

*Curriculum Vitae*  
**Robert Fourer**

**Current position**

Professor of Industrial Engineering and Management Sciences  
Northwestern University  
Evanston, Illinois 60208-3119, U.S.A.

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**Education**

Ph.D. in Operations Research, Stanford University (1980)

Dissertation Advisor: George B. Dantzig

M.S. in Statistics, Stanford University (1979)

M.S. in Operations Research, Stanford University (1979)

B.S. in Mathematics, M.I.T. (1972)

**Professional employment**

Northwestern University, Department of Industrial Engineering and Management Sciences, Evanston, IL: chair (1989–1995); professor (1993–), associate professor (1985–1993); assistant professor (1979–1985)

AT&T Bell Laboratories, Computing Science Research Center, Murray Hill, NJ: visiting member of technical staff (1985–1986 and 1995–1996)

National Bureau of Economic Research, Cambridge, MA: research analyst in mathematical programming (1974–1977)

Intermetrics, Inc., Cambridge, MA: technical writer and staff engineer (1973–1974)

## **Awards**

2004 INFORMS Fellow Award, for significant contributions to the advancement of operations research and the management sciences.

2004 Medallion Award of the Institute of Industrial Engineers, in recognition of activities that have made a notable impact on the industrial engineering profession.

2003 Beale-Orchard-Hays Prize for Excellence in Computational Mathematical Programming (with E.D. Dolan, J.J. Moré and T.S. Munson), awarded by the Mathematical Programming Society for “Optimization on the NEOS Server.”

2002 John Simon Guggenheim Memorial Foundation Fellowship, to support studies of languages and systems for large-scale optimization.

1993 ORSA/CSTS Prize (with D.M. Gay and B.W. Kernighan), awarded by the Computer Science Technical Section of the Operations Research Society of America, for writings on the design of mathematical programming systems and the AMPL modeling language.

## **Books and edited volumes**

Robert Fourer, David M. Gay and Brian W. Kernighan, *AMPL: A Modeling Language for Mathematical Programming*. Duxbury Press, Belmont, CA (first edition 1993, second edition 2003).

Collette Coullard, Robert Fourer and Jonathan H. Owen, eds., “Modeling Languages and Systems.” *Annals of Operations Research* **104**, Kluwer Academic Publishers (April 2001).

## **Refereed articles**

*Under revision:*

R. Fourer, H.I. Gassmann, J. Ma, and R.K. Martin, “An XML-Based Schema for Stochastic Programs.” In final revision for *Annals of Operations Research*.

Robert Fourer and Leonardo B. Lopes, “StAMPL: A Filtration-Oriented Modeling Tool for Stochastic Programming.” In third revision for *INFORMS Journal on Computing*.

P. Valente, G. Mitra, M. Sadki and R. Fourer, “Extending Algebraic Modelling Languages for Stochastic Programming.” In second revision for *INFORMS Journal on Computing*.

*To appear:*

Elizabeth D. Dolan, Robert Fourer, Jean-Pierre Goux, Todd S. Munson and Jason Sarich, “Kestrel: An Interface from Optimization Modeling Systems to the NEOS Server.” Forthcoming in *INFORMS Journal on Computing*.

Robert Fourer, Jun Ma and Kipp Martin, “OSiL: An Instance Language for Optimization.” Forthcoming in *Computational Optimization and Applications*.

## Refereed articles (continued)

### Published:

Goutam Dutta, Robert Fourer, Akhilesh Majumdar, and Debabrata Dutta, “An Optimization-Based Decision Support System for Strategic Planning in a Process Industry: the Case of a Pharmaceutical Company in India.” *International Journal of Production Economics* **106** (2007) 92–103.

Robert Fourer and Leo Lopes, “A Management System for Decompositions in Stochastic Programming.” *Annals of Operations Research* **142** (2006) 99–118.

Robert Fourer, Leo Lopes and Kipp Martin, “LPFML: A W3C XML Schema for Linear and Integer Programming.” *INFORMS Journal on Computing* **17** (2005) 139–158.

A. Nareyek, R. Fourer, E.C. Freuder, E. Giunchiglia, R.P. Goldman, H. Kautz, J. Rintanen and A. Tate, “Constraints and AI Planning.” *IEEE Intelligent Systems* **20** (2005) 62–72.

Goutam Dutta and Robert Fourer, “An Optimization-Based Decision Support System for Strategic and Operational Planning in Process Industries.” *Optimization and Engineering* **5** (2004) 295–314.

Robert Fourer and David M. Gay, “Extending an Algebraic Modeling Language to Support Constraint Programming.” *INFORMS Journal on Computing* **14** (2002) 322–344.

Omar B. Sawaya, Dung Le Doan, Athanasios Ziliaskopoulos and Robert Fourer, “Multistage Stochastic System Optimum Dynamic Traffic Assignment Program with Recourse for Incident Traffic Management.” *Transportation Research Record* **1748** (2001) 116–124.

Robert Fourer and Jean-Pierre Goux, “Optimization as an Internet Resource.” *Interfaces* **31**, 2 (2001) 130–150.

Robert Fourer and David M. Gay, “Hooking a Constraint Programming Solver to an Algebraic Modeling Language.” *Proceedings of the 3rd International Workshop on Integration of AI and OR Techniques in Constraint Programming for Combinatorial Optimization Problems*, Ashford, United Kingdom (2001).

Goutam Dutta and Robert Fourer, “A Survey of Mathematical Programming Applications in Integrated Steel Plants.” *Manufacturing & Service Operations Management* **3** (2001) 387–400.

Robert Fourer and David M. Gay, “Conveying Problem Structure from an Algebraic Modeling Language to Optimization Algorithms.” In *Computing Tools for Modeling, Optimization and Simulation: Interfaces in Computer Science and Operations Research*, M. Laguna and J.L. González Velarde, eds., Kluwer Academic Publishers (2000) 75–89.

Michael C. Ferris, Robert Fourer and David M. Gay, “Expressing Complementarity Problems in an Algebraic Modeling Language and Communicating Them to Solvers.” *SIAM Journal on Optimization* **9** (1999) 991–1009.

