIS Bangalore (India), Illinois, Lancaster (U.K), Lehigh, Louisville, Maryland, Michigan, Milan (Italy), Missouri-Rolla, Naval Postgraduate School, Northern Arizona, NC State, U. North Carolina, Northwestern, Oslo (Norway), Rome (Italy), St. Gallen (Switzerland), Norwegian Univ. of Science and Tech. (Trondheim, Norway), Ohio State University, Penn State, Pittsburgh, Princeton, Purdue, Sabanci (Turkey), Southern California, Stanford, Stevens, Texas A&M, Tennessee, VPI, VCU, Wisconsin, Zurich (Switzerland).

(A) **Publications**[1]

Archival Journals (AA: 64), Book/Book Chapters (AB:14), Conf. Proceedings (AC:22)

[AC.1] F.H. Murphy, S. Sen and A.L. Soyster, "Accounting for uncertain load forecasts in electric utility capacity expansion: a deterministic equivalence," *Proceedings of Energy Modeling III*, Institute of Gas Technology, Chicago, Il. pp. 71-98, 1980.

[AA.2] F.H. Murphy, S. Sen and A.L. Soyster, "Electric utility capacity expansion planning with uncertain load forecasts," *AIIE Transaction*, 14, pp. 52-59, 1982.

[AA.3] H.D. Sherali, A.L. Soyster, F.H. Murphy and S. Sen, "Linear programming based analysis of marginal cost pricing in electric utility capacity expansion," *European Journal of Operations Research*, 11, pp. 349-360, 1982.

[AA.4] H.D. Sherali, A.L. Soyster, F.H. Murphy and S. Sen, "Allocation of capital costs in electric utility capacity expansion planning under uncertainty," *Management Science* 30, pp. 1-19. 1984.

[AA.5] S. Sen, S.K. Saraf, A.L. Soyster, F.H. Murphy, "The capital supply curve in models of capacity expansion: some economic and algorithmic aspects," *Naval Research Logistics Quarterly*, 31, pp. 199-212, 1984.

[AA.6] S. Sen and H.D. Sherali, "On the convergence of cutting plane algorithms for a class of nonconvex mathematical programs," *Mathematical Programming*, 31, pp. 42-56, 1985.

[AA.7] S. Sen and H.D. Sherali, "A disjunctive cutting plane algorithm for the extreme point mathematical programming problem," *Opsearch*, 22, pp. 83-94, 1985.

[1] *As a general rule, all authors are listed alphabetically for publications (papers, books etc.), unless there were special circumstances (e.g. graduate student) to warrant an alternate author sequence.*

[AA.8] S. Sen and H.D. Sherali, “A branch and bound algorithm for extreme point mathematical programming," *Discrete Applied Mathematics*, 11, pp. 265-280, 1985.

[AA.9] H.D. Sherali and S. Sen, “On generating cutting planes from combinatorial disjunctions," *Operations Research*, 33, pp. 928-933, 1985.

[AC.10] S. Sen and D.N. Contractor, “Reduction of fluid transients by minimax optimization," *Forum on Unsteady Flow*, ASME Winter Meeting, November 1985.

[AC.11] S. Sen and A. Whiteson, “A cone splitting algorithm for reverse convex programming," *Proceedings of IEEE Conference on Systems Man and Cybernetics*, Tucson, AZ, pp. 656-660, 1985.

[AA.12] S. Sen and H.D. Sherali, “Facet inequalities from simple disjunctions in cutting plane theory," *Mathematical Programming*, 34, pp. 72-83, 1986.

[AA.13] S. Sen and H.D. Sherali, “A class of convergent primal-dual subgradient algorithms for nondifferentiable optimization," *Mathematical Programming*, 35, pp. 279-297, 1986.

[AA.14] S. Sen, “A class of algorithms for large scale nonlinear minimax optimization," *Applied Mathematics and Computation*, 18, pp. 355-361, 1986.

[AA.15] S. Sen and D.N. Contractor, “Reduction of pressure surges by minimax optimization," *Applied Mathematical Modelling*, 10, pp. 271-277, 1986.

[AA.16] S. Sen and D. Yakowitz, “A primal-dual subgradient method for time staged capacity expansion," *European Journal of Operational Research*, 27, pp. 301-312, 1986.

[AA.17] F.H. Murphy, S. Sen and A.L.Soyster, “Electric utility expansion planning in the presence of existing capacity: a nondifferentiable convex programming approach," *Computers and Operations Research*, 14, pp. 19-31, 1987.

[AA.18] S. Sen and H.D. Sherali, “Nondifferentiable reverse convex programs and facetial cuts via a disjunctive characterization," *Mathematical Programming*, 37, pp. 169-183, 1987.

[AA.19] S. Sen and S.J. Yakowitz, “A Quasi-Newton algorithm for discrete-time optimal control," *Automatica*, 23, pp. 749-752, 1987.

[AA.20] A. Rakshit, S. Sen and L. Duckstein, “A Stagewise Compromise Programming Framework for Multi-stage Multiple Objective Decision Making Problems," *Control Theory and Advanced Technology*, special issue on Multi-objective Discrete Dynamic Systems (Y. Haimes, editor), 5, pp. 413-441, 1989.

[AC.21] S. Sen, R.D. Doverspike and S.I. Vohnout, “Diverse Routing in the Unified Facilities Optimizer," *Proceedings of Global Telecommunications Conference (Globe-com)*, 1989.

[AC.22] A. Vakharia, R.G. Askin and S. Sen, “Cell Formation in Group Technology: A Mathematical Programming Approach," *Proceedings of the Decision Sciences Institute Annual Meeting*, 1989.

[AA.23] A. Rakshit and S. Sen, “Sequential rank-one/rank-two updates for quasi-Newton differential dynamic programming," *Optimal Control Applications and Methods*, 11, pp. 95-101, 1990.

[AA.24] J.L. Higle and S. Sen, “Stochastic Decomposition: An algorithm for two stage

linear programs with recourse," *Math. of Operations Research*, 16, pp. 650-669, 1991.

