

*Curriculum Vitae: January 4, 2006*

## **Jonathan Eckstein**

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### **Office Address (Undergraduate Teaching)**

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### **Home Address**

161 Longview Drive  
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**Date of Birth:** March 1, 1958

**Birthplace:** Boston, Massachusetts, USA

**Citizenship:** USA

## **Work Experience**

### **Rutgers Business School, Rutgers University, Piscataway NJ**

1995-present: Department of Management Science and Information Systems (MSIS). Full Professor July 2004-present (official rank "Professor I"). Associate Professor with tenure: July 1998-June 2004. Assistant Professor: July 1995-June 1998. Teach undergraduate and doctoral courses and pursue research in mathematical programming, operations research, parallel algorithms, and information systems. Member of RUTCOR (Rutgers Center for Operations Research). (Note: school was formerly called "Faculty of Management," and, prior to merger, "School of Business New Brunswick".)

### **Thinking Machines Corporation, Cambridge MA**

Scientist, July 1991-May 1995. Performed applied and theoretical research on parallel optimization algorithms, along with some consulting and sales support duties. Member of Mathematical Sciences Research Group until its dissolution in October 1994. Various consulting assignments 1995-1996.

### **Harvard University, Graduate School of Business, Boston MA**

Assistant professor, July 1989-June 1991. Taught at the MBA level and pursued research interests in mathematical programming and parallel computation.

### **Massachusetts Institute of Technology, Cambridge MA**

Research assistant, February 1984-September 1986. Developed optimization codes for network flow, integer programming decomposition, and Lagrangian branch-and-bound. Oversaw installation of Apollo and Macintosh computer networks. Purchased hardware and software, augmented system software, wrote a user manual, and created color graphics demonstration programs. Coordinated visiting faculty seminar series.

**Massachusetts Institute of Technology, Cambridge MA**

Part-time teaching assistant for operations management course, September 1984-December 1984.

**Xenergy Incorporated, Burlington MA**

Programmer/analyst, September 1980-August 1982, July 1983-January 1984. Designed, implemented and maintained a variety of software, including some very large packages. Formulated probabilistic models of energy use in buildings, and applied nonlinear optimization techniques to them. Worked on sample design for electric utility customer surveys. Supervised other computer programmers. Performed “energy audits” of commercial buildings. Occasionally acted as a mathematical and computational consultant 1984-1990.

**Stanford University, Stanford CA**

Full-time teaching assistant for engineering mathematics, September 1982-June 1983. Taught graduate students topics including computational linear algebra and both numerical and analytic methods for differential equations.

**System Dynamics Incorporated, Morristown NJ**

Microcomputer consultant and programmer, June 1978-August 1978, June 1979-August 1979. Analyzed microcomputer applications. Wrote firmware for point-of-sale terminal.

**Applied Data Research Incorporated, Princeton, NJ**

Programmer, June 1976-September 1976, June 1977-September 1977. Wrote assembly-language microprocessor firmware for telephone equipment. Wrote mainframe COBOL programs to process telephone data.

**Princeton University, Princeton NJ**

Research assistant/programmer, June 1975-July 1975. Helped analyze data on heat loss from residences.

**Awards/Honors/Fellowships/Grants**

2003 Thomas H. Mott, Jr. award for excellence in teaching, awarded by popular vote of graduating senior business majors, Rutgers University, New Brunswick.

NSF grant CCR-9902092, “Adaptable and Scalable Techniques for Branching Algorithms,” CISE directorate, August 1999-July 2002, extended through July 2004, \$239,967.

Rutgers University Board of Trustees Research Fellowship for Scholarly Excellence, awarded May 1998.

1996-1997 Lilly Endowment Teaching Fellow.

Fellowship from the MIT/Harvard/Brown Center for Intelligent Control 1988-1989.

Phi Beta Kappa, inducted June 1980.

*Magna cum laude* graduation honors, Harvard College, 1980.

## Education

### Massachusetts Institute of Technology, Cambridge MA

Ph.D. in operations research, June 1989. Thesis title: *Splitting Methods for Monotone Operators with Applications to Parallel Optimization*. Advisor: D. P. Bertsekas. Specialization/minor in computer science.

S.M. in operations research, June 1986. Thesis title: *Routing Methods for Twin-Trailer Trucks*. Advisor: Y. Sheffi.

### Stanford University, Stanford CA

Completed first academic year of two-year master's program in mechanical engineering, 1982-1983. Courses included: thermodynamics, fluid mechanics, solar engineering, and operations research.

### Harvard University, Cambridge MA

A.B. in mathematics, *magna cum laude*, June 1980. Phi Beta Kappa. Additional courses in physics, computer science, economics, urban planning, and various areas of art and history. Thesis title: *The Algebra of [Error-Correcting] Codes: An Introduction*. Advisor: A. Gleason.

## Publications (lead or sole author unless otherwise noted)

### Refereed Print Journals

“A Family of Projective Splitting Methods for the Sum of Two Maximal Monotone Operators,” with Benar F. Svaiter. *Mathematical Programming*, to appear.