**Refereed articles** (*continued*)

Joseph Czyzyk, Robert Fourer and Sanjay Mehrotra, "Using a Massively Parallel Processor to Solve Large Sparse Linear Programs by an Interior-Point Method." *SIAM Journal on Scientific Computing* **19** (1998) 553–565.

Robert Fourer, "Extending a General-Purpose Algebraic Modeling Language to Combinatorial Optimization: A Logic Programming Approach." In *Advances in Computational and Stochastic Optimization, Logic Programming, and Heuristic Search: Interfaces in Computer Science and Operations Research*, D.L. Woodruff, ed., Kluwer Academic Publishers (1998) 31–74.

Robert Fourer, "Predictions for Web Technologies in Optimization." *INFORMS Journal on Computing* **10** (1998) 388–389.

Robert Fourer, "Database Structures for Mathematical Programming Models." *Decision Support Systems* **20** (1997) 317–344.

J.J. Bisschop and Robert Fourer, "New Constructs for the Description of Combinatorial Optimization Problems in Algebraic Modeling Languages." *Computational Optimization and Applications* **6** (1996) 83–116.

Collette Coullard and Robert Fourer, "Algebraic, Logical and Network Representations in the Design of Software for Combinatorial Optimization." *Proceedings of the 29th Hawaii International Conference on System Sciences*, Volume II: Decision Support and Knowledge-Based Systems, IEEE Computer Society Press (1996) 407–417.

Joseph Czyzyk, Robert Fourer and Sanjay Mehrotra, "A Study of the Augmented System and Column-Splitting Approaches for Solving Two-Stage Stochastic Linear Programs by Interior-Point Methods." *ORSA Journal on Computing* **7** (1995) 474–490.

Robert Fourer and David M. Gay, "Expressing Special Structures in an Algebraic Modeling Language for Mathematical Programming." *ORSA Journal on Computing* **7** (1995) 166–190.

Robert Fourer and David M. Gay, "Experience with a Primal Presolve Algorithm." In *Large Scale Optimization: State of the Art*, W.W. Hager, D.W. Hearn and P.M. Pardalos, eds., Kluwer Academic Publishers (1994) 135–154.

Robert Fourer and Sanjay Mehrotra, "Solving Symmetric Indefinite Systems in an Interior-Point Method for Linear Programming." *Mathematical Programming* **62** (1993) 15–39.

Robert Fourer and Roy E. Marsten, "Solving Piecewise-Linear Programs: Experiments with a Simplex Approach." *ORSA Journal on Computing* **4** (1992) 16–31.

Robert Fourer, "A Simplex Algorithm for Piecewise-Linear Programming, III: Computational Analysis and Applications." *Mathematical Programming* **53** (1992) 213–235.

Robert Fourer, David M. Gay and Brian W. Kernighan, "A Modeling Language for Mathematical Programming." *Management Science* **36** (1990) 519–554.

### **Refereed articles** (*continued*)

Robert Fourer, “A Simplex Algorithm for Piecewise-Linear Programming, II: Finiteness, Feasibility and Degeneracy.” *Mathematical Programming* **41** (1988) 281–315.

Robert E. Bixby and Robert Fourer, “Finding Embedded Network Rows in Linear Programs I: Extraction Heuristics.” *Management Science* **34** (1988) 342–376.

Robert Fourer, “A Simplex Algorithm for Piecewise-Linear Programming, I: Derivation and Proof.” *Mathematical Programming* **33** (1985) 204–233.

Robert Fourer, “Staircase Matrices and Systems.” *SIAM Review* **26** (1984) 1–70.

Robert Fourer, “Modeling Languages versus Matrix Generators for Linear Programming.” *ACM Transactions on Mathematical Software* **9** (1983) 143–183.

Robert Fourer, “Solving Staircase Linear Programs by the Simplex Method, 2: Pricing.” *Mathematical Programming* **25** (1983) 251–292.

Robert Fourer, “Solving Staircase Linear Programs by the Simplex Method, 1: Inversion.” *Mathematical Programming* **23** (1982) 274–313.

Robert Fourer, Judith B. Gertler and Howard J. Simkowitz, “Optimal Fleet Sizing and Allocation for Improved Rail Service in the Northeast Corridor.” *Transportation Research Record* **656** (1978) 40–45.

Robert Fourer, Judith B. Gertler and Howard J. Simkowitz, “Models of Railroad Passenger-Car Requirements in the Northeast Corridor.” *Annals of Economic and Social Measurement* **6** (1977) 367–398.

### **Invited articles** (*selected*)

Robert Fourer, “Software Survey: Linear Programming.” *OR/MS Today* **34**, 3 (June 2007) 42–43, 50–51.

Robert Fourer, “Software Survey: Linear Programming.” *OR/MS Today* **32**, 3 (June 2005) 46–47, 54–55.

Robert Fourer, David M. Gay and Brian W. Kernighan, “Design Principles and New Developments in the AMPL Modeling Language.” In *Modeling Languages in Mathematical Optimization*, J. Kallrath, ed., Kluwer Academic Publishers (2004) 105–135.

Robert Fourer, “2003 Software Survey: Linear Programming.” *OR/MS Today* **30**, 6 (December 2003) 34–35, 42–43.

Robert Fourer and David M. Gay, “Numerical Issues and Influences in the Design of Algebraic Modeling Languages for Optimization.” *Proceedings of the 20th Biennial Conference on Numerical Analysis*, Dundee, Scotland, D.F. Griffiths and G.A. Watson, eds., University of Dundee Numerical Analysis Report NA/217 (2003).

Elizabeth D. Dolan, Robert Fourer, Jorge J. Moré and Todd S. Munson, “Optimization on the NEOS Server.” *SIAM News* **35**, 6 (July/August 2002), 4, 8–9.

Robert Fourer, “Linear Programming: 2001 Software Survey.” *OR/MS Today* **28**, 4 (August 2001) 58–59, 68.

Robert Fourer, “OR Counterparts to AI Planning.” *Constraints and AI Planning: Papers from the AAAI Workshop*, Tech. Report WS-00-02 (AAAI Press, 2000) 1–6.