[AA.25] J.L. Higle and S. Sen, "Statistical verification of optimality conditions for stochastic programs with recourse," *Annals of Operations Research*, 30, pp. 215-240, 1991.

[AA.26] J.L. Higle and S. Sen, "On the convergence of algorithms with implications for stochastic and nondifferentiable optimization," *Math. of Operations Research*, 17, pp. 112-131, 1992.

[AA.27] S. Sen, "Relaxations for probabilistically constrained programs with discrete random variables," *Operations Research Letters*, 11, pp. 81-86, 1992.

[AA.28] S. Sen, "Subgradient decomposition and the differentiability of the recourse function of a two stage stochastic LP with recourse," *Operations Research Letters*, 13, pp. 143-148, 1993.

[AC.29] S. Sen and L. Mahajan, "A Model for Multiplexing and Cable Sizing in Local Access Telephone Networks," *Annual Communications Review*, 47, pp. 530-537, 1993.

[AC.30] J.L. Higle and S. Sen, "Stochastic Decomposition: A Statistical Approach to Activity Analysis Under Uncertainty," *Proceedings of the IFIP/Daimler-Benz Workshop on* "Statistical Methods for Decision Processes," (G. Hellwig, P. Abel and P. Kall eds.) pp. 64-77, 1993.

[AA.31] K.T. Au, J.L. Higle and S. Sen, "Inexact subgradient methods with applications in stochastic programming," *Mathematical Programming*, 63, pp. 65-82, 1994.

[AA.32] M.S. Sodhi, R.A. Askin, S. Sen, "Multiperiod tool and production assignment in Flexible Manufacturing Systems," *Int. J. of Prod. Research*, 32, pp. 1281-1294, 1994.

[AB.33] S. Sen, J. Mai and J.L. Higle, "Solution of Large Scale Stochastic Programs with Stochastic Decomposition Algorithms," Book Chapter for *Large Scale Optimization: The State of the Art*, W. Hager, D. Hearn and P. Pardalos (eds.), 1994

[AA.34] S. Sen, R.D. Doverspike and S. Cosares, "Network Planning with Random Demand," *Telecommunication Systems*, 3, pp. 11-30, 1994.

[AA.35] J.L. Higle and S. Sen, "Epigraphical Nesting: a unifying theory for the convergence of algorithms," *Journal of Optimization Theory and Applications*, 84, pp. 339-360, 1995.

[AA.36] M.S. Sodhi, R.A. Askin and S. Sen, "A hierarchical model for flexible manufacturing systems control," *Journal of Operational Research*, 45, pp. 1185-1196, 1994.

[AA.37] J.L. Higle and S. Sen, "Finite master programs in stochastic decomposition," *Mathematical Programming*, 67, pp. 143-168, 1994.

[AA.38] J.L. Higle and S. Sen, "Statistical Approximations for Recourse Constrained Stochastic Programs," *Annals of Operations Research*, 56, pp. 157-175, 1995.

[AA.39] J.L. Higle and S. Sen, "Duality and Statistical Tests of Optimality for Two Stage Stochastic Programs," *Mathematical Programming*, 75, pp. 257-275, 1996.

[AB.40] J.L. Higle and S. Sen, *Stochastic Decomposition: A Statistical Method for*

Large Scale Stochastic Linear Programming, Kluwer Academic Publishers, Dordrecht, 1996.

[AB.41] S.W. Wallace, J.L. Higle and S.Sen (eds). *Stochastic Programming, Algorithms and Models*, special issue of Annals of Operations Research, 64, 1996.

[AC.42] J.L. Higle and S. Sen, "Tutorial: Modeling Two Stage Stochastic Linear Programs," *Proceedings of the Industrial Engineering Research Conference*, pp. 311-320, 1996.

[AC.43] S. Sen, J.L. Higle, J.B. Goldberg and W.R. Ferrell, "Engineering with a Liberal and Technical Education (ELITE)," *Proceedings of Frontiers in Education Conference*, Salt Lake City, UT, 1996.

[AC.44] S. Sen, J.B. Goldberg, J.L. Higle and W.R. Ferrell, "Bachelor of Arts in Engineering: Endless Possibilities," *Proceedings of the ASEE-PSW Conference*, San Luis Obispo, CA, 1997.

[AA.45] S. Sen and K.L. Head "Controlled Optimization of Phases (COP) at an Intersection," *Transportation Science*, 31, pp. 5-17, 1997.

[AA.46] H.D. Sherali, G. Choi and S. Sen, "An exterior-point polytope sliding method for linear programming," *Informatica*, 8, pp. 559-582, 1997.

[AA.47] S. Sen and J.L. Higle, "An Introductory Tutorial on Stochastic Linear Programming: Modeling," *Interfaces*, 29, pp. 33-61, 1999.

[AA.48] J.L. Higle and S. Sen, "Statistical approximations for stochastic linear programming problems," *Annals of Operations Research*, 85, pp. 173-192, 1999.

[AC.49] J.L. Higle and S. Sen, "Algorithmic Implications of Duality in Stochastic Programs," *Proceedings of the IFIP Conference*, 1999.

[AA.50] S. Sen, J.L. Higle and J.R. Birge, "Duality Gaps in Stochastic Integer Programming," *Journal of Global Optimization*, 18, pp. 189-194, 2000.

[AC.51] Y.K. Cho, B.P. Zeigler, H.J. Cho, H.S. Sarjoughian and S. Sen, "Design Considerations for Distributed Real-time DEVS," *Proceedings of AIS 2000*.

[AA.52] S. Sen, R. Pillai, S. Joshi, A. Rathi, "A Mean-Variance Model for Route Guidance in Advanced Traveller Information Systems," *Transportation Science*, 35, pp. 37-49, 2001.

[AA.53] J. Wu and S. Sen, "A Stochastic Programming Model for Currency Option Hedging," *Annals of Operations Research*, 100, pp. 227-250, 2000.