“Double-Regularization Proximal Methods, with Complementarity Applications,” with Paulo J.S. Silva (lead author), *Computational Optimization and Applications*, to appear.

“Depth-Optimized Convexity Cuts,” with Mikhail Nediak, *Annals of Operations Research* 139: 95-129 (2005).

“Scheduling of Data Transcription in Periodically Connected Databases,” with Avigdor Gal (lead author) and Zachary Stoumbos, *Stochastic Analysis and Applications* 21(5):1021-1058 (2003).

“A Practical General Approximation Criterion for Methods of Multipliers Based on Bregman Distances,” *Mathematical Programming* 96(1):61-86 (2003).

“The Maximum Box Problem and its Application to Data Analysis,” with Peter L. Hammer, Ying Liu, Mikhail Nediak, and Bruno Simeone, *Computational Optimization and Applications* 23(3):285-298 (2002).

“Managing Periodically Updated Data in Relational Databases: A Stochastic Modeling Approach,” with Avigdor Gal (lead author), *Journal of the ACM*, 46(6):1141-1183 (2001).

“Rescaling and Stepsize Selection in Proximal Methods using Separable Generalized Distances,” with Paulo José da Silva e Silva (lead author) and Carlos Humes, Jr., *SIAM Journal on Optimization*, 12(1):238-261 (2001).

- “Smooth Methods of Multipliers for Complementarity Problems,” with Michael C. Ferris, *Mathematical Programming*, 86(1):65-90 (1999).
- “Approximate Iterations in Bregman-Function-Based Proximal Algorithms,” *Mathematical Programming*, 83(1):113-123 (1998).
- “Operator Splitting Methods for Monotone Affine Variational Inequalities, with a Parallel Application to Optimal Control,” with M. C. Ferris. *INFORMS Journal on Computing*, 10(2):218-235 (1998).
- “How Much Communication Does Parallel Branch and Bound Need?” *INFORMS Journal on Computing*, 9(1):15-29 (1997).
- “Distributed versus Centralized Storage and Control for Parallel Branch and Bound: Mixed Integer Programming on the CM-5,” *Computational Optimization and Applications*, 7(2):199-220 (1997).
- “Data-Parallel Implementations of Dense Simplex Methods on the Connection Machine CM-2,” with I. Boduroglu, L. Polymenakos, and D. Goldfarb. *ORSA Journal on Computing*, 7(4):402-416 (1995).
- “Parallel Branch-and-Bound Methods for Mixed-Integer Programming on the CM-5,” *SIAM Journal on Optimization*, 4(4):794-814 (1994).
- “Some Saddle-Function Splitting Methods for Convex Programming,” *Optimization Methods and Software*, 4:75-83 (1994).
- “Alternating Direction Multiplier Decomposition of Convex Programs,” *Journal of Optimization Theory and Applications*, 80(1):39-62 (1994).
- “Stochastic Dedication: Designing Fixed-Income Portfolios using Massively Parallel Benders Decomposition,” with R. S. Hiller (lead author), *Management Science*, 39(11):1422-1438 (1993).
- “The Alternating Step Method for Monotropic Programming on the Connection Machine 2,” *ORSA Journal on Computing*, 5(1):84-96 (1993).
- “Nonlinear Proximal Point Algorithms using Bregman Functions, with Applications to Convex Programming,” *Mathematics of Operations Research*, 18(1):202-226 (1993).
- “On the Douglas-Rachford Splitting Method and the Proximal Point Algorithm for Maximal Monotone Operators,” with D. P. Bertsekas. *Mathematical Programming*, 55(3):293-318 (1992).
- “Dual Coordinate Step Methods for Linear Network Flow Problems,” with D. P. Bertsekas (lead author), *Mathematical Programming*, 42(2):203-243 (1988).
- “Optimization of Group Line-Haul Operations for Motor Carriers Using Twin Trailers,” with Y. Sheffi. *Transportation Research Record*, 1120:12-23 (1987).

**Refereed Online Journals**

“YASAI: Yet Another Add-In for Teaching Elementary Monte Carlo Simulation in EXCEL,” with Steven T. Riedmueller, *INFORMS Transactions on Education* 2(2) (2002), <http://ite.informs.org/Vol2No2/EcksteinRiedmueller/>.

**Refereed Print Collections and Proceedings**

“PICO: An Object-Oriented Framework for Parallel Branch and Bound,” with Cynthia A. Phillips and William E. Hart, *Proceedings of the Workshop on Inherently Parallel Algorithms in Optimization and Feasibility and their Applications*, Haifa, March 2000, Studies in Computational Mathematics, Elsevier Scientific, Amsterdam, 219-265 (2001).

“Parallel Computing in Network Optimization,” with D. P. Bertsekas (lead author), D. Castañon, and S. A. Zenios. *Network Models*, M. O. Ball, T. L. Magnanti, C. L. Monma, and G. L. Nemhauser, eds., *Handbooks in Operations Research and Management Science* 7, Elsevier Scientific, Amsterdam, 331-399 (1995).

