

# Curriculum Vitae Todd S. Munson

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## Education

1995 - B.S.     Computer Science     University of Nebraska at Omaha  
1996 - M.S.     Computer Science     University of Wisconsin at Madison  
2000 - Ph.D.    Computer Science     University of Wisconsin at Madison

## Research Interests

Algorithms for numerical optimization and equilibrium problems, applications of mathematical programming, and linear algebra for large sparse systems

## Experience

1996 - 1999     Research Assistant  
Department of Computer Science  
University of Wisconsin at Madison

Summer 1997    Givens Research Associate  
Mathematics and Computer Science Division  
Argonne National Laboratory

1999 - 2000     Distinguished Graduate Fellow in Computer Science  
Department of Computer Science  
University of Wisconsin at Madison

2000 - 2002     Postdoctoral Research Associate  
Mathematics and Computer Science Division  
Argonne National Laboratory

Fall 2002        Lecturer  
Electrical and Computer Engineering Department  
Northwestern University

2002 - 2004     Enrico Fermi Scholar  
Mathematics and Computer Science Division  
Argonne National Laboratory

2004 - 2006     Assistant Scientist  
Mathematics and Computer Science Division  
Argonne National Laboratory

2006 -            Scientist  
Mathematics and Computer Science Division  
Argonne National Laboratory

## Professional Activities

**Fellow:** University of Chicago and Argonne National Laboratory Computation Institute

**Member:** Institute for Operations Research and the Management Sciences, Mathematical Programming Society, Society for Industrial and Applied Mathematics

**Referee:** various journals including SIAM Journal on Optimization, SIAM Journal on Scientific Computing, SIAM Journal on Numerical Analysis, Mathematical Programming, Computational Optimization and Applications, Optimization Methods and Software, Journal of Global Optimization, Annals of Operations Research, Journal of Economic Dynamics and Control, and Proceedings of AD2004 Conference

**Local Organizing Committee:** ISMP 2009 (2007–)

**Co-Chair:** Institute for Computational Economics, University of Chicago (2005, 2006, 2007, 2008).

**Editorial Board:** Mathematical Methods of Operations Research (2008–)

**Technical Editor:** Mathematical Programming Computation (2008–)

**Administrator:** NEOS Server (2000–)

**Area Coordinator:** Optimization Online (2000–)

**Organizer:** Optimization Technology Center Seminar Series (2001–2002)

**Advisory Board:** MPEC World (2001–)

**Session Organizer:** INFORMS International Meeting (2001), Mathematical Programming Symposium (2003), SIAM Conference on Optimization (2002, 2005), ICIAM Meeting (2003), SIAM Annual Meeting (2006)

## Awards and Prizes

2007	Kavli Frontiers Fellow National Academy of Sciences
2006	Presidential Early Career Award for Scientists and Engineers Executive Office of the President of the United States
2006	Early Career Scientist and Engineer Award United States Department of Energy
2003	Beale-Orchard-Hayes Prize Mathematical Programming Society
2002 -2004	Enrico Fermi Scholar Argonne National Laboratory
2000	Outstanding Graduate Student Research Award University of Wisconsin at Madison
1999 - 2000	Distinguished Graduate Fellow in Computer Science University of Wisconsin at Madison
1999	SIAM Student Travel Award
1998	GAMS Corporation Travel Award
1997	Givens Research Associateship Argonne National Laboratory
1996	Summer Research Assistantship University of Wisconsin at Madison
1993	Participant in NSF Research Experience for Undergraduates University of Nebraska at Lincoln
1993 - 1995	Honors Scholarship Recipient University of Nebraska at Omaha

## Journal Publications

1. (with M. Ferris) “Interfaces to PATH 3.0: Design, Implementation, and Usage,” *Computational Optimization and Applications*, 12 (1999), pages 207–227.
2. (with M. Ferris and C. Kanzow) “Feasible Descent Algorithms for Mixed Complementarity Problems,” *Mathematical Programming*, 86 (1999), pages 475–497.
3. (with M. Ferris) “Complementarity Problems in GAMS and the PATH Solver,” *Journal of Economic Dynamics and Control*, 24 (2000), pages 165–188.
4. (with M. Ferris) “Modeling Languages and Condor: Metacomputing for Optimization,” *Mathematical Programming*, 88 (2000), pages 487–506.
5. (with F. Facchinei, M. Ferris, A. Fischer, and C. Kanzow) “The Semismooth Algorithm for Large Scale Complementarity Problems,” *INFORMS Journal on Computing*, 13 (2001), pages 294–311.