[AB.54] F.H. Murphy and S. Sen, "Qualitative Implications of Uncertainty in Economic Equilibrium Models," *Decision-Making Under Uncertainty: Energy and Power*, (C. Greengard and A. Ruszczynski, eds.), The IMA Volumes in Mathematics and its Applications, vol. 128, Springer, New York, 2002.

[AC.55] S. Sen, A. Dixit, Y. Xu, A.L. Barath and F. Ciarallo, "The Open Bit Mine: A Laboratory Test-bed for Studying Parallel Realities," *Proceedings of IE Research Conference*, May 2001.

[AB.56] J.L. Higle and S. Sen, "Stochastic Linear Programming: Decomposition and Cutting Planes," *Encyclopedia of Optimization*, (C.A. Floudas and P.M. Pardalos, eds.), Kluwer Academic Publishers, Dordrecht, 2001.

[AB.57] S. Sen and J.L. Higle, "Stabilization of Cutting Plane Algorithms for

Stochastic Linear Programming Problems," *Encyclopedia of Optimization*, (C.A. Floudas and P.M. Pardalos, eds.), Kluwer Academic Publishers, Dordrecht, 2001.

[AB.58] S. Sen, "Stochastic Programming," *Encyclopedia of Operations Research and Management Science* (S. Gass and C. Harris, eds.), pp. 784 - 789, Kluwer Academic Publishers, Dordrecht, 2001.

[AB.59] J.L. Higle and S. Sen, "A Stochastic Programming Model for Network Resource Utilization in the Presence of Multi-Class Demand Uncertainty," *Applications of Stochastic Programming* (eds. S.W. Wallace and W.T. Ziemba), 2005.

[AC.60] S. Sen, L. Yu and T. Genc, "Decision Aids for Scheduling and Hedging in Deregulated Electricity Markets: A Stochastic Programming Approach to Power Portfolio Optimization," (invited paper), *Proceedings of the 2002 Winter Simulation Conference*, San Diego, CA.

[AB.61] G. Lulli and S. Sen, "Stochastic Batch Sizing Problems: Models and Algorithms," *Stochastic Integer Programming and Network Interdiction Models* (D.L. Woodruff ed.), pp. 85 - 103, Kluwer Academic Press, 2002.

[AB.62] S. Sen, J.L. Higle and L. Ntaimo, "A Summary and Illustration of Disjunctive Decomposition with Set Convexification," *Stochastic Integer Programming and Network Interdiction Models* (D.L. Woodruff ed.), pp. 105 - 125, Kluwer Academic Press, 2002.

[AA.63] G. Lulli and S. Sen, "A Branch and Price Algorithm for Multi-stage Stochastic Integer Programs with Applications to Stochastic Lot Sizing Problems," *Management Science*, 50, pp. 786-796, 2004.

[AA.64] Y. Xu, S. Sen and F. Ciarallo, "An Agent-based Approach for Distributed Simulation," *International Journal of Modeling and Simulation*, 24, no. 2, pp. 55-64, 2004.

[AA.65] J.L. Higle and S. Sen "Duality for Multistage Convex Stochastic Programs," *Annals of Operations Research*, 142, pp. 129-146, 2006.

[AB.66] S. Sen, "Algorithms for Stochastic Mixed-Integer Programming Models," *Handbook of Discrete Optimization*, (K. Aardal, G.L. Nemhauser, and R. Weismantel eds.), North-Holland Publishing Co., pp. 515-558, 2005.

[AA.67] L. Ntaimo and S. Sen, "The Million Variable "March" for Stochastic Combinatorial Optimization," *Journal of Global Optimization*, 32, no. 3, pp. 385-400, 2005.

[AA.68] S. Sen, L. Yu, and T. Genc, "A Stochastic Programming Approach to Power Portfolio Optimization," *Operations Research*, 54, pp. 55-72, 2006.

[AA.69] M. Casey and S. Sen, "The Scenario Generation Algorithm for Multi-stage Stochastic Linear Programming," *Mathematics of Operations Research*, 30, pp. 615-631, 2005.

[AA.70] G. Lulli and S. Sen, "A Heuristic Algorithm for Stochastic Integer Programming with Complete Recourse," *European J. of Operations Research*, 171, pp. 879-890, 2006.

[AA.71] S. Sen and J.L. Higle, "The C3 Theorem and a D2 Algorithm for Large Scale Stochastic Integer Programming," *Mathematical Programming*, 104, pp. 1-20, 2005.

[AA.72] S. Sen and H.D. Sherali, "Decomposition with Branch-and- Cut Approaches for Two Stage Stochastic Integer Programming," *Mathematical Programming*, 106, pp. 203-223, 2006.

[AC.73] Y. Xu and S. Sen, "A Distributed Computing Architecture for Simulation and Optimization," *Winter Simulation Conference 2005* (M.E. Kuhl, N.M. Steiger, F.B. Armstrong, J.A. Jones, eds.).

[AB.74] G. Mitra, C. Poojari and S. Sen, "Strategic and Tactical Planning Models for Supply Chain: An Application of Stochastic Mixed Integer Programming," Handbook on Modelling for Discrete Optimization Springer International Series in Operations Research and Management Science, pp. 227-264, 2006.

[AA.75] T. Genc, S. Reynolds, and S. Sen, "Dynamic Oligopolistic Games Under Uncertainty: A Stochastic Programming Approach," *Journal of Economic Dynamics and Control*, 31, pp. 55-80, 2007.

[AC.76] S. Sen "On Bridging the Gap between Academe and Industry in OR/MS," *OR/MS Today* (The INFORMS Professional Magazine) pp. 31-33, 2006.

[AC.77] L. Zhao and S. Sen, "A comparison of sample-path based simulation-optimization and stochastic decomposition for multi-location transshipment problems," *Winter Simulation Conference 2006* (L.F. Perrone et al, eds.).

[AA.78] L. Ntaimo and S. Sen, "A branch-and-cut algorithm for two-stage stochastic mixed-binary programs with continuous first-stage variables," *Int. J. of Computational Science and Engineering*, 3, pp. 232-241, 2007.