“Control Strategies for Parallel Mixed Integer Branch and Bound,” *Proceedings of Supercomputing '94*, IEEE Computer Society Press, Los Alamitos, CA, 41-48 (1994).

“Some Reformulations and Applications of the Alternating Direction Method of Multipliers,” with M. Fukushima, in *Large Scale Optimization: State of the Art*, W. W. Hager, D. W. Hearn, P. M. Pardalos, eds., Kluwer Academic, Dordrecht, 115-134 (1994).

**Refereed Electronic Proceedings**

“Arrival Rate Approximation by Nonnegative Cubic Splines (extended abstract),” with Farid Alizadeh (lead author), Nilay Noyan, and Gábor Rudolf. Proceedings of the IEEE Electro/Information Technology (EIT) Conference, Lincoln, NB, May 2005 (distributed on conference CD-ROM).

“Resource Management in a Parallel Mixed Integer Programming Package,” with William E. Hart and Cynthia Phillips, Intel Supercomputer Users Group Thirteenth Annual Conference, June 1997, <http://www.cs.sandia.gov/ISUG97/>.

**Papers under Review or in Process**

“Arrival Rate Approximation by Nonnegative Cubic Splines,” with Farid Alizadeh (lead author), Nilay Noyan, and Gábor Rudolf. Submitted to *Operations Research*, May 2005; reviews received August 2005, and revision in progress.

“Optimal Information Monitoring under a Politeness Constraint,” with Avigdor Gal and Sarit Reiner. Submitted to *INFORMS Journal on Computing*, May 2005; reviews received September 2005, and revision in progress.

“Pivot, Cut, and Dive: A Heuristic for Mixed 0-1 Integer Programming,” with Mikhail Nediak. Submitted to *Journal of Heuristics*, July 2004.

**Invited Non-Refereed Publications**

“Massively-Parallel Mixed-Integer Programming: Algorithms and Applications,” with William E. Hart, and Cynthia Phillips. In *Frontiers of Parallel Processing for Scientific Computing*, M.A.

Heroux, P. Raghavan, and H.D. Simon editors, to be published in SIAM book series on Software, Tools, and Environments (based on 11th SIAM Conference on Parallel Processing for Scientific Computing), to appear December 2005 or January 2006.

"Massively-Parallel Mixed-Integer Programming: Algorithms and Applications," with William E. Hart and Cynthia A. Phillips, in *Frontiers of Parallel Processing for Scientific Computing*, M. H. Heroux, P. Raghavan, and H. D. Simon, eds., SIAM book series on Software, Environments, Environments, and Tools (editor-in-chief J.J. Dongarra). To appear.

"Parallel Computing," *Encyclopedia of Operations Research and Management Science*, S. I. Gass and C. M. Harris, eds., Kluwer Academic, Boston, 483-485 (1996). Revised version in second edition (2001), 601-603.

"Parallel Branch-and-Bound Methods for Mixed Integer Programming," *SIAM News* 27(1):1,12-15 (1994). Updated version appears in the collection *Applications on Advanced Architecture Computers*, G. Astfalk, ed., SIAM, Philadelphia, 141-153 (1996).

"Large-Scale Parallel Computing, Optimization, and Operations Research: A Survey," *ORSA Computer Science Technical Section Newsletter* 14(2), 1, 8-12, 25-28 (1993).

"Distributed Asynchronous Relaxation Methods for Linear Network Flow Problems," with D. P. Bertsekas (lead author). *Automatic Control: World Congress, 1987*, R. Isermann, ed., Pergamon, Munich, 7:103-114 (1987).

### **Working Papers, Preprints, and Other Publications**

(Includes preprint versions of refereed/invited/submitted publications appearing above.)

"Optimal Information Monitoring under a Politeness Constraint," with Avigdor Gal and Sarit Reiner. RUTCOR Research Report RRR 16-2005, May 2005.

"Arrival Rate Approximation by Nonnegative Cubic Splines," with F. Alizadeh (first author), N. Noyan, and G. Rudolf. RUTCOR Research Report RRR 46-2004, December 2004. This report a much shorter and more condensed than the journal submission with the same title.

"Projective Splitting Methods for Pairs of Monotone Operators," with B.F. Svaiter, RUTCOR Research Report RRR 31-2003, August 2003.

"Double-Regularization Proximal Methods, with Complementarity Applications," with Paulo J.S. Silva (lead author), RUTCOR Research Report RRR 29-2003, August 2003. Revised September 2004.

"Depth-Optimized Convexity Cuts," with Mikhail Nediak. RUTCOR Research Report RRR 23-2003, May 2003. Revised November 2003.

"The Maximum Box Problem and its Application to Data Analysis," with Peter L. Hammer, Ying Liu, Mikhail Nediak, and Bruno Simeone. RUTCOR Research Report RRR 4-2002, January 2002.

“Pivot, Cut, and Dive: A Heuristic for Mixed 0-1 Integer Programming,” with Mikhail Nediak (lead author). RUTCOR Research Report RRR 53-2001, October 2001. Title change and very minor revisions, November 2001.