## **Dissertations supervised**

Jun Ma, 2005: “Optimization Services”

Leonardo B. Lopes, 2003: “Modeling Stochastic Optimization: from Idea to Instance”

Goutam Dutta, 1996: “A Multi-Period Optimization-Based Decision Support System for Strategic and Operational Planning”

Arthur C. Hsu, 1996: “Exploiting Network Structure for Solving Large-Scale Linear Programming Models” — *This work took 2nd place in competitions for the Nicholson Student Paper Prize and for the Dantzig Dissertation Award.*

Joseph J. Czyzyk, 1994 (with S. Mehrotra): “Parallel Solution of Linear and Stochastic Programs by Interior-Point Methods”

Kyu Ho Ahn, 1984 (with R.E. Bixby): “Algorithms for Identification of Embedded Networks and Specialized Simplex Methods for Embedded-Network Linear Programs”

Joelle Y. Assous, 1983: “Bounds on Network Reliability”

## **Research funding**

*LogicBlox, Inc.* (2007-2008, \$13,000): “An Algebraic Modeling Language Based on Datalog” (with D. Klabjan)

*IBM Corporation* (2006-2007, \$20,000): “2005 IBM Faculty Award”

*National Science Foundation* (2004–2007, \$150,342): “STTR Phase II: Integrated Software and Systems for Large-Scale Nonlinear Optimization” (with J. Nocedal and R. Waltz), subcontract from Ziena Optimization Inc.

*Argonne National Laboratory* (2004–2008, \$518,602): “Toolkit for Advanced Optimization and Network-Enabled Optimization Systems”

*National Science Foundation* (2003–2007, \$374,969; supplement \$17,820): “Next-Generation Servers for Optimization as an Internet Resource” (with J.J. Moré)

*National Science Foundation* (2003, \$99,994): STTR Phase I: “Integrated Software and Systems for Large-Scale Nonlinear Optimization” (with J. Nocedal and R. Waltz), subcontract from Ziena Optimization Inc.

*National Science Foundation* (2000–2003, \$468,359; software capitalization supplement \$23,765): “Information Technology Research: Advanced Application Service Provider Technologies for Large-Scale Optimization” (with J.J. Moré)

*Sun Microsystems, Inc.* (1999, \$63,870): Computing equipment for “Optimization as a Network Resource”

*ILOG S.A.* (1999, \$30,122): “Complex Mathematical Programming Applications”

*National Science Foundation* (1998–2001, \$339,248): “General-Purpose Modeling Environments for Discrete Optimization” (with C.R. Coullard)

*Armco, Inc.* (1995–96, \$25,000): “A Multi-Period Optimization Based Decision Support System for Steel Production Planning”

### **Research funding** (*continued*)

*National Science Foundation* (1994–98, \$239,993): “General-Purpose Modeling Environments for Discrete Optimization” (with C.R. Coullard)

*National Science Foundation* (1994–95, \$37,580): “Engineering Research Equipment: A Multi-Processor Computing Facility for Large-Scale Optimization” (with S. Mehrotra and D. Simchi-Levi)

*American Iron and Steel Institute* (1993–95, \$48,020): “A Multi-Period Optimization Model for Manufacturing Strategy in the U.S. Steel Industry”

*Office of Naval Research* (1993–94, \$90,120): “Large-Scale Computational Techniques in Interior-Point Methods for Mathematical Programming” (with S. Mehrotra)

*American Iron and Steel Institute* (1990–91, \$13,000): “A Long-Range Strategic Technical Plan for Intelligent Processing in the Steel Industry” (with M.F. Tuite)

*National Science Foundation* (1989–91, \$119,985): “Aspects of the Structure Problem in Linear Programming” and “Design of Model Management Systems for Large-Scale Optimization” (combined grant)

*American Iron and Steel Institute* (1989–90, \$80,000): “An Optimization Model for Strategic Planning in the Steel Industry”

*Apple Computer* (1988, approximately \$20,000): “Computing Equipment for Manufacturing Strategy in the U.S. Steel Industry” (with M.F. Tuite)

*National Science Foundation* (1986–87, \$47,000): “Scientific Computing Equipment for the Mathematical Sciences” (with A. Bayliss, T. Erneux, M.J. Miksis, J. Nocedal and B.J. Sullivan)

*National Science Foundation* (1985–88, \$42,380): “Studies in Monotropic Optimization and Embedded-Network Linear Programming”

*National Science Foundation* (1983–85, \$32,570): “Simplex Methods for Piecewise-Linear Programming”

*Exxon Corporation* (1981, \$20,000): “Embedded-Network Linear Programming” (with R.E. Bixby)

*U.S. Department of Transportation* (1976, \$13,000): “Models for Railroad Passenger-Car Requirements in the Northeast Corridor,” contract to the National Bureau of Economic Research

### **Web sites**

“AMPL: A Modeling Language for Mathematical Programming,” [www.ampl.com](http://www.ampl.com)

“Linear/Nonlinear Programming Frequently Asked Questions,”

[www-unix.mcs.anl.gov/otc/Guide/faq/linear-programming-faq.html](http://www-unix.mcs.anl.gov/otc/Guide/faq/linear-programming-faq.html),

[www-unix.mcs.anl.gov/otc/Guide/faq/nonlinear-programming-faq.html](http://www-unix.mcs.anl.gov/otc/Guide/faq/nonlinear-programming-faq.html)

“Network-Enabled Optimization System (NEOS) Server,” [neos.mcs.anl.gov](http://neos.mcs.anl.gov)

## **Entrepreneurial activities**

### *Companies co-founded:*

AMPL Optimization LLC ([www.ampl.com](http://www.ampl.com)), developer of the AMPL modeling language and system

Ziena Optimization, Inc. ([www.ziena.com](http://www.ziena.com)), developer of the KNITRO package for large-scale nonlinear optimization

### *Consulting:*

Abbott Laboratories, Abbott Home Care Division, Lake Bluff, IL (1984–1985)

Accenture, Chicago, IL (2001–2002)

AT&T Advanced Decision Support Systems Division, Whippany, NJ (1988–1989)

Bell Laboratories division of Lucent Technologies (and predecessor AT&T Bell Laboratories), Murray Hill, NJ (1986–2001)