[AA.79] L. Ntaimo and S. Sen, "A Comparative Study of Decomposition Algorithms for Stochastic Combinatorial Optimization," *Computational Optimization and Applications*, vol. 40, pp. 299-319, 2008.

[AA.80] T. Genc and S. Sen, "An analysis of capacity and price trajectories for the Ontario Electricity Market using dynamic Nash Equilibrium under uncertainty," *Energy Economics*, 30, pp. 173-191, 2008.

[AA.81] J.L. Higle, B. Rayco, and S. Sen, "Stochastic Scenario Decomposition for Multi-stage Stochastic Programs," *IMA Journal of Management Mathematics*, pp 1-28, 2009.

[AC.82] S. Sen, S. Kang, Y. Qi, "Dashboard for Intelligent Collaborative Engineering: An Architectural Overview," Proceedings of the Industrial Engineering Research Conference, Vancouver, BC, Canada, 2008.

[AA.83] Y. Yuan and S. Sen, "Enhanced cut generation methods for decomposition-based branch-and-cut algorithms for two-stage stochastic mixed-integer programs," *INFORMS Journal on Computing*, pp. 480 – 487, 2009.

[AA.84] S. Sen, Z. Zhou and K. Huang, "Enhancements of Two-Stage Stochastic Decomposition, *Computers and Operations Research*, pp. 2434 – 2439, 2009. An updated version entitled "Stochastic Decomposition and Extensions," is to appear in "Stochastic Programming: The State of the Art," in honor of George Dantzig, edited by G. Infanger.

[AA.85] J. Desai and S. Sen, "A global optimization algorithm for reliable network design," *European J. of Operational Research* pp. 1 – 8, 2010.

[AB.86] S. Sen, "Stochastic Integer Programming Algorithms: Beyond Benders' Decomposition," *Wiley Encyclopedia on Operations Research and Management Science*, 2010

[AA.87] B. Chen, S. Küçükyavuz, and S. Sen, "Finite Disjunctive Programming Characterizations for General Mixed-Integer Linear Programs," *Operations Research*, Vol. 59, pp. 202–210, 2011.

[AC.88] S. Sen and Z. Zhou, "Optimization Simulation: The case of multi-stage stochastic decision models," *Proceedings of the Winter Simulation Conference* (S. Jain et al, eds.), 2011.

[AA.89] B. Chen, S. Küçükyavuz, and S. Sen, "A Computational Study of the Cutting Plane Tree Algorithm for General Mixed-Integer Linear Programs," *Operations Research Letters*, Vol. 40, pp. 15-19, 2012.

[AA.90] K. Huang, S. Sen, and F. Szidarovszky, "Connections among Decision Field Theory models of Cognition," *Journal of Mathematical Psychology*, Vol. 56, pp. 287 – 296, 2012.

[AB.91] S. Sen, "Stochastic Programming," *Encyclopedia of Operations Research and Management Science* (S. Gass and M. Fu, eds.), Springer, pp. 1486 – 1497, 2013.

[AA.92] P.V.S Aketi and S. Sen, "Modeling Demand Response and Economic Impact of Advanced and Smart Metering," *Energy Systems*, vol. 5, pp. 583-606, 2013.

[AA.93] D. Gade, S. Küçükyavuz, and S. Sen, "Decomposition algorithms with parametric Gomory cuts for two-stage stochastic integer programs," *Mathematical Programming*, vol. 144, pp. 39-64, 2014.

[AA.94] S. Sen and Z. Zhou, "Multi-stage Stochastic Decomposition" *SIAM Journal on Optimization* , Vol. 24, pp. 127-153, 2014.

[AA.95] H. Gangammanavar, S. Sen and V. Zavala, "Simulation and Stochastic Optimization for Sub-hourly Economic Dispatch of Wind Energy" accepted for publication in *IEEE Transactions on Power Systems*, 2015

[AC.96] S. Sen, C. Barnhart, J.R. Birge, E.A. Boyd, M.C. Fu, D.S. Hochbaum, D.P. Morton, G.L. Nemhauser, B.L. Nelson, W.B. Powell, C.A. Shoemaker, D.D. Yao, S. Zenios, "Operations Research – A Catalyst for Engineering Grand Challenges" *OR/MS Today*, (The INFORMS Professional Magazine) pp. 44-47, August 2015.

[AC.97] S. Sen, C. Barnhart, J.R. Birge, W.B. Powell, C.A. Shoemaker, "OR – A Catalyst for Engineering Grand Challenges: Opportunities in Sustainability" *OR/MS Today*, (The INFORMS Professional Magazine) pp. 22-26, December 2015.

[AC.98] D.P. Morton, and S. Sen, "OR – A Catalyst for Engineering Grand Challenges: Opportunities in Security" accepted for publication in *OR/MS Today*, (The INFORMS Professional Magazine) February 2016.

[AA.99] Y. Qi and S. Sen, "Ancestral Benders' Cuts and Multi-term Disjunctions for Mixed-Integer Recourse Decisions in Stochastic Programming," accepted for publication in *Mathematical Programming*.

[AA.100] S. Sen and Y. Liu, "Mitigating Uncertainty via Compromise Decisions in Stochastic Linear Programming" recommended for publication in *Operations Research*.

(B) Papers under review

[B.1] A. Atakan, G. Lulli, and S. Sen, "An Improved MIP Formulation for the Unit Commitment Problem," submitted to *INFORMS J. on Computing*

[B.2] J-S. Pang, S. Sen and U.V. Shanbhag, "Two-stage Non-cooperative Games with Risk Averse Players," Submitted to *Mathematical Programming B*, (special issue on *Stochastic Variational Inequalities*).

(C) Scholarly Presentations

Major Invitations

[C.1] Semi-plenary Lecture on 'Stochastic Decomposition algorithms for stochastic linear programming,' International Conference on Operations Research, Berlin, 1994.

[C.2] Featured Lecture on 'Advances in Stochastic Programming,' Twenty-Fifth Dutch Operations Research Conference, January 2000. (This is a series of 3 lectures at the conference.)

[C.3] Plenary Lecture on 'Algorithmic Challenges in Stochastic Programming,' Ninth International Conference on Stochastic Programming, August 2001.