*YASAI (Yet Another Simulation Add-In) Version 1.0 User Guide*, with and Steven Riedmueller, <http://www.yasai.rutgers.edu/yasai-guide-10.html>, May 2001.

“YASAI: Yet Another Add-In for Teaching Elementary Monte Carlo Simulation in Excel,” with Steven T. Riedmueller, RUTCOR Research Report RRR 27-2001, April 2001.

“Scheduling of Data Transcription in Periodically Connected Databases,” with Avigdor Gal (lead author), RUTCOR Research Report RRR 25-2001, February 2001.

“A Practical General Approximation Criterion for Methods of Multipliers Based on Bregman Distances,” RUTCOR Research Report RRR 61-2000, December 2000.

Letter to the editor, *The New York Times*, December 10, 2000.

“PICO: An Object-Oriented Framework for Branch and Bound,” with Cynthia A. Phillips and William E. Hart. Report SAND2000-3000, Sandia National Laboratories, December 2000 (a slightly expanded version of RRR 40-2000 listed below).

“PICO: An Object-Oriented Framework for Parallel Branch and Bound,” with Cynthia A. Phillips and William E. Hart. RUTCOR Research Report RRR 40-2000, August 2000.

“Managing Periodically Updated Data in Relational Databases: A Stochastic Modeling Approach,” with Avigdor Gal (lead author). RUTCOR Research Report RRR 37-2000, July 2000.

“Rescaling and Step-size Selection in Proximal Methods using Separable Generalized Distances,” with Paulo José da Silva e Silva (lead author) and Carlos Humes Jr.. RUTCOR Research Report RRR 35-99, October 1999. Revisions: RRR 43-2000 September/November 2000, and RRR 17-2001, February 2001.

“Generalized Jacobians of Vector-Valued Convex Functions,” with Teemu Pennanen (lead author), RUTCOR Research Report RRR 6-97.

“Smooth Methods of Multipliers for Monotone Complementarity Problems,” RUTCOR Research Report RRR 27-96. Superseded by version joint with M. C. Ferris, with “monotone” deleted from title.

“Operator Splitting Methods for Monotone Affine Variational Inequalities, with a Parallel Application to Optimal Control,” with M. C. Ferris. Mathematical Programming Technical Report 94-17, Department of Computer Science, University of Wisconsin.

“Some Reformulations and Applications of the Alternating Direction Method of Multipliers,” with M. Fukushima, Nara Institute of Science and Technology, Graduate School of Information Science, information science technical report NAIST-IS-TR93002.

“Parallel Branch-and-Bound Methods for Mixed-Integer Programming on the CM-5,” Thinking Machines Corporation technical report TMC-257.

“Operator Splitting Methods for Monotone Linear Complementarity Problems,” with M. C. Ferris. Thinking Machines Corporation technical report TMC-239.

“Data-Parallel Implementations of Dense Linear Programming Algorithms,” with R. Qi, V. I. Ragulin, and S. A. Zenios. Thinking Machines Corporation technical report TMC-230. Decision Sciences Department report 92-05-06, The Wharton School, University of Pennsylvania. Army High Performance Computing Research Center preprint 92-078, University of Minnesota.

“Some Saddle-Function Splitting Methods for Convex Programming,” Thinking Machines Corporation technical report TMC-225.

“Alternating Direction Multiplier Decomposition of Convex Programs,” Thinking Machines Corporation technical report TMC-211.

“Stochastic Dedication: Designing Fixed-Income Portfolios using Massively Parallel Benders Decomposition,” with R. S. Hiller (lead author). Harvard Business School working paper 91-025.

“Note on Linear Programming” (teaching material). Publication Division, Harvard Business School, publication N9-191-085. Reproduced in *Decision Making under Certainty* by Arthur Schleifer, Jr. and David E. Bell, Course Technology/Duxbury Press, Cambridge, MA (1995).

“PPM Systems, Inc. — Resource Pricing” (case study teaching material). Publication Division, Harvard Business School, publication N9-191-079. Reproduced in *Decision Making under Certainty* by Arthur Schleifer, Jr. and David E. Bell, Course Technology/Duxbury Press, Cambridge, MA (1995).

“Implementing and Running the Alternating Step Method on the Connection Machine 2,” Harvard Business School working paper 91-005.

“Nonlinear Proximal Point Algorithms using Bregman Functions, with Applications to Convex Programming,” Harvard Business School working paper 91-004.

“An Alternating Direction Method for Linear Programming,” with D. P. Bertsekas. Harvard Business School working paper 90-063.

“On the Douglas-Rachford Splitting Method and the Proximal Point Algorithm for Maximal Monotone Operators,” with D. P. Bertsekas. Harvard/MIT/Brown Center for Intelligent Control Systems, report CICS-P-167, 1989, or Harvard Business School working paper 90-033.

“The Lions-Mercier Splitting Algorithm and the Alternating Direction Method are Instances of the Proximal Point Algorithm,” MIT Laboratory for Information and Decision Sciences report LIDS-P-1769.