Communications and Computer Science Department, Exxon Corporation, Florham Park, NJ (1981)

Geneva Steel, Provo, UT (1989)

Goldman Sachs & Company, New York, NY (1993–2002)

Keebler Company, Elmhurst, IL (1981–1983)

Kraft Foods, Glenview, IL (1994–1995)

Paragon Decision Technology B.V., Haarlem, Netherlands (2003)

Sears, Roebuck and Company, Sears Merchandise Group, Chicago, IL (1985–1988)

## **Professional activities**

### *Elective positions:*

COIN-OR (Computational INfrastructure for Operations Research) Foundation: Strategic Leadership Board (2005–present)

INFORMS Computing Society (previously Computer Science Technical Section): vice chair (1995–96), chair (1996–97), board of directors (2001–2004)

Mathematical Programming Society: council member-at-large (1994–1997)

### *Appointed positions:*

Co-director (with J. Moré), Optimization Technology Center of Northwestern University and Argonne National Laboratory (2000–2004)

### *Memberships:*

Association for Computing Machinery

Institute for Operations Research and the Management Sciences

Institute of Industrial Engineers

Mathematical Programming Society

Society for Industrial and Applied Mathematics

**Professional activities** (*continued*)

*National Science Foundation proposal review panel service:*

Computer & Information Science & Engineering Directorate (2006)

Operations Research and Production Systems Program (1994, 1996, 2000, 2002)

Office of Cyberinfrastructure (2005, 2006)

Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Programs, phase I (2002, 2005) & phase II (2006)

*National Science Foundation invited workshop participation:*

Workshop on Engineered Systems Enabled by Cyber-Infrastructure (2006)

Workshop on EXchanging CyberInfrastructure Themes in Engineering Design (2005)

Multi-Disciplinary Workshop at the Interface of Cyberinfrastructure and Operations Research, with Enterprise-Wide Applications, co-organizer (2004)

Sector Context for Cyberinfrastructure Strategies for Research and Education (2004)

*Committees:*

Editor-in-Chief selection committee, *INFORMS Journal on Computing*: chair (2006–2007)

INFORMS Computing Society Prize Committee: chair (2005), member (2007)

INFORMS Expository Writing Award Committee: member (1999–2000), chair (2001)

Mathematical Programming Society Beale-Orchard-Hays Prize Committee: member (2000)

Mathematical Programming Society Symposium 2000 Advisory Committee: chair (1994–97)

TIMS/ORSA National Meeting, Chicago: publications/publicity co-chair (1993)

## **Editorial activities**

### *Area Editor for:*

Operations Research, Computing and Decision Technology, 2005–  
INFORMS Journal on Computing, Modeling Methods & Analysis, 2007–

### *Member of Editorial Board:*

Computational Management Science, 2003–  
Computational Optimization and Applications, 1998–

### *Associate Editor for:*

IMA Journal of Management Mathematics, 2002–  
Management Science, 1983–2002  
Operations Research, 1986–2005

### *Referee for:*

ACM Transactions on Mathematical Software	Journal of the Operational Research Society
Annals of Operations Research	Linear Algebra and Its Applications
Applied Mathematics Letters	Management Science
Computational Management Science	Math. Methods of Operations Research
Computational Optimization & Applications	Mathematical Programming
Computers and Operations Research	Mathematics and Artificial Intelligence
Decision Support Systems	Mathematics of Computation
Discrete Applied Mathematics	Mathematics of Operations Research
European Journal of Operational Research	Multi-Criteria Decision Analysis
4OR	Naval Research Logistics
IMA Journal of Numerical Analysis	Omega
IMA Journal on Mathematics in Management	Operations Research
INFORMS Journal on Computing	Operations Research Letters
Interfaces	Optimization Methods and Software
Intl. Transactions in Operational Research	SIAM J. on Matrix Analysis and Applications
Journal of Optimization Theory & Applications	SIAM Journal on Optimization
Journal of Parallel & Distributed Computing	Transportation Science

**Educational activities** (*at Northwestern University*)

*Undergraduate courses developed:*

Linear Algebra for Operations Research  
Deterministic Models and Optimization

*Graduate courses developed:*

Mathematical Programming I  
Large-Scale Optimization  
Advanced Mathematical Programming  
Optimization Services and Cyberinfrastructure

*Lecture notes used as texts:*

“Case Studies for Matrix Algebra” (64 pages)  
“Linear Algebra for Operations Research” (164 pages)  
“Optimization Models” (127 pages)  
“Optimization Methods” (180 pages)

*Honors:*

Graduate Teaching Award of the INFORMS Student Chapter:  
1989-90, 2003-04

## **Presentations**

### *Plenary talks:*

“Numerical Issues and Influences in the Design of Algebraic Modeling Languages for Optimization” (with D.M. Gay), 20th Biennial Conference on Numerical Analysis, Dundee, Scotland (2003)

“Optimization as an Internet Resource,” APMOD 2000: Applied Mathematical Programming and Modeling, London (2000).

### *Invited seminars:*

AT&T Bell Laboratories, Computing Science Research Center (1985)

Brooklyn College, Dept. of Computer Science (1995)

Brunel University, United Kingdom, Dept. of Mathematical Sciences (1998, 2003)

Carnegie Mellon University, Engineering Design Research Center (1991)

Carnegie Mellon University, Graduate School of Industrial Administration (1997)

Clemson University, Dept. of Mathematical Sciences (2007)

Cornell University, School of Operations Research and Industrial Eng. (1994)

Facultés Universitaires Notre-Dame de la Paix, Namur, Belgium (1994)

Institut de Recherche d’Hydro-Québec (1985)

Konrad-Zuse-Zentrum für Informationstechnik Berlin (1992)

Massachusetts Institute of Technology, Operations Research Center (1998)

Motorola Advanced Technology Center (2002)

Naval Postgraduate School, Dept. of Operations Research (1990)

New York University, Dept. of Statistics and Operations Research (1985)

Northwest Airlines (1993)

Princeton University, Dept. of Civil Engineering (1985, 1986)

Purdue University, School of Industrial Engineering (1987)