[C.4] Distinguished Lecture on 'The SPEED-CS Project,' Speed Scientific School, Univ. of Louisville, Nov. 2001.

[C.5] Distinguished Lecture at Penn State University, September 2004.

[C.6] Report on 'Structuring Cyberinfrastructure for the Engineering Directorate,' presented as Chair of the Engineering Cyberinfrastructure Working Group, August 2005.

[C.7] Keynote Lecture 'Service Enterprise Engineering,' First IEEE-Service Operations, Logistics and Transportation Conf. Beijing, China, August 11, 2005.

[C.8] Opening Keynote Lecture 'Operations Research: The Glue for Infrastructure Systems,' Operations Research Society of India National Meeting, Bangalore, India, December 2005.

[C.9] Plenary Lecture 'New Directions in Stochastic Decomposition,' Eleventh International Conference on Stochastic Programming, Vienna, Austria , August 2007.

[C.10] Featured Lecture 'Stochastic Mixed Integer Programming,' INFORMS Optimization Conference, Miami, Florida, February 2012.

[C.11] STOR-i Lectures 'Stochastic Programming" for EPSRC (U.K.) Program at University of Lancaster, Statistics and Operations Research.

[C.12] Tutorial (Plenary) Lecture 'Conceptual v Computational Stochastic Programming: Perspectives as SP turns 60!' INFORMS Computing Society Conference, Richmond, VA, Jan. 2015.

Research Tutorials

[C.13] Tutorial on 'Large Scale Optimization Under Uncertainty,' ORSA/TIMS Conference, Boston, 1994.

[C.14] Tutorial on 'Algorithms for Stochastic Programming,' INFORMS (formerly ORSA/TIMS) Conference, New Orleans, 1995.

[C.15] Tutorial on 'Algorithms for Large Scale Stochastic Programming,' INFORMS

Computer Science Technical Section Meeting (formerly ORSA/TIMS) Monterey, CA, 1998.

[C.16] Tutorial on 'Scenario Generation in Stochastic Programming,' INFORMS Conference, Cincinnati, OH, May 1999.

[C.17] Tutorial on 'Stochastic Integer Programming,' INFORMS Conference, Salt Lake City, UT, May 2000.

[C.18] Tutorial on 'Stochastic Integer Programming,' INFORMS Conference, Maui, Hawaii, June 2001.

[C.19] Winter School on Stochastic Programming 2011: Lecture to about 80 Ph.D. Students in Europe, hosted in Norway by the Norwegian University of Science and Technology, March, 2011

[C.20] Master Class on Stochastic Programming: Series of 3 lectures to Ph.D. students in Northern England, hosted by the University of Lancaster, March 2012.

[C.21] Winter School on Stochastic Programming 2013: Lecture to 80 Ph.D. students in Europe, hosted in Tignes, France, April, 2013.

Lectures at Academic Institutions and Industry

[C.22] 'Multiplexing considerations in network planning,' *Bell Communications Research*, May 1989.

[C.23] 'Stochastic Decomposition: A new algorithmic concept for stochastic programming,' March 1987, presented at:
(a) *RPI*, Decision Sciences and Systems Engineering Dept.
(b) *Penn State*, IE Dept.
(c) *Bell Communications Research*.

[C.24] 'Primal-Dual methods in Lagrangian Relaxation,' *Martin Marietta Information and Communications Systems*, June 1987.

[C.25] 'Algorithms for the Unified Facilities Optimizer,' presented at:
(a) *Purdue*, IE Dept., March 1988.
(b) *Univ. of Ariz.* Elect. and Comp. Eng. Dept, Nov. 1989.

[C.26] 'Planning CIM Systems,' *Diversified Engineering*, October, 1989.

[C.27] 'Integrating Dynamic Routing in Link Sizing,' *Deutsche Bundespost*, Darmstadt, Germany, July 1991.

[C.28] 'Progress on Stochastic Decomposition Algorithms,' presented at:
(a) *Stanford Optimization Laboratory*, Feb. 1989.
(b) *Pacific Gas and Electric Co.*, March, 1989.
(c) *Bell Communications Research*, April 1989.
(d) *Southern Methodist University*, November 1989.
(e) *Nat. Institute of Standards and Tech.*, November 1990
(f) *Bell Communications Research*, March 1991.
(g) Minisymposium at *Humboldt University*, Berlin, Germany, January 1994.
(h) *University of British Columbia*, Vancouver, B.C, February 1994.
(i) *Naval Postgraduate School*, Monterey, February, 1994.
(j) *The University at Buffalo*, April 2001.

[C.29] 'Activity Analysis Under Uncertainty,' presented at:
(a) *Systems Science Seminar, Arizona State University*, April, 1992.

(b) *Bell Communications Research*, May, 1992.
(c) *Daimler Benz*, Stuttgart, Germany, June 1992.
(d) *AT & T Bell Laboratories*, August 1992.
(e) *U.S. West Advanced Technologies*, December 1992.

[C.30] 'Computational considerations in the solution of large scale stochastic programs using Stochastic Decomposition algorithms,' presented at:
(a) 24th Optimization Conf. organized by *Charles University*, Prague, Czech., Sept. 1992.
(b) Conference on Large Scale Optimization, organized by *The University of Florida*, February 1993.
(c) *Pacific Gas and Electric Co.*, March, 1993.

[C.31] 'Verification of Optimality in Sampling-based Algorithms,' presented at
(a) Workshop at the *Intl. Inst. for Appl. Systems Analysis (IIASA)*, Laxenburg, Austria, July 1993.
(b) *Bell Communications Research*, May 1994.

[C.32] 'Multi-stage Stochastic Decomposition Algorithms,' presented at:
(a) *University of California, Davis*, March 1995.
(b) *Humboldt University, Berlin, Germany*, March 1996.

[C.33] 'Controlled Optimization of Phases (COP) at an Intersection,' presented at:
(a) *Univ. of Tennessee, Knoxville, TN*, Sept. 1995.
(b) *Univ. of Louisville, Louisville, KY*, Oct. 1995.
(c) *Charles University, Prague, Czech Rep.*, Feb. 1996.
(d) *University of Copenhagen, Denmark*, March, 1996.