6. (with M. Ferris) “Interior-Point Methods for Massive Support Vector Machines,” *SIAM Journal on Optimization*, 13 (2003), pages 783–804.
7. (with M. Ferris) “Semismooth Support Vector Machines,” *Mathematical Programming*, 101 (2004), pages 185–204.
8. (with J. Moré) “Computing Mountain Passes and Transition States,” *Mathematical Programming*, 100 (2004), pages 151–182.
9. (with E. Dolan, R. Fourer, J.-P. Goux, and J. Sarich) “Kestrel: A Callable Interface to the NEOS Server,” *INFORMS Journal on Computing*, 20 (2008), pages 525–538.
10. (with S. Benson) “Flexible Complementarity Solvers for Large-Scale Applications,” *Optimization Methods and Software*, 21 (2006), pages 155–168.
11. “Mesh Shape-Quality Optimization Using the Inverse Mean-Ratio Metric,” *Mathematical Programming*, 110 (2007), pages 561–590.
12. (with E. Dolan and J. Moré) “Optimality Measures for Performance Profiles,” *SIAM Journal on Optimization*, 16 (2006), pages 891–909.
13. (with Y. Chen, B. Hobbs, and S. Leyffer) “Leader-Follower Equilibria for Electric Power and  $\text{NO}_x$  Allowances Markets,” *Computational Management Science*, 3 (2006), pages 307–330.
14. (with L. Freitag, P. Knupp, and S. Shontz) “A Comparison of Two Optimization Algorithms for Mesh Quality Improvement,” *Engineering with Computers*, 22 (2006), pages 61–74.
15. (with S. Leyffer) “Solving Multi-Leader-Common-Follower Games,” *Optimization Methods and Software*, to appear 2010.
16. (with S. Leyffer) “A Globally Convergent Filter Method for MPECs,” Argonne Preprint ANL/MCS-P1457-0907, submitted April 2009.
17. (with Q. Li and M. Ferris) “Linear Algebra Enhancements to the PATH Solver,” Argonne Preprint ANL/MCS-P1565-1208, submitted May 2009.
18. (with D. Hanson, Y. Kryukov, and S. Leyffer) “Optimal Control Model of Technology Penetration”, Argonne Preprint, ANL/MCS-P1544-0908, submitted June 2009.
19. (with H.-R. Fang and S. Leyffer) “A Pivoting Algorithm for Linear Programs with Linear Complementarity Constraints,” Argonne Preprint ANL/MCS-P1680-1009, submitted October 2009.
20. (with J. Elliott, M. Franklin, I. Foster, and K. Judd) “Propagation of Data Error and Parametric Sensitivity in Computable General Equilibrium Model Forecasts,” Argonne Preprint ANL/MCS-P1650-0709, November 2009.

## Refereed Proceedings

21. (with M. Ferris) “Case Studies in Complementarity: Improving Model Formulation,” in *Ill-Posed Variational Inequalities and Regularization Techniques*, M. Thera and R. Tichatschke editors, Springer Verlag, 1999.