Rice University, Dept. of Mathematical Sciences (1985)

Rutgers University, Center for Operations Research (1995)

Sabre Decision Technologies (1997)

University of Chicago, Graduate School of Business (2004)

University of Chicago, Department of Economics (2005)

University of Colorado at Denver, Dept. of Mathematics (1991)

University of Michigan, Dept. of Industrial and Operations Eng. (1994)

University of Minnesota, Carlson School of Management (1993)

University of Minnesota, Department of Mechanical Engineering (2002)

University of Paderborn, Germany, International Graduate School (2007)

University of Twente, The Netherlands, Dept. of Math. (1989, 1992, 1995, 1998)

## **Presentations** *(continued)*

### *Tutorials and surveys:*

“How to Publish Your Software on COIN-OR” (on behalf of the COIN-OR Strategic Leadership Board), INFORMS International Meeting, Puerto Rico (2007); INFORMS Annual Meeting, Seattle (2007).

“Enhanced Solver Support in the AMPL Modeling Language,” INFORMS Annual Meeting, Pittsburgh (2006); INFORMS Conference on OR/MS Practice, Vancouver (2007); INFORMS International Meeting, Puerto Rico (2007).

“Beyond Linear Programming: Recent Advances in Large-Scale Optimization,” INFORMS Conference on OR/MS Practice, Miami (2006).

“A Practical Guide to Acquiring AMPL<sup>®</sup> for Applications in Large-Scale Optimization,” INFORMS Conference on OR/MS Practice, Palm Springs (2005); INFORMS Annual Meeting, San Francisco (2005); INFORMS Conference on OR/MS Practice, Miami (2006); 21st European Conference on Operational Research, Reykjavik (2006).

“Assigning People in Practice,” CORS/INFORMS Joint International Meeting, Banff (2004); 17th Triennial Conference of the International Federation of Operational Research Societies, Honolulu, Hawaii (2005).

“Languages and Servers for Optimization Support,” INFORMS Conference on OR/MS Practice, Boston (2004)

“Using the NEOS Server: A Network Resource for Optimization,” INFORMS Conference on OR/MS Practice, Phoenix (2003)

“Software Demo: AMPL,” 8th INFORMS Computing Society Conference, Phoenix (2003)

“Constraint Programming from an OR Perspective,” INFORMS Annual Meeting, San Jose, CA (2002)

“AMPL Hands-On Session,” Tutorials in Supply Chain and Logistics Optimization, Optimization Year at the Institute for Mathematics and Its Applications, Minneapolis (2002)

“Constraint Programming for Math Programmers,” INFORMS International Meeting, Maui, HI (2001)

“OR Counterparts to AI Planning,” Workshop on Constraints and AI Planning, 17th National Conference on Artificial Intelligence, Austin, TX (2000)

“Optimization as an Internet Resource,” Isolated Practitioner Workshop, INFORMS College on the Practice of Management Science, INFORMS National Meeting, Salt Lake City (2000)

“Design of Modeling Languages and Systems for Optimization,” 3ème Cycle Romand de Recherche Opérationnelle, Zinal, Switzerland (1999)

*... 8 additional tutorials and surveys since 1992*

## **Presentations** *(continued)*

### *Panel discussions:*

“Benchmarking Solvers: Who, What, When, Why, How, How Much? — The NEOS Benchmarking Service” INFORMS International Meeting, Puerto Rico (2007).

“Algebraic Modeling Languages Roundup,” INFORMS International Meeting, Puerto Rico (2007).

“Creating a Testbed of Industry Problems for OR Model and Algorithm Development,” INFORMS Annual Meeting, San Francisco (2005)

“Standards for Optimization Problem Instances,” INFORMS Annual Meeting, San Francisco (2005)

“Modeling Language Roundup,” 9th INFORMS Computing Society Conference, Annapolis (2005).

“Optimization Web Services Panel: Next Steps,” INFORMS National Meeting, Denver (2004).

“Cyberinfrastructure,” 1st Mathematical Programming Society International Conference on Continuous Optimization, Troy, NY (2004)

“Future Directions: Cyberinfrastructure,” National Science Foundation Design, Service and Manufacturing Grantees and Research Conference, Dallas (2004).

“New Directions & Standards for the MPS File Format,” INFORMS Annual Meeting, Miami (2001).

“The OR/MS/WWW Interface,” INFORMS International Meeting, Tel Aviv (1998).

“Operations Research in Steel Industries,” EURO/INFORMS International Meeting, Barcelona (1997).

“Model Management & Operations Research,” ORSA/TIMS Joint National Meeting, Anaheim, CA (1991).

“Modeling Languages & Systems for Mathematical Programming,” TIMS/ORSA Joint National Meeting, Nashville (1991).

### *Conference sessions organized:*

2 sessions in stream: Modelling Languages, 2nd International Conference on Continuous Optimization, Hamilton, Ontario, Canada (2007).

2 sessions on Open-Source Application Programming Interfaces for Optimization, INFORMS Annual Meeting, Pittsburgh (2006).

Invited cluster on Optimization Software and Modeling Systems, 19th International Symposium on Mathematical Programming, Rio de Janeiro (2006).

Invited stream on Software for OR/MS, 21st European Conference on Operational Research, Reykjavik (2006).

8 sessions on Optimization Services and Open Source Software (with John Chinneck, Kipp Martin, Robin Lougee-Heimer, Matthew Saltzman, and Ted Ralphs), INFORMS Annual Meeting, San Francisco (2005).

## **Presentations** *(continued)*

*Conference sessions organized (continued):*

2 sessions on Optimization Modeling Language and Services (with Jun Ma and Kipp Martin), 17th Triennial Conference of the International Federation of Operational Research Societies, Honolulu, Hawaii (2005).

6 sessions on Modeling Systems and Solvers (with Bjarni Kristjansson), 9th INFORMS Computing Society Conference, Annapolis (2005).

2 sessions on “Open-Source Application Programming Interfaces for Optimization,” INFORMS Annual Meeting, Pittsburgh (2006).