## Scholarly Presentations

*Data Replicas, Nonhomogeneous Poisson Processes, and Optimization.* Department of Computer Science, University of São Paulo, Brazil, June 2005. Instituto Nacional de Matemática Pura e Aplicada (IMPA), Rio de Janeiro, Brazil, June 2005.

*Rounding Heuristics and Ramp-Up Procedures for Parallel MIP,* INFORMS Computing Society Conference, Annapolis, MD, January 2005. PAREO 2005 Meeting on Parallel Processing in Operations Research, Mont Tremblant, Quebec, January 2005. Department of Computer Science, University of São Paulo, Brazil, June 2005. Instituto Nacional de Matemática Pura e Aplicada (IMPA), Rio de Janeiro, Brazil, June 2005.

*Parallel MIP Branch and Bound with PICO: Ramp-Up and Heuristic Incorporation.* CORS-INFORMS International Meeting, Banff, Alberta, Canada, May 2004. DIMACS Reconnect Satellite Conference, Lafayette College, Easton, PA, June 2004.

*Pivot, Cut, and Dive: a Class of Heuristics for General MIP.* 18<sup>th</sup> International Symposium on Mathematical Programming, Lyngby, Denmark, August 2003.

*Pivot, Cut, and Dive Heuristics for General Mixed-Integer Programming.* Department of Mechanical and Industrial Engineering, University of Illinois at Urbana-Champaign, April 2003. Department of Industrial and Systems Engineering, Lehigh University, April 2003.

*Stochastic Models of Relational Database Activity.* Department of Mathematical Sciences seminar series in stochastic systems, Stevens Institute of Technology, Hoboken, NJ, March 2003.

*The PICO Package for Parallel Branch and Bound: Recent Developments.* INFORMS national meeting, San Jose, CA, November 2002.

*Pivot, Cut, and Dive: an Embarrassingly Parallel Heuristic for Mixed Integer Programming.* PAREO 2002 Meeting on Parallel Processing in Operations Research, Guadeloupe, France, May 2002.

*PICO: an Object-Oriented Toolbox for Parallel Branch and Bound.* PAREO 2002 Meeting on Parallel Processing in Operations Research, Guadeloupe, France, May 2002.

*PICO: a Massively Parallel Branch-and-Bound Toolbox.* Fields Institute workshop on Novel Approaches to Hard Discrete Optimization, University of Waterloo, April 2001.

“Integer Programming Lunch” presentation with Mikhail S. Nediak. IBM T.J. Watson Research Center, Yorktown Heights, NY, April 2001.

*The PICO Approach to Parallel Branch and Bound.* Operations Research and Financial Engineering Department, Princeton University, November 2000.

*PICO: an Object-Oriented Framework for Parallel Branch and Bound.* Mathematical Sciences seminar, IBM T.J. Watson Research Center, Yorktown Heights, NY, November 2000.

*The PICO Parallel Branch and Bound System.* 17<sup>th</sup> International Symposium on Mathematical Programming, Atlanta GA, August 2000.

*An Adaptable Parallel Toolbox for Branching Algorithms.* Johns Hopkins University Mathematical Sciences Department seminar, November 1999. (Note: this talk was considerably expanded and modified from the earlier talks with the same name listed immediately below.)

*An Adaptable Parallel Toolbox for Branching Algorithms.* International Symposium on Mathematical Programming, Lausanne, August 1997. INFORMS Computer Science Technical Section conference, Monterey, CA, January 1998.

*Smooth Methods of Multipliers for Complementarity Problems.* Department of Civil Engineering and Operations Research, Princeton University, February 1997. INFORMS national meeting, San Diego, CA, May, 1997. 16<sup>th</sup> International Symposium on Mathematical Programming, Lausanne, August 1997.

*Dual and Primal-Dual Formulations of Monotone Complementarity Problems.* RUTCOR “Brown Bag” seminar, Rutgers University, November 1996.

Member of discussion panel on tools for parallel combinatorial optimization. POC96 Parallel Optimization Colloquium, Versailles, March 1996.

*How Much Communication Does Parallel Branch and Bound Need?* INFORMS national meeting, New Orleans, LA, October/November 1995. INFORMS CSTS conference, Dallas, TX, January 1996. POC96 Parallel Optimization Colloquium, Versailles, March 1996.

*A Parallel Operator-Splitting Approach to Some Discrete-Time Optimal Control Problems.* INFORMS national meeting, New Orleans, LA, October/November 1995. INFORMS Computer Science Technical Section conference, Dallas, TX, January 1996. POC96 Parallel Optimization Colloquium, Versailles, March 1996.

*Central Versus Distributed Control in Parallel Mixed Integer Branch and Bound on the CM-5.* INFORMS national meeting, Los Angeles, CA, April 1995.

*Operator Splitting Methods and Monotone Affine Variational Inequalities.* MIT Optimization Day, Massachusetts Institute of Technology, April 1995.

*Splitting Methods and Affine Variational Inequalities, with a Parallel Application to Optimal Control.* Department of Computer Science and Operations Research, University of Montreal, January 1995. Mathematical Sciences Colloquium, Worcester Polytechnic Institute (Worcester, MA), February, 1995.