[C.34] 'A Mean-Variance Approach in Advanced Traveller Information Systems,'
(a) *Cambridge University*, Cambridge, England

[C.35] 'On connections between stochastic programming, simulation optimization and design optimization,' *NASA Langley*, Hampton, VA, July 1998.

[C.36] 'A Scenario Generation Algorithm for Stochastic Programming,' presented at:
(a) *University of Florida*, February 1999.
(b) *University of British Columbia*, March 1999.
(c) *Texas A & M University*, April 1999.
(d) *University of Oslo, Norway*, March 2001.

[C.37] 'Qualitative Implications of Uncertainty in Economic Equilibrium Models,'
(a) *Univ. of Copenhagen*, November 1998.
(b) *Univ. of California, Riverside*, May 1999.
(c) *Electric Power Research Inst.*, July 1999.

[C.38] 'The SPEED-CS Project'
(a) *Univ. of Louisville*, November 2001.
(b) *NSF Workshop, University of Texas*, March 2002.

[C.39] 'Algorithmic Challenges in Stochastic Programming'
(a) *Arizona State University*, February 2002.
(b) *Penn State University*, February 2002.
(c) *Georgia Tech.*, April 2002.

[C.40] 'The Scenario Generation Algorithm for Multi-stage SLP'
(a) *Johns Hopkins University*, October 2002.
(b) *CGDO Conference*, Blacksburg, August, 2005.

[C.41] 'Research Trails in Operations Research,'
(a) *National Science Foundation*, February 2003.
(b) *Brunel University*, March 2003.
[C.42] 'Two stage SMIP with Continuous First-Stage Variables in Both Stages,' Econometrics Department, University of Groningen, Netherlands, May 2004.
[C.43] 'Stochastic Mixed-Integer Programming,'
(a) IE Symposium, University of Wisconsin, Madison, April 2006.
(b) OR Colloquium, Carnegie Mellon University, February, 2009
(c) OR-Ohio Tutorials, May 2009
[C.44] `Non-negative start-up prices and uniqueness of shadow prices in the presence of indivisibilities,"
(a) MURI Workshop, University of Arizona, Tucson, AZ, March 2008.
(b) University of Cincinnati, Cincinnati, OH, .May 2008
(c) Sabanci University, Istanbul, Turkey, July 2008
[C.45] 'Mixed-Integer Programming in Natural Language Processing'
(a) University of Arizona (December 2008)
(b) Arizona State University (January 2009)
(c) University of Pittsburgh (February, 2009)
[C.46] 'Overview of Stochastic Mixed-Integer Programming,' Banff International Research Station (BIRS), Banff, Canada, 2009, Univ. of Miami, February 2010, University of Texas, El-Paso, April 2011.
[C.47] 'Multi-stage Stochastic Decomposition and connections to Dynamic Programming,' Princeton University, April 2010.

(D) Invited Conference Presentations (unrefereed)

On average about 4 invited conference presentations are made each year at INFORMS conferences, and the other main conference venues are International Symposium on Mathematical Programming (once every three years) and International Conference on Stochastic Programming (once every three years).

Grants and Contracts (S. Sen is the lead PI unless otherwise stated)

I have served as the lead PI for grants totaling approximately $9.1 million. While most of the funds are from federal agencies, some industrial grants were also obtained. Internal grants from the university are not listed below.

Completed Projects

Bell Communications Research
Project: Intra-LATA network design with multiplexing considerations
Duration: Jan. 1984 - Dec. 1985 ($75,000); Summer 1986.
Responsibility: 100%

AT&T
Distributed Algorithms ($27,000 from AT&T).

Responsibility: 100%
Manufacturing Laboratory Development (Co-PI: R. Askin, $26,000 from AT&T).
Responsibility: 50%

Bell Communications Research
Project: Unified Facilities Optimizer.
Duration: September 1986 - May 1989 ($126,000).
Responsibility: 100%

U.S. West
Project: Network Planning under Uncertainty
Duration: June 1991-August 1992 ($17,200)
Responsibility: 60%

Arizona Department of Transportation
Project: RHODES for Real-Time Tra±c Control (PI: P. Mirchandani)
Involvement: May 1991-Feb 1992.
Responsibility: 15% of $200,000.

National Science Foundation
Project: Mathematical Programming Under Uncertainty: Risk and Recourse Revisited. (Co-PI: J.L. Higle)
Duration: October 1991 - September 1994 ($245,000).
Responsibility: 50%

NATO
Project: Cellular Decomposition (Co-PI's: J.L. Higle and S.W. Wallace)
Duration: January 1993 - August 1994 ($4,000)
Responsibility: 33%

National Science Foundation
Project: Research Experience for Undergraduates. This grant is intended to supplement an earlier NSF grant.
Duration: December 1992 - August 1994 ($5,000).
Responsibility: 100%

Federal Highway Administration
Project: Real-Time Traffic Control (PI: P. Mirchandani)
Duration: June 1994 - December 1995
Responsibility: 15% of $375,000

National Science Foundation
Project: Integrated Planning Under Uncertainty: Statistical Methods in Mathematical Programming. (Co-PI: J.L. Higle)
Duration: November 1994 - October 1997 ($301,921).
Responsibility: 50%

National Science Foundation
Project: Tutorials on Stochastic Optimization.
Duration: July 1995 - July 1996 ($20,000).
Responsibility: 50%

Department of Education
Project: Graduate Assistance in Areas of National Need (GAANN, PI: P. Mirchandani)
Duration: September 1995 - July 2000 ($500,000).
Responsibility: 20%

National Science Foundation
Project: ELITE: Engineering with Liberal and Technical Education. (Co-PIs: W.R. Ferrell, J.B. Goldberg, J.L. Higle)
Duration: June 1996 - June 2001 ($700,000).
Responsibility: 40%