“Embedding Optimization Modeling Languages into Applications I, II” and “Tools for Detecting or Insuring Convexity,” CORS/INFORMS Joint International Meeting, Banff (2004)

3 sessions on Modeling Languages and Systems, 18th International Symposium on Mathematical Programming, Copenhagen (2003)

Software demo track, 8th INFORMS Computing Society Conference, Phoenix (2003)

2 sessions on Optimization Services on the Internet, INFORMS Annual Meeting, Miami (2001)

2 sessions on Modeling Tools for Optimization, INFORMS International Meeting, Maui (2001)

3 sessions on Modeling Languages and Systems, 17th International Symposium on Mathematical Programming, Atlanta (2000)

2 sessions on Optimization Modeling Languages and Systems, APMOD 2000: Applied Mathematical Programming and Modeling, London (2000)

2 sessions on Languages and Computing Environments for Optimization, 15th Triennial Conference of the International Federation of Operational Research Societies, Beijing (1999)

6 sessions on Modeling Languages and Approaches (with Moshe Pollatschek), 16th International Symposium on Mathematical Programming, Lausanne (1997)

34 sessions sponsored by the Computer Science Technical Section, INFORMS National Meeting, San Diego (1997)

“New Developments in Graphical Interfaces for Optimization Software” and “Panel Discussion: The Future of Graphical Interfaces for Optimization Software,” INFORMS National Meeting, Los Angeles (1995)

“Piecewise Linear Programming,” 15th International Symposium on Mathematical Programming, Ann Arbor (1994).

“Computer Science-Mathematical Programming Interface,” ORSA/TIMS Joint National Meeting, Miami (1986).

*... 7 additional conference sessions since 1984*

## **Presentations** *(continued)*

### *Talks at conferences:*

- “The COIN-OR Optimization Services Project” (with J. Ma and K. Martin), INFORMS Annual Meeting, Seattle (2007).
- “Setting Up and Hosting Your Solver as Web Services via Optimization Services (OS)” (with J. Ma and K. Martin), INFORMS Annual Meeting, Seattle (2007).
- “Hooking Optimization Services to Modeling Languages and Solvers” (with J. Ma and K. Martin), INFORMS Annual Meeting, Seattle (2007).
- “The Optimization Services Project on COIN-OR” (with J. Ma and K. Martin), Annual Meeting of the German Operational Research Society, Saarbrücken (2007).
- “Walking the Expression Tree for Interfacing Modeling Languages to Nonlinear (or Not-Linear) Solvers” (with D.M. Gay), 2nd International Conference on Continuous Optimization, Hamilton, Ontario, Canada (2007)
- “An Open Interface for Hooking Solvers to Modeling Systems” (with J. Ma and K. Martin), INFORMS International Meeting, Puerto Rico (2007).
- “The NEOS Benchmarking Service.” INFORMS International Meeting, Puerto Rico (2007).
- “KNITRO 5.1 for Nonlinear Optimization” (with J. Nocedal, T. Plantenga, R. Waltz), Power Systems Modelling Conference, Athens (2007).
- “The Optimization Services Project on COIN-OR” (with J. Ma and K. Martin), 10th INFORMS Computing Society Conference, Coral Gables, Florida (2007).
- “Expressing ‘Logical’ Constraints and Conveying Them to Solvers” (with J. Ma and K. Martin), Workshop on Global Optimization – Integrating Convexity, Optimization, Logic Programming, and Computational Algebraic Geometry, University of Vienna (2006).
- “Extensions to an Optimization Services Instance Language” (with J. Ma and K. Martin), INFORMS Annual Meeting, Pittsburgh (2006).
- “The OSInstance Application Programming Interface for Optimization Problem Instances” (with J. Ma and K. Martin), INFORMS Annual Meeting, Pittsburgh (2006).
- “A Result Language (OSrL) and Solver Option Language (OSoL) for Distributed Optimization” (with J. Ma and K. Martin), INFORMS Annual Meeting, Pittsburgh (2006).
- “Using the Optimization Services hookup Language (OShL) to Invoke Remote Optimization Services” (with J. Ma and K. Martin), INFORMS Annual Meeting, Pittsburgh (2006).
- “OSiL: An Open Standard for Expressing and Using Optimization Problem Instances” (with J. Ma and K. Martin), 21st European Conference on Operational Research, Reykjavik (2006).
- “An XML-Based Schema for Stochastic Programs” (with G. Gassmann, J. Ma and K. Martin), 21st European Conference on Operational Research, Reykjavik (2006).
- “An Optimization Based Decision Support System for Strategic and Operational Planning in Process Industries” (with G. Dutta), 21st European Conference on Operational Research, Reykjavik (2006).

## **Presentations** *(continued)*

### *Talks at conferences (continued):*

“An Open Interface for Hooking Solvers to Modeling Systems” (with J. Ma and K. Martin), DIMACS Workshop on COIN-OR, Rutgers University (2006).

“Optimization via the Internet: NEOS 5 and Beyond” (with J. Moré, T. Munson and J. Sarich), INFORMS International Meeting, Hong Kong (2006); also 19th International Symposium on Mathematical Programming, Rio de Janeiro (2006).

“Model Representation and an Open Solver Interface” (with K. Martin, J. Ma and M. Saltzman), INFORMS Annual Meeting, San Francisco (2005).

“The Optimization Services (OS) Library and Server” (with J. Ma and K. Martin), INFORMS Annual Meeting, San Francisco (2005).

“OSiL: Optimization Services Instance Language” (with J. Ma and K. Martin), INFORMS Annual Meeting, San Francisco (2005).

“OSiL Stochastic Extensions” (with H.I. Gassmann, J. Ma and K. Martin), INFORMS Annual Meeting, San Francisco (2005).

“A Problem Instance Analyzer for Optimization Services” (with D. Orban), INFORMS Annual Meeting, San Francisco (2005).

“The Optimization Services (OS) Framework” (with K. Martin and J. Ma), INFORMS Annual Meeting, San Francisco (2005).

“Advances in Version 5 of the NEOS Server for Optimization” (with J. Moré, T. Munson and J. Sarich), INFORMS Annual Meeting, San Francisco (2005).