*Parallel Branch-and-Bound Techniques for General Mixed Integer Programming on the CM-5.* Department of Industrial and Systems Engineering, Georgia Institute of Technology, February, 1994. Department of Computational and Applied Mathematics, Rice University, Houston, TX, March 1994. DIMACS Workshop on Parallel Processing of Discrete Optimization Problems, Rutgers University, April 1994. Supercomputing Research Center, Bowie, MD, May 1994. 15th International Mathematical Programming Symposium, Ann Arbor, MI, August 1994. Department of Mathematical Sciences, Rensselaer Polytechnic Institute, September 1994. Centre

de Recherche sur les Transports, University of Montreal, October, 1994. Bellcore Applied Research Center, Morristown, NJ, November 1994. RUTCOR, Rutgers University, and Sandia National Laboratories, Albuquerque, NM, January 1995. Department of Industrial and Operations Engineering, University of Michigan, February 1995.

*Control Strategies for Parallel Mixed Integer Branch and Bound.* Supercomputing '94, Washington, DC, November 1994.

*Parallel Solution of Linear Programs via Nash Equilibria.* 15<sup>th</sup> International Mathematical Programming Symposium, Ann Arbor, MI, August 1994 (presentation time shared with M. Kallio).

*A Survey of Parallel Numerical Optimization and Operations Research Techniques on Connection Machines.* Department of Informatics, University of Karlsruhe (Germany), June 1994.

*Alternating Direction Methods for Optimization Problems in Operations Research: Theory and Practice.* Workshop on Decomposition and Parallel Computing Techniques for Large-Scale Systems, International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria, June 1994.

*An Alternating Direction Method for Convex Transportation Problems.* TIMS/ORSA national meeting, Boston, MA, April 1994.

*Asynchronous Branch-and-Bound Algorithms on the CM-5.* TIMS/ORSA national meeting, Phoenix, AZ, November 1993.

*Parallel Branch-and-Bound Methods for Mixed-Integer Programming on the CM-5.* Symposium on Parallel Optimization 3, University of Wisconsin, Madison, WI, July 1993.

*Highly Parallel Optimization in Operations Research: A Survey and Case Study.* USAir Operations Research Group seminar series, June 1993.

*Massively Parallel Linear and Mixed Integer Programming: A Survey.* TIMS/ORSA national meeting, Chicago, IL, May 1993.

*An Epigraphic Projection Method: Parallel Application of Douglas-Rachford Splitting to Block-Separable Convex Programming.* TIMS/ORSA National meeting, Chicago, IL, May 1993.

Member of discussion panel on future directions in parallel systems. DIMACS Workshop on Future Directions in Parallel Optimization, Rutgers University, April/May 1993.

*Remarks on Parallel Linear Programming.* DIMACS Workshop on Future Directions in Parallel Optimization, Rutgers University, April/May 1993.

*An Asynchronous Parallel Branch-and-Bound Procedure for Mixed Integer Programming on the CM-5 — Preliminary Results.* DIMACS Workshop on Future Directions in Parallel Optimization, Rutgers University, April/May 1993.

*The CM-5 Multiprocessor System and Parallel Numerical Optimization.* Graduate School of Industrial Administration, Carnegie-Mellon University, Pittsburgh, PA, April 1993.

*A Branch-and-Bound Method for Mixed Integer Programming on the CM-5.* Department of Computer Science, University of Wisconsin, Madison, March 1993.

*An Asynchronous Parallel Branch-and Bound Procedure for Mixed Integer Programming on the CM-5 — Preliminary Results.* Conference on Large Scale Optimization, University of Florida, Gainesville, February 1993.

*Progress in Linear and Mixed Integer Programming on Connection Machines.* ORSA/TIMS national meeting, San Francisco, CA, November 1992.

*Progress towards Massively Parallel Optimization.* Lecture for summer course 15.08s, “New Technologies for Decision Support,” Sloan School of Management, MIT, July 1992.

*Some Saddle-Function Splitting Methods for Convex Programming.* SIAM Conference on Optimization, Chicago, IL, May 1992.

*Progress Towards Massively Parallel LP Solvers on the Connection Machine.* TIMS/ORSA national meeting, Orlando, FL, April 1992.

*An Application of Massively Parallel Benders Decomposition and the Dense Simplex Method on the Connection Machine CM-2.* Mathematical Sciences Department, Rice University, February, 1992. Department of Industrial Engineering and Management Science, Northwestern University, March 1992.

*Bregman Function Methods for Convex Programming.* Department of Operations Research, Yale University, November, 1991.

*Managing Asset/Liability Portfolios via Stochastic Programming: Massively Parallel Benders' Decomposition on the Connection Machine CM-2.* TIMS/ORSA national meeting, Nashville, TN, May 1991.

*A Massively Parallel Alternating Step Method for Quadratic-Cost Generalized Network Problems: Computational Experience on the Connection Machine 2.* TIMS/ORSA national meeting, Nashville, TN, May 1991.