National Science Foundation
Project: SPEED-CS: A Simulation Platform for Experimetation and Evaluation of Distributed-Computing Systems. (Co-PIs: F. Ciarallo, H. Sarjoughian, R. Schlichting and B. Zeigler)
Duration: August 1999 - July 2003 ($1 million).
Responsibility: 55%

National Science Foundation
Project: Performance Models with Data Evolution (Co-PI: J.L. Higle)
Duration: August 1999 - July 2002 ($416,000).
Responsibility: 50%

Lockheed Martin
Project: Network Design and Simulation (Co-PI: J.C. Smith)
Duration: December 2000 - December 2001 ($10,000).
Responsibility: 50%

Air Force Office of Scientific Research
Project: MURI for Human Decision Making (PI: J.C. Smith, 2003-2005), (PI: S. Sen, 2005 - 2008)
Duration: August 2003 - August 2008 ($4,200,000).
Responsibility: 20%

Air Force Office of Scientific Research
Project: Decomposition Algorithms for Very Large Scale Stochastic Integer Programs
Duration: May 2007 - December 2007 ($75,000).
Responsibility: 100%

National Science Foundation
Project: Workshop for Cyber-Enabled Discovery
Duration: Nov. 2007 – June 2008 ($10,000).
Responsibility: 100%

Honda of America Manufacturing
Project: Dashboard for Intelligent Collaborative Engineering
Duration: January 2008 - December 2008 ($152,000), includes $30,000 matching from Honda-OSU Partnership.
Responsibility: 100%
Contination: September 2009 – August 2010 ($110,000).

Public Utility Commission of Ohio
Project: Impact of Advanced Metering on demand and prices
Duration: June 2008 - May 2010 ($125,000).
Responsibility: 100%

Air Force Office of Scientific Research
Project: Models and Algorithms involving Very Large Scale Stochastic Integer Programs
Duration: February 2008 - December 2010 ($421,000).
Responsibility: 100%

DARPA-AT&T (CORONET Project)
Project: Stochastic Network Design (Subcontract from AT&T)
Duration: January 2008 - July 2011 ($68,000 – Phase II).
Responsibility: 100%

Air Force Office of Scientific Research
Project: Dynamic Stochastic Mixed-Integer Programming
Duration: February 2012 - 2013 ($110,000).
Responsibility: 100%

National Science Foundation
Project: Stochastic Multi-scale Optimization for Energy Resource Planning
Duration: July 2009 - June 2013 ($245,999).
Responsibility: 100%

National Science Foundation
Project: Stochastic mixed-integer optimization: Polyhedral theory, large-scale algorithms and computations (Co-PI: S. Küçükyavuz)
Duration: July 2011 - June 2014 ($230,000).
Responsibility: 50%

National Science Foundation
Project: OR as a Catalyst for NAE Grand Challenges
Duration: August 2012 - July 2013 ($25,000).
Responsibility: 100%

Air Force Office of Scientific Research
Project: Dynamic Stochastic Mixed-Integer Programming
Duration: February 2013- Dec. 2014 ($310,000).
Responsibility: 100%

Air Force Office of Scientific Research
Project: Statistical Optimality and Algorithms for Resilience
Duration: August 2015- Dec. 2018 ($400,000).
Responsibility: 100%

National Science Foundation
Project: Stochastic Nash Equilibrium Problems
Duration: August 2015 - July 2018 ($300,000).
Responsibility: 50%

National Science Foundation
Project: Stochastic Unit Commitment with Topology Control Recourse for Networks with High Penetration of Distributed Renewable Resources
Duration: August 2015 – July 2017 ($150,000).
Responsibility: 100%

Consulting and Software

Consultant to *AT&T, Bellcore, Diversified Engineering Inc., Frontline Systems, Honda, Modular Mining, Pinnacle West Capital Corporation, Public Utility Commission of Ohio, U.S. West Communications, United Airlines.*

Teaching

List of Courses (Arizona)

Undergraduate Courses (Book used in parenthesis)
(1) Computer Methods for Engineering (Yakowitz/Szidarovszky).
(2) Deterministic Operations Research (Winston).
(3) A Survey of Optimization Methods (Winston).
(4) Concepts in Communications Systems (Kurose/Ross, Bertsekas/Gallagher).
(5) Dynamical Systems Modeling (Scheinerman)

Graduate Courses (Book used in parenthesis)

(1) Linear Programming (Bertsimas)
(2) Foundations of Optimization (Bazaara, Sherali and Shetty)
(3) Nonlinear Programming Algorithms (Bertsekas)
(4) Distributed Algorithms (Lynch)
(5) Topics in Optimization (Boyd and Vandenberghe)
(6) Large Scale Optimization (Notes).

Contributions to University Teaching (Arizona)

(1) Applied Mathematics Brown Bag Lunch, 1990, 1994.
(2) ATRP Brown Bag Lunch, 1991.
(3) Applied Mathematics Case Studies Seminar, 1991, 1994, 1998.
(4) MIS Seminar, 1999.
(5) Statistics Seminar, 2002

List of Courses (Ohio State)

Undergraduate Courses (Book used in parenthesis)

(1) Integrated Systems Engineering (Scheinerman).

Graduate Courses (Book used in parenthesis)

(2) Linear Programming (Bertsimas)
(3) Foundations of Optimization (Bazaara, Sherali and Shetty)
(4) Nonlinear Programming Algorithms (Bertsekas)
(5) Stochastic Programming (Notes).

List of Courses (USC)

Graduate Courses (Book used in parenthesis)

(1) Foundations of Optimization (Bazaara, Sherali and Shetty)

Undergraduate Research Supervision

[1] J. Mai (funded thru NSF grant) 'Implementation of Stochastic Decomposition algorithms' (Sept. 1991 - 1993)
[2] C. Tomkins (ELITE student) 'Water Resources Case Study' (May 2001)

Graduate Research Supervision

My research program has involved a number of graduate students. As a measure of the quality of my students, it may be noted that several of my students (Sonia Vohnout, Jason Mai and Claire Tomkins) have been awarded NSF Graduate Fellowships. In addition, two students have been funded by European Governments to conduct graduate research under my supervision at Arizona.