“Optimization Via the Internet: NEOS 5 and Beyond” (with J. Ma, K. Martin, J. Moré, T. Munson, D. Orban and J. Sarich), SIAM Conference on Mathematics for Industry, Detroit (2005)

“Influences of Algebraic Modeling Languages on Optimization Algorithms (with D.M. Gay), VI Brazilian Workshop on Continuous Optimization, Goiânia, Brazil (2005).

“An Optimization-Based Decision Support System for Strategic Planning in a Process Industry” (with G. Dutta), 17th Triennial Conference of the International Federation of Operational Research Societies, Honolulu, Hawaii (2005).

“Stochastic Programming Extensions to AMPL,” 17th Triennial Conference of the International Federation of Operational Research Societies, Honolulu, Hawaii (2005).

“Extensions to an Optimization Services Instance Language” (with J. Ma and K. Martin), 17th Triennial Conference of the International Federation of Operational Research Societies, Honolulu, Hawaii (2005).

“Optimization Services — A Unified and Standard Framework for Optimization Over the Internet” (with J. Ma and K. Martin), 17th Triennial Conference of the International Federation of Operational Research Societies, Honolulu, Hawaii (2005).

“OSiL: An Instance Language and API for Optimization” (with J. Ma and K. Martin), 17th Triennial Conference of the International Federation of Operational Research Societies, Honolulu, Hawaii (2005).

## **Presentations** *(continued)*

### *Talks at conferences (continued):*

“Optimization Services Instance Language (OSiL), Solvers, and Modeling Languages” (with J. Ma and K. Martin), 17th Triennial Conference of the International Federation of Operational Research Societies, Honolulu, Hawaii (2005).

“Optimization via Simulation under the Optimization Services Framework” (with J. Ma and K. Martin), 17th Triennial Conference of the International Federation of Operational Research Societies, Honolulu, Hawaii (2005).

“Design Principles and New Directions in the AMPL Modeling Language” (with D.M. Gay), 9th INFORMS Computing Society Conference, Annapolis (2005).

“KNITRO: A Comprehensive Software Package for Continuous Optimization” (with R. Waltz, J. Nocedal and R. Byrd), 9th INFORMS Computing Society Conference, Annapolis (2005).

“A Unified XML-Based Framework for Optimization Services” (with J. Ma, L. Lopes and K. Martin), INFORMS Annual Meeting, Denver (2004); 9th INFORMS Computing Society Conference, Annapolis (2005).

“An XML-Based Standard Form for Linear Programming Problem Instances” (with K. Martin and L. Lopes), INFORMS Annual Meeting, Denver (2004).

“DrAMPL — A Meta-Solver for Optimization” (with D. Orban), INFORMS Annual Meeting, Denver (2004).

“Bound Analysis of Nonlinear Optimization Problems” (with D. Orban), INFORMS Annual Meeting, Denver (2004).

“AMPL: New Features for Formulating Optimization Models” and “Ziena Optimization, Inc.: Experts in Nonlinear Optimization,” Workshop on Optimization Services in Europe, Bad Honnef, Germany (2004).

“New Developments in the Design and Operation of the NEOS Server” (with J. Moré, T. Munson and J. Sarich), APMOD 2004: Applied Mathematical Programming and Modeling, London (2004); EURO XX, 20th European Conference on Operational Research, Rhodes (2004).

“An XML-Based Standard for Representing Linear Programming Problem Instances” (with L. Lopes and K. Martin), APMOD 2004: Applied Mathematical Programming and Modeling, London (2004).

“DrAmpl – A Meta-Solver for Optimization” (with D. Orban), CORS/INFORMS Joint International Meeting, Banff (2004)

“Interacting with Algebraic Modelling Languages: AMPL Studio and COM objects” (with M. Sadki, G. Mitra and P. Valente), CORS/INFORMS Joint International Meeting, Banff (2004)

“Recent Work on the AMPL/Solver Interface Library” (with D.M. Gay), INFORMS Annual Meeting, Atlanta (2003)

“New Developments in the Design and Operation of the NEOS Server” (with J.J. Moré, T.S. Munson and J. Sarich), INFORMS Annual Meeting, Atlanta (2003)

## **Presentations** *(continued)*

### *Talks at conferences (continued):*

“A Graphical Modeling Language for Stochastic Optimization” (with L. Lopes), INFORMS Annual Meeting, Atlanta (2003)

“Analyzing Submissions to the NEOS Server for the Purpose of Recommending Solvers” (with D. Orban), 18th International Symposium on Mathematical Programming, Copenhagen (2003); INFORMS Annual Meeting, Atlanta (2003)

“Update on the AMPL/Solver Interface Library” (with D.M. Gay), 18th International Symposium on Mathematical Programming, Copenhagen (2003)

“A Modeling Language for Stochastic Programming” (with L. Lopes), 18th International Symposium on Mathematical Programming, Copenhagen (2003)

“Analyzing and Benchmarking Submissions to the NEOS Server” (with E.D. Dolan, J.J. Moré, T.S. Munson and D. Orban), EURO/INFORMS Joint International Meeting, Istanbul, Turkey (2003)

“Interactions between Modeling Languages and Internet Optimization Services” (with E.D. Dolan, J.J. Moré and T.S. Munson), 12th Annual Industrial Engineering Research Conference, Portland, OR (2003)

“Design Principles and New Developments in the AMPL Modeling Language (with D.M. Gay), Workshop on Modeling Languages in Mathematical Optimization, Bad Honnef, Germany (2003)

“Conveying Instances of Mathematical Programs in XML” (with L. Lopes), 8th INFORMS Computing Society Conference, Phoenix (2003).

“Interfacing a Modeling Language with Global Solvers, an Exercise in Manipulating Expression Representations” (with D.M. Gay), INFORMS Annual Meeting, 8th INFORMS Computing Society Conference, Phoenix (2003).

“Advances in an XML-Based Representation for Instances of Mathematical Programs” (with L. Lopes), INFORMS Annual Meeting, San Jose, CA (2002).

“A Modeling System for Multistage Stochastic Programming Problems” (with L. Lopes), INFORMS Annual Meeting, San Jose, CA (2002).