*A Splitting Method for Parallel Network Optimization on the Connection Machine.* Brown University, department of applied Mathematics, February 1991.

*Stochastic Portfolio Optimization: Massively Parallel Benders Decomposition.* MIT Operations Research Center, November 1990 (presentation time shared with R. S. Hiller).

*Nonlinear Proximal Point Algorithms using Bregman Functions, with Applications to Convex Programming.* ORSA/TIMS national meeting, Philadelphia, PA, October 1990.

*The Alternating Step Method for Linear Programming and Its Adventures on the CM-2.* Thinking Machines Corp., Cambridge, MA, February 1990.

*Implementing the Alternating Step Method on the Connection Machine.* ORSA/TIMS national meeting, New York, NY, October 1989.

*Operator Splitting and Parallel Methods for Linear Programming.* Third SIAM Conference on Optimization, Boston, MA, April 1989.

*A Parallel Method for Linear Programming, as Applied to Networks.* ORSA/TIMS national meeting, Denver, CO, October 1988.

*Efficient Use of Twin-Trailer Trucks.* TIMS/ORSA national meeting, Los Angeles, CA, April 1986.

### **Graduate Student Research Supervision and Dissertation Committees**

March 2003-present: dissertation committee of Miguel Lejeune, doctoral student, Management Science, Business School, Rutgers University (principal advisor: Andrzej Ruszczyński).

July 2003-September 2003: dissertation evaluator for Maknoun Zaknoon, doctoral student, mathematics, University of Haifa (principal advisor: Yair Censor).

September 2001-present: supervising research assistantship for Konrad Borys, RUTCOR doctoral student. Work involves C++ implementation improvements to the PICO parallel branch-and-bound software library.

May 2000-September 2002: doctoral dissertation supervisor for Mikhail Nediak, RUTCOR doctoral student. Thesis concerned heuristic methods for general mixed integer programming, both in isolation and combined with branch and bound, along with a general theory of convexity/intersection cuts. Ph.D. awarded October 1, 2002.

May 2000-June 2003: in collaboration with other RUTCOR faculty, supervised Mikhail Nediak and Ying Liu's research on the maximum box problem for data analysis.

January 2001-present: dissertation committee of Yu Xia, doctoral student, Management Science, Business School, Rutgers University (principal advisor: Farid Alizadeh).

July 1999-December 2000: Paulo José da Silva e Silva, doctoral student, Applied Mathematics, University of São Paulo. Visited RUTCOR under my supervision July 1999-December 1999, working on proximal algorithms for nonlinear programming and variational inequalities.

September 1996-June 1997: Teemu Pennanen, RUTCOR doctoral student. Supervised research in various topics relating to convex analysis and monotone operators.

April 1997: David Rader, RUTCOR doctoral student. Served on dissertation reading committee.

September 1994-May 1997: I. Ilkay Boduroglu, Columbia IE/OR doctoral student. Assisted D. Goldfarb in supervising research on parallel simplex algorithms. Served on dissertation committee.

Summer 1993: Lazaros Polymenakos, MIT Electrical Engineering doctoral student. Supervised work on parallel simplex algorithms.

### **Undergraduate Student Independent Study Projects and Supervision**

September 2005-December 2005: Eric Duelfer, Rutgers University undergraduate student, MSIS department. Independent study in elementary JAVA programming.

January 2005-May 2005: George Dyer, Rutgers University undergraduate student, MSIS department. Project to complete addition of graphics capability to YASAI. Created “installer” application for YASAI.

January 2003-May 2003: Philip Fickas, Rutgers University undergraduate student, MSIS department. Project to add graphics capability to YASAI.

January 2002-May 2002: Justin Sarnak, Rutgers University undergraduate student, MSIS department. Added improved random number generator and made other enhancements to YASAI software.

September 2001-January 2002: Hesham Osman, Rutgers University undergraduate student, MSIS department. Supervised independent study program to continue development of YASAI software.

June 2000-May 2001: Steven Riedmuller, Rutgers University undergraduate, Livingston College honors program and MSIS department. Supervising senior honors project to write YASAI, spreadsheet-based simulation software to replace “@Risk” in School of Business computer lab.

### **Courses Taught**

*Advanced Operations Management.* Business School, Rutgers University, New Brunswick, NJ, Fall 2005. Required course for undergraduate MSIS seniors. Topics include inventory modeling, decision trees, critical fractile analysis, deterministic and stochastic dynamic programming, queuing, and simulation.

*Operations Management.* Business School, Rutgers University, New Brunswick, NJ. Taught most semesters Fall 1996-Spring 2005. Required course for undergraduate business majors (mostly juniors), stressing introductory management science concepts, including linear programming modeling, integer programming modeling, and stochastic simulation. Redesigned curriculum to improve focus and, increase use of computers, and employ spreadsheet modeling. Appointed course coordinator in Fall 1997. Developed extensive course materials that completely replaced textbook by Fall 2003. Acted as liaison with computer science department on content of CS 170, a prerequisite course. Devised “Excel proficiency exam” for certain students entering the business school.