22. (with M. Ferris) “Preprocessing Complementarity Problems,” in *Complementarity: Applications, Algorithms, and Extensions*, M. Ferris, O. Mangasarian, and J.-S. Pang editors, Kluwer Academic Publishers, 2001.
23. (with M. Ferris and D. Ralph) “A Homotopy Method for Mixed Complementarity Problems Based on the PATH Solver,” in *Numerical Analysis 1999*, D. Griffiths and G. Watson editors, Chapman and Hall, 2000.
24. (with M. Ferris and K. Sinapiromsaran) “A Practical Approach to Sample-Path Simulation Optimization,” in *Proceedings of the 2000 Winter Simulation Conference*, J. Joines, R. Barton, K. Kang, and P. Fishwick editors, Omnipress, 2000.
25. (with L. Freitag, P. Knupp, and S. Shontz) “A Comparison of Optimization Software for Mesh Shape-Quality Improvement Problems,” in *Proceedings of the 11th International Meshing Roundtable*, 2002.
26. (with L. Freitag, P. Knupp, and S. Shontz) “A Comparison of Inexact Newton and Coordinate Descent Mesh Optimization Techniques,” in *Proceedings of the 13th International Meshing Roundtable*, 2004.
27. (with M. Anitescu, D. Negrut, and P. Zapol) “Simulating Multi-Scale Processes in Solids using DFT and the Quasicontinuum Method,” in *Proceedings of IMECE 2005, ASME International Mechanical Engineering Congress and Exposition*, 2005.
28. (with P. Hovland) “The FeasNewt Benchmark,” in *Proceedings of the 2005 IEEE International Symposium on Workload Characterization (IISWC2005)*, October 2005.
29. (with J. Moré and J. Sarich) “Optimization in SciDAC Applications,” *Journal of Physics: Conference Series*, 78 (2007), article 012052.
30. (with S. Leyffer, J. Linderoth, J. Luedtke, and A. Miller) “Applications and Algorithms for Mixed Integer Nonlinear Programming,” *Journal of Physics: Conference Series*, 180 (2009), article 012014.
31. (with N. Voshell, S. Shontz, L. Freitag, and P. Knupp) “A Patch-Based Mesh Optimization Algorithm for Partitioned Meshes”, *Proceedings of the 9th International Workshop on State-of-the-Art in Scientific and Parallel Computing (PARA’08)*, to appear.

## Miscellaneous Articles

32. (with M. Ferris) “Linear Programming for Emergency Broadcast Systems,” *SIAG/Optimization News and Views*, 10 (1999), pages 6–8.
33. (with E. Dolan, R. Fourer, and J. Moré) “Optimization on the NEOS Server,” *SIAM News*, 35 (2002), pages 4–9.
34. “Optimizing the Quality of Mesh Elements,” *SIAG/Optimization News and Views* 16 (2005), pages 27–34.

## Other Preprints and Technical Reports

35. “Algorithms and Environments for Complementarity,” Ph.D. Dissertation, Mathematical Programming Technical Report MP 00-02, University of Wisconsin at Madison, 2000.
36. (with E. Dolan) “The Kestrel Interface to the NEOS Server,” Argonne Technical Memorandum ANL/MCS-TM-248, 2001.
37. (with E. Dolan, R. Fourer, and J. Moré) “The NEOS Server for Optimization: Version 4 and Beyond,” Argonne Preprint ANL/MCS-P947-0202, 2002.
38. (with E. Dolan and J. Moré) “Benchmarking Optimization Software with COPS 3.0,” Argonne Technical Memorandum ANL/MCS-TM-273, February 2004.
39. “Mesh Shape-Quality Optimization Using the Inverse Mean-Ratio Metric: Tetrahedral Proofs,” Argonne Technical Memorandum ANL/MCS-TM-275, April 2004.
40. (with M. Anitescu, D. Negrut, and P. Zapol) “Density Functional Theory-Based Nanostructure Investigation: Theoretical Considerations,” Argonne Preprint ANL/MCS-P1252-0505, May 2005.
41. (with M. Friedlander, N. I. M. Gould, and S. Leyffer) “A Filter Active-Set Trust-Region Method,” Argonne Preprint ANL/MCS-P1456-0907, September 2007.
42. (with J. Elliott, I. Foster, K. Judd, and E. Moyer) “Introducing CIM-EARTH”, Argonne Technical Memorandum ANL/MCS-TM-307, November 2009.