Supervision of Exchange Students

[1] T.S. Sund (funded by Norwegian Govt.) (1993-94).
[2] G. Lulli (funded by Italian Govt.) (2001-2002).

M.S. Theses and Reports

[1] D.S. Yakowitz, 'Subgradient optimization methods for capacity expansion planning,' December 1983. (proceeded to finish a Ph.D at UA).
[2] A. Whiteson, 'A cone splitting algorithm for reverse convex programming,' July 1985. (proceeded to join Sandia Labs.)
[3] S. Bradley, `Multiplexing considerations in the design of intra-LATA networks,' August 1985. (proceeded to join AT&T Bell Labs.)
[4] F. Burstrom, 'Approximate methods for large scale fixed charge network flow problems,' August 1985. (proceeded to join AT&T Bell Labs)
[5] M.S. Dunatunga, `Successive two segment separable programming for large scale nonlinear minimax optimization,' December 1985. (proceeded to finish a Ph.D at UA)
[6] J. Gunn, 'Stochastic Decomposition,' May 1986. (proceeded to join Hughes)
[7] D. Rushall, 'Heuristics for 3-Dimensional Collision Avoidance,' May 1989. (proceeded to join General Dynamics)
[8] S.I. Vohnout, 'Heuristics for diverse routing in telecommunications networks,' May 1990. (proceeded to join IBM)
[9] L. Murthy, 'A Multiplexing and Cable Sizing Model for Tree Networks,' (June 1993). (employed with a software firm in Seattle)
[10] G. Cameron, 'A stochastic programming approach to network planning,' (Co-directed with J.L. Higle), December 1993.
[11] J. Mai (M.S.) 'Cellular Decomposition,' 1994. (joined Microsoft)
[12] R. Balasubramaniam (M.S.) 'Statistical Tests of Optimality for Stochastic Linear Programming,' 1996. (joined U.S. Air)
[13] I. Hapugoda (M.S.) 'Dynamic Interactive Planning and Simulation,' (2002).

Ph.D. Dissertations

[1] A. Rakshit (Ph.D) 'A Framework For Discrete-Time Dynamic Programming with Multiple Objectives,' October 1988. (Co-directed with L.D. Duckstein). (joined United Airlines)
[2] M.S. Dunatunga, (Ph.D) 'Stagewise methods for nondifferentiable dynamic optimization problems,' May 1990. (joined Univ. of Arizona)
[3] D.S. Yakowitz, (Ph.D) 'Stochastic Decomposition for Some Nonlinear Stochastic Programs,' Dec. 1990, (Co-directed with J.L. Higle). (joined U.S. Geological Service)
[4] M.S. Sodhi, (Ph.D.) 'Hierarchical Methods for Manufacturing Systems Design,' Feb.1991. (Co-directed with Ron Askin). (joined Univ. of Rhode Island)
[5] K.T. Au, (Ph.D.) 'Inexact Subgradient Methods,' March 1992, (joined Reliant Energy)
[6] J. Wu (Ph.D) 'A Sampling Based Stochastic Programming Algorithm and Its Application to Currency Option Hedging,' October 1996. (joined Fannie Mae)
[7] S. Shelby (Ph.D) 'Distributed Traffic Control,' December 2001. (joined Gardner Transportation Systems)
[8] G. Lulli (Ph.D) (Univ. of Rome), (S. Sen is the technical advisor.) (December 2002)

(joined Univ. of Milan, Italy)

[9] T. Genc (Ph.D, Economics) 'Economics of Restructuring in Electricity Markets,' (co-advised by S. Reynolds), December 2003. (joined Univ. of Guelph).

[10] L. Yu (Ph.D) 'Stochastic Optimization in Competitive Markets,' May 2004. (joined PPL Inc.)

[11] N. Lewis (Ph.D) 'Stochastic Combinatorial Optimization,' July 2004. (joined Texas A&M)

[12] Y. Xu (Ph.D) 'Distributed Systems Simulation,' August 2005. (currently at University of California)

[13] Y. Yang (Ph.D) 'Algorithms for Very Large Scale Stochastic Combinatorial Optimization,' (joined J.P. Morgan-Chase, March 2010)

[14] Z. Zhou (Ph.D) 'Multi-stage Stochastic Decomposition Algorithms' (May 2012)

[15] B.Y. Chen (Ph.D) 'Cutting Plane Trees and Extensions,' (May 2011, joined Cisco).

[16] Y. Qi (Ph.D) 'Stochastic Mixed-Integer Programming,' (August 2012, joined Hitachi).

[17] D. Gade (Ph.D) 'Algorithms and Reformulations for Large Scale Integer and Stochastic Integer Programs," (Co-advised with S. Kucukyavuz. August 2012, joined Iowa State, followed by Saber Technologies)

[18] H. Gangammannavar (Ph.D) 'Multi Time-scale Stochastic Optimization with Application to Integrating Renewable Resources into the Power Grid' (August 2013, joined USC)

[19] AVS. Praneeth (Ph.D) 'Prices in Wholesale Electricity Markets and Demand Response' January 2014, (joined Edison Mission Energy).

[20] Y. Liu (Ph. D) "Statistical Aspects of Stochastic Decomposition," (expected August 2015)

Post-doctoral/Visiting Scholar Supervision

[1] B. Rayco (Ph.D in ISE, Univ. of Florida), "Stochastic Scenario Decomposition," (1997-98). Currently at Modular Mining Systems.

[2] M. Casey (Ph.D in Math. Univ. of California-Davis), "Scenario Generation Algorithms," (2001-2002). Currently at Raytheon.

[3] J. Desai (Ph.D. in ISE, Virginia Tech.), "Survivable Network Design," (2005-2006). Currently at National University of Singapore

[4] K. Huang (Ph.D. in ISyE, Georgia Tech. "Re-sampling in Stochastic Programming," (2005-2006). Currently at McMaster University

[5] K. Shugang (Ph.D. in IE, Hong Kong University), "Dashboard for Intelligent Collaborative Engineering," (2007-2012).