*Nonlinear Programming,* Business School, Rutgers University, Spring 1998, Spring 1999. Theoretical doctoral course on nonlinear optimization algorithms, with students from management science, operations research, mathematics, and electrical engineering programs.

*Management Information Systems.* Business School, Rutgers University, New Brunswick, NJ, Fall 1995, Spring 1996, Fall 2004, Fall 2005. Required course for business majors (mostly juniors) stressing relational database design, database software, and the role of information technology in the firm.

*Managerial Economics.* Harvard University, Graduate School of Business, September 1989-January 1990, November 1990-March 1991. Required first-year MBA course stressing quantitative methods, including linear programming, decision analysis, linear regression, and some game theory (also included elementary stochastic simulation in the 89-90 school year).

For experience as a teaching assistant, see “Work Experience” above.

## Professional Service and Miscellaneous

### Journal Service:

- Member of editorial board of *Computational Optimization and Applications*, April 1996-present.
- Associate editor of *Mathematical Programming* (Series B), March 1995-September 2000.
- Associate editor for *Operations Research*, computing and decision technologies, January 1996-October 1999.

### Conference Organization:

- Program committee of SCOOP conference (subset of IPPS '97), Geneva, Switzerland, April 1997.
- Organized four sessions for 16<sup>th</sup> International Mathematical Programming Symposium, Lausanne, Switzerland (three co-organized with Martin Savelsbergh), August 1997.
- Organized session for INFORMS CSTS Conference, Monterey, CA, January 1998.
- Cluster chair for Parallel Computing, 17<sup>th</sup> International Mathematical Programming Symposium, Atlanta, GA (organized four sessions), August 2000.
- Organizing committee member for PAREO 2002, Third meeting of the PAREO European working group on Parallel Processing in Operations Research, Guadeloupe, May 2002.
- Organized two sessions for 18<sup>th</sup> International Symposium on Mathematical Programming, Lyngby, Denmark, August 2003.

### Referee for:

- *Abstract and Applied Analysis*
- *Annals of Operations Research*
- *Applied Mathematics and Optimization*
- *Applied Mathematics Letters*
- *Applied Nonlinear Analysis*
- *Asian Pacific Journal of Operational Research*
- *Byte*
- *Computational Optimization and Applications*
- *The Computer Journal*
- *Computers and Operations Research*
- *Discrete Applied Mathematics*
- *ESAIM: Control, Optimization, and Calculus of Variations*
- *European Journal of Operational Research*

- *INFORMS/ORSA Journal on Computing*
- *Investigación Operativa*
- *Journal of Combinatorial Optimization*
- *Journal of Convex Analysis*
- *Journal of Mathematical Analysis and Applications*
- *Journal of Optimization Theory and Applications*
- *Journal of Parallel and Distributed Computing*
- *Management Science*
- *Mathematical Programming*
- *Mathematics of Operations Research*
- *Nonlinear Analysis*
- *Numerical Algorithms*
- *Operations Research Letters*
- *Optimization*
- *Parallel Computing*
- *SIAM Journal on Control and Optimization*
- *SIAM Journal on Optimization*
- SIAM book acquisitions
- Numerous conference proceedings
- Various NSF proposals

**National Science Foundation**

- January 2002 panel member, Optimization group for Numeric, Symbolic, and Geometric computation area, Computer and Communication Research directorate.

**Professional Society Memberships:**

- SIAM
- Mathematical Programming Society
- Full member of INFORMS (formerly of ORSA).

**Professional Society Service:**

- Elected to INFORMS/ORSA Computer Science Technical Section (CSTS) board 1994-1996.
- Chair of 1995 INFORMS/CSTS prize committee.
- Member of 2001 INFORMS prize committee for best paper by a young researcher.
- Member from inception in August 1998-present, PAREO: Association of European Operational Research Societies working group on Parallel Processing in Operations Research.
- Chair of 2004 INFORMS Computing Society (ICS) prize committee.
- Member, site selection committee for ISMP (International Symposium on Mathematical Programming) 2009

**University Service**

- Member of various Rutgers Business School and departmental committees, including appointments and promotions 2004-2005.
- Rutgers University 2004-2005 President's undergraduate task force on undergraduate education, curriculum subcommittee. Proposed sweeping changes to undergraduate core curriculum for Rutgers' New Brunswick campus.

## Miscellaneous

- Sufficient knowledge of French to comprehend technical papers.
- Amateur jazz saxophonist and guitarist.
- Regular fundraiser for NAAR, the National Alliance for Autism Research

## Computer Skills (Partial Listing)

**Operating Systems:** UNIX/Linux (including some minimal system administration experience), Various versions of Microsoft Windows, MacOS, VAX/VMS.

**Languages:** C++, C, JavaScript, various flavors of FORTRAN, Pascal, various dialects of LISP, various dialects of BASIC including Visual Basic, shell scripting, MATLAB, AWK, assembly language for various processors, various SNOBOL dialects.

**Applications:** All Microsoft Office components including Access and FrontPage, FrameMaker, EMACS, CPLEX, AMPL, LaTeX, Netscape, X tools.

## References

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