“Interactions Between Modelling Languages and Internet Optimization Services” (with E. Dolan, J. Moré, T. Munson), APMOD 2002: Applied Mathematical Programming and Modeling, Varenna, Italy (2002); 16th Triennial Conference of the International Federation of Operational Research Societies, Edinburgh (2002).

“An XML-Based Format for Sharing Mathematical Programs” (with L.B. Lopes), INFORMS Annual Meeting, Miami (2001).

“An Update on Optimization as an Internet Resource,” INFORMS Annual Meeting, Miami (2001).

“Model-Level Directives for Generating Alternative Formulations of Stochastic Programs” (with L.B. Lopes), 9th International Conference on Stochastic Programming, Berlin (2001).

## **Presentations** *(continued)*

### *Talks at conferences (continued):*

“Random Parameters — A Step Toward Conveniently Expressing Some Stochastic Programming Problems” (with D.M. Gay), 9th International Conference on Stochastic Programming, Berlin (2001).

“New Modeling Language Features for Non-Traditional Optimization Methods” (with D.M. Gay), INFORMS International Meeting, Maui (2001); 20th IFIP TC7 Conference on System Modelling and Optimization, Trier, Germany (2001).

“Hooking a Constraint Programming Solver to an Algebraic Modeling Language” (with D.M. Gay), 3rd International Workshop on Integration of AI and OR Techniques in Constraint Programming for Combinatorial Optimization Problems, Ashford, United Kingdom (2001).

“Web Technologies for Decision Support,” INFORMS Annual Meeting, San Antonio (2000).

“Hooking Nontraditional Solvers to an Algebraic Modeling Language” (with D.M. Gay), 17th International Symposium on Mathematical Programming, Atlanta (2000); INFORMS Annual Meeting, San Antonio (2000).

“Interfacing with the Algebraic Modeling Language AMPL” (with D.M. Gay and B.W. Kernighan), 17th International Symposium on Mathematical Programming, Atlanta (2000).

“A Comparison of Approaches for the Sequence Dependent Setup Machine Scheduling Problem” (with M.L. Spearman and J. Mittenthal), 17th International Symposium on Mathematical Programming, Atlanta (2000).

“Extending Algebraic Modeling Languages for Combinatorial Optimization via Constraint Programming” (with D.M. Gay), SIAM Annual Meeting, Rio Grande, Puerto Rico (2000).

“Relational Database Access for an Algebraic Modeling Language” (with D.M. Gay), APMOD 2000: Applied Mathematical Programming and Modeling, London (2000); INFORMS National Meeting, Salt Lake City (2000).

“Conveying Problem Structure from an Algebraic Modeling Language to Optimization Algorithms” (with D.M. Gay), 7th INFORMS Computing Society Conference, Cancún (2000).

“Designing an Open Interface for Hooking Constraint Logic Programming Solvers to an Algebraic Modeling Language” (with D.M. Gay), INFORMS National Meeting, Philadelphia (1999).

“Optimization as an Internet Resource,” INFORMS National Meeting, Philadelphia (1999).

“Designing an Open Interface for Hooking Constraint Logic Programming Solvers to an Algebraic Modeling Language” (with D.M. Gay), OR41: Annual Conference of the Operational Research Society, Edinburgh (1999).

“New Developments in the AMPL Modeling System for Mathematical Programming” (with D.M. Gay), 15th Triennial Conference of the International Federation of Operational Research Societies, Beijing (1999).

“Mathematical Programming in the North American Steel Industry,” 15th Triennial Conference of the International Federation of Operational Research Societies, Beijing (1999).

## **Presentations** *(continued)*

### *Talks at conferences (continued):*

“An Optimization-Based Decision Support System for Strategic and Operational Planning” (with G. Dutta), 15th Triennial Conference of the International Federation of Operational Research Societies, Beijing (1999).

“Developments in Algebraic Modeling Languages for Optimization” (with D.M. Gay), 6th SIAM Conference on Optimization, Atlanta (1999).

“Conveying Structure to and from Solvers” (with D.M. Gay), 6th SIAM Conference on Optimization, Atlanta (1999).

“Extending the AMPL Modeling Language for Combinatorial Optimization via Constraint Programming” (with D.M. Gay), INFORMS National Meeting, Cincinnati (1999).

“New AMPL Notation for Complementarity Problems” (with M.C. Ferris and D.M. Gay), INFORMS National Meeting, Seattle (1998).

“Optimization Approaches to Production Planning in the Steel Industry,” Association Of Iron and Steel Engineers 4th Advanced Modeling and Control Seminar, Cambridge, MA (1998).

“General-Purpose Modeling Languages for Combinatorial Optimization,” APMOD 98: Applied Mathematical Programming and Modeling, Limassol, Cyprus (1998).

“Expressing Complementarity Problems and Communicating Them to Solvers” (with D.M. Gay and M.C. Ferris), 6th INFORMS Computer Science Technical Section Conference, Monterey, CA (1998).

“Analysis Support in a Modeling Language for Mathematical Programming” (with D.M. Gay), 6th INFORMS Computer Science Technical Section Conference, Monterey, CA (1998).

“General-Purpose Modeling Languages for Combinatorial Optimization Via Logic Programming,” INFORMS National Meeting, Dallas (1997).

“New Directions for Optimization Support Systems Based on Algebraic Modeling Languages,” Workshop on Advances in Methodology and Software for Decision Support Systems, International Institute for Applied Systems Analysis, Laxenburg, Austria (1997).

“General-Purpose Modeling Languages for Combinatorial Optimization,” 16th International Symposium on Mathematical Programming, Lausanne (1997).

“The Evolving AMPL/Solver Interface” (with D.M. Gay), 16th International Symposium on Mathematical Programming, Lausanne (1997).

“Stochastic Programming Using AMPL” (with D.M. Gay), 16th International Symposium on Mathematical Programming, Lausanne (1997).

“Analysis Support in a Modeling Language for Mathematical Programming” (with D.M. Gay), 16th International Symposium on Mathematical Programming, Lausanne (1997).

“Uses of the AMPL Modeling Language in Solving ‘Balanced’ Assignment Problems,” EURO/INFORMS International Meeting, Barcelona (1997).

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