

18 February 2015

Daniel B. Szyld

Department of Mathematics, Temple University, Philadelphia, PA 19122-6094.
+1.215.204.7288, szyld@temple.edu, <http://math.temple.edu/szyld>

Ph.D. in Mathematics (Numerical Analysis, Olof B. Widlund, advisor), October 1983,
Courant Institute of Mathematical Sciences, New York University.

Undergraduate studies at the School of Exact Sciences, University of Buenos Aires, 1973–
1977.

AREAS OF RESEARCH

Computational Mathematics, Numerical Analysis, and Linear Algebra: Sparse matrix techniques. Parallel asynchronous iterations for linear and nonlinear systems. Conjugate gradient type methods. Applications to the solution of Partial Differential Equations