Paul T. Boggs

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Computational Sciences and Mathematics Research Department
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Education

B.S.	Mathematics	University of Akron	1966
Ph. D.	Computer Science	Cornell University	1970

Professional Career

1998–Present	Principal Member, Technical Staff, Computational Sciences and Mathematics Research Department Sandia National Laboratories
1989–1998	Chief, Mathematical and Computational Sciences Division National Institute of Standards and Technology (Formerly, National Bureau of Standards)
1994-1995	Program Analyst, Program Office National Institute of Standards and Technology
1987–1989	Chief, Scientific Computing Division National Bureau of Standards
1986–1987	Acting Chief, Scientific Computing Division National Bureau of Standards
1986–Present	Group Leader, Optimization Group National Bureau of Standards
1982–1986	Computer Scientist National Bureau of Standards
1978–1982	Associate Director, Mathematics Division U. S. Army Research Office
1975–1978	Mathematician U. S. Army Research Office
1972–1975	Assistant Professor of Mathematics Rensselaer Polytechnic Institute
1970–1972	Assistant Professor of Computer Science University of Kansas

Society Memberships and Professional Activities

Society for Industrial and Applied Mathematics

Member of SIAM Council, 1995–2000

SIAM Council Representative to the Board of Directors, 1999–2000

Member of the Science Policy Committee, 1996–present

Associate Editor, SIAM Journal on Optimization, 1991–1996

Conference Co-Organizer, SIAM Conference on Numerical Optimization, Boulder, Colorado, 1984

Co-Founder, SIAM Activity Group on Optimization (SIAG-OPT), 1985

Chairperson, SIAG-OPT, 1986–1989

Co-Founder, SIAM Activity Group on Optimization (SIAG-OPT), 1985

Chairperson, SIAG-OPT, 1986–1989

Member of Advisory Committee, SIAG-OPT, 1989–1993

Member SIAM News Editorial Board, 1985–2000

Member SIAM Program Committee, 1985–1993

SIAM Short Course Coordinator, 1987–1994

Minisymposium Organizer at several SIAM Conferences

Association for Computing Machinery 1977–1993

Member of SIGNUM

Board of Directors 1977–1979
Nominating Committee 1980

Member of SIGMAP

Associate Editor, Transactions on Mathematical Software, 1981–1993

Mathematical Programming Society

Committee on Algorithms, 1985–1994

Member Editorial Board, Applied Mathematics Letters, 1987–present

Member of Several NSF Panels

Member of Advisory Committee, Interdisciplinary Applied Mathematics Program, University of Maryland, 1996

Member of Board of Visitors, U. S. Army Research Office, 1996–present

Member of Program Review Committee, Center for Computing Sciences, 1996–present

Referee For Numerous Journals and Funding Agencies

Research Interests

Numerical methods for the solution of optimization problems and, in particular, methods for constrained and unconstrained nonlinear optimization problems including the solution of nonlinear least squares problems and nonlinear systems of equations. Special interest in interior-point methods for linear and quadratic programming problems and SQP methods for large-scale nonlinear programming problems.

Publications of Paul T. Boggs

P. T. Boggs (1970), The Solution of Nonlinear Operator Equations by A-Stable Integration Techniques, PhD thesis, Cornell University.

P. T. Boggs (1971), 'The solution of nonlinear systems of equations by A-stable integration techniques', *SIAM Journal on Numerical Analysis* **8**, 767–785.

P. T. Boggs (1974), 'A new algorithm for the Chebyshev solution of overdetermined linear systems', *Mathematics of Computation* **28**, 203–217.

P. T. Boggs (1975), On the use of Lyapunov theory for the analysis of nonlinear iterative methods, in *Proceedings of the 1975 Conference on Information Sciences and Systems*, Johns Hopkins University Press, Baltimore, MD.

P. T. Boggs (1976), 'The convergence of the Ben-Israel iteration for nonlinear least squares problems', *Mathematics of Computation* **30**, 512–522.

P. T. Boggs and J. E. Dennis, Jr. (1976), 'A stability analysis for perturbed nonlinear iterative methods', *Mathematics of Computation* **30**, 199–215.

P. T. Boggs (1977), 'An algorithm, based on singular perturbation theory, for ill-conditioned minimization problems', *SIAM Journal on Numerical Analysis* **14**, 830–843.

P. T. Boggs and J. W. Tolle (1977*a*), Asymptotic analysis of the saddle point of a two-parameter multiplier function, Technical Report 77-6, Department of Operations Research and Systems Analysis, University of North Carolina.

P. T. Boggs and J. W. Tolle (1977*b*), Certain theoretical and computational aspects of multiplier methods for constrained minimization, Technical Report 77-13, Department of Operations Research and Systems Analysis, University of North Carolina.

P. T. Boggs and J. W. Tolle (1977*c*), A two-parameter multiplier function with exact penalty functions, Technical Report 77-1, Department of Operations Research and Systems Analysis, University of North Carolina.

P. T. Boggs, D. G. Wilson and A. D. Solomon, eds (1978), *Moving Boundary Problems*, Academic Press, New York.

P. T. Boggs and R. L. Launer (1979), Time-optimal rejection sequencing, in *Transactions of the Twenty-Fourth Conference of Army Mathematicians* (F. Dressel, ed.), U.S. Army Research Office, Research Triangle Park, North Carolina.

P. T. Boggs and J. W. Tolle (1980*a*), 'Augmented Lagrangians which are quadratic in the multiplier', *Journal of Optimization Theory and Applications* **31**, 17–26.

P. T. Boggs and J. W. Tolle (1980*b*), Differential equations techniques for nonlinear optimization problems, in *Ottimizzazione Non Lineare e Applicazione* (S. Incerti and O. Treccani, eds), Pitagora Editrice, Bologna, pp. 1–32.

P. T. Boggs, J. W. Tolle and P. Wang (1982), 'On the local convergence of quasi-Newton methods for constrained optimization', *SIAM Journal on Control and Optimization* **20**, 161–171.

P. T. Boggs and J. W. Tolle (1982), Merit functions for nonlinear programming problems, in *Numerical Analysis: Proceedings of the Third IIMAS Workshop Held at Cocoyoc, Mexico, January 1981* (J. P. Hennart, ed.), Springer-Verlag, Berlin, pp. 1–11.

P. T. Boggs and J. W. Tolle (1984), 'A family of descent functions for constrained optimization', *SIAM Journal on Numerical Analysis* **21**, 1146–1161.

G. N. Stenbakken, T. M. Souders, P. T. Boggs and J. M. Lechner (1985), Efficient calibration strategies for linear time invariant systems, in *Proceedings of Autoestcon '85*, pp. 361–366.

P. T. Boggs, K. Hoffman and R. Jackson (1985), 'Proposal for testing Karmarkar's algorithm', *Committee on Algorithms Newsletter.*

P. T. Boggs, R. H. Byrd and R. B. Schnabel (1987), 'A stable and efficient algorithm for nonlinear orthogonal distance regression', *SIAM Journal of Scientific and Statistical Computing* **8**(6), 1052–1078.

P. T. Boggs and J. W. Tolle (1988), Merit functions and nonlinear programming, in *Operations Research '87* (G. K. Rand, ed.), Elsevier Science Publishers B. V., North Holland, pp. 882–889.

P. T. Boggs, J. R. Donaldson, R. B. Schnabel and C. H. Spiegelman (1988), 'A computational examination of orthogonal distance regression', *Journal of Econometrics* **38**(1/2), 169–201.

P. T. Boggs and J. W. Tolle (1989), 'A strategy for global convergence in a sequential quadratic programming algorithm', *SIAM Journal on Numerical Analysis* **21**, 600–623.

P. T. Boggs, R. H. Byrd, J. R. Donaldson and R. B. Schnabel (1989*a*), 'ODRPACK — software for weighted orthogonal distance regression', *ACM Transactions on Mathematical Software* **15**(4), 348–364.

P. T. Boggs, R. H. Byrd, J. R. Donaldson and R. B. Schnabel (1989*b*), User's reference guide for ODRPACK — software for weighted orthogonal distance regression, Internal Report 89-4103, National Institute of Standards and Technology, Gaithersburg, Maryland.

P. T. Boggs and J. R. Donaldson (1989), The computation and use of the asymptotic covariance matrix for measurement error models, Internal Report 89-4102 (Revised 1990), National Institute of Standards and Technology, Gaithersburg, Maryland.

P. T. Boggs, P. D. Domich, J. R. Donaldson and C. Witzgall (1989*c*), 'Algorithmic enhancements to the method of centers for linear programming problems', *ORSA Journal of Computing* **1**, 159–171.

P. T. Boggs and J. E. Rogers (1990), Orthogonal distance regression, in *Contemporary Mathematics* (W. Fuller and P. Brown, eds), Vol. 112, American Mathematical Society, American Mathematical Society, Providence, RI, pp. 183–194.

C. Witzgall, P. T. Boggs and P. D. Domich (1990), On the convergence behavior of trajectories for linear programming, in *Mathematical Developments Arising from Linear Programming* (J. C. Lagarias and M. J. Todd, eds), Contemporary Mathematics, American Mathematical Society, Providence, RI, pp. 161–188.

P. T. Boggs, P. D. Domich, J. E. Rogers and C. Witzgall (1991*a*), 'An interior point method for linear and quadratic programming problems', *Mathematical Programming Society Committee on Algorithms Newsletter* (19), 32–40.

P. T. Boggs, J. W. Tolle and A. J. Kearsley (1991*b*), A merit function for inequality constrained nonlinear programming problems, Internal Report 4702, National Institute of Standards and Technology.

P. D. Domich, P. T. Boggs, J. E. Rogers and C. Witzgall (1991), 'Optimizing over three-dimensional subspaces in an interior-point method for linear programming', *Linear Algebra and its Applications* **152**, 315–342.

R. H. F. Jackson, P. T. Boggs, S. G. Nash and S. Powell (1991), 'Guidelines for reporting results of computational experiments. report of the ad hoc committee', *Mathematical Programming* **49**, 413–426.

P. T. Boggs and E. Prince (1992), Least squares, in *International Tables for Crystallography, Volume C: Mathematical, Physical and Chemical Tables* (A. J. C. Wilson, ed.), Kluwer Academic Publishers, Dordrecht, pp. 594–604.

P. T. Boggs, P. D. Domich and J. E. Rogers (1994*a*), An interior-point method for general large scale quadratic programming problems, Internal Report 5406 (accepted in *Annals of Operations Research*), National Institute of Standards and Technology.

P. T. Boggs (1996), Interior point methods, in *Encyclopedia of Operations Research* (S. Gass and C. Harris, eds), Kluwer Academic Press, Dordrecht, pp. 305–308.

P. T. Boggs, J. W. Tolle and A. J. Kearsley (1994*c*), A truncated SQP algorithm for large scale nonlinear programming problems, in *Advances in Optimization and Numerical Analysis: Proceedings of the Sixth Conference on Numerical Analysis and Optimization* (S. Gomez and J.-P. Hennart, eds), Kluwer Academic Publishers, Dordrecht, pp. 69–78.

P. T. Boggs and J. W. Tolle (1994), 'Convergence properties of a class of rank-two updates', *SIAM Journal on Optimization* **4**, 262–287.

P. T. Boggs and J. W. Tolle (1995), 'Sequential quadratic programming', *Acta Numerica* **1995**, 1–52.

P. T. Boggs, J. W. Tolle and A. J. Kearsley (1995), On the convergence of a trust region SQP algorithm for nonlinearly constrained optimization problems, in *Proceedings of the 17th IFIP TC7 Conference on System Modeling and Optimization* (J. Dolezal, ed.), Chapman, London, pp. 1–14.

P. T. Boggs, A. J. Kearsley and J. W. Tolle (1999*b*), 'A practical algorithm for general large scale nonlinear optimization problems', *SIAM Journal on Optimization* **9**(3), 755–778.

P. T. Boggs, A. J. Kearsley and J. W. Tolle (1999*a*), 'A global convergence analysis of an algorithm for large scale nonlinear programming problems', *SIAM Journal on Optimization* **9(4)**, 833–862.

P. T. Boggs and J. W. Tolle (2000), 'Sequential quadratic programming for large-scale nonlinear optimization', *J. Computational and Applied Mathematics* **124**, 123–137.

Recent Public Speaking

Recent Public Speaking

Conference on "High Performance Algorithms and Software for Nonlinear Optimization," Erice, Italy, July 2001.

7^{th} US–Mexico Workshop in Numerical Analysis, Merida, Mexico, January 2001 (Conference Organizer, Contributed Talk)

First SIAM Conference on Computational Science and Engineering, Washinton, DC, September 2000 (Minisymposium organizer and speaker)

17^{th} International Symposium on Mathematical Programming, Atlanta, Georgia, August 2000 (Invited Minisymposium talk)

SIAM National Meeting, Puerto Rico, July 2000 (Organized Minisymposium and gave talk)

Systems Modeling and Optimization Conference, Cambridge, England, July 1999, (Contributed talk)

6^{th} SIAM Conference on Optimization, Atlanta, May 1999, (Contributed talk)

Optimization '98, Coimbra, Portugal, July 1998, (Organized invited session and gave talk)

16th International Symposium on Mathematical Programming, Lusanne, Switzerland, August 1997, (Contributed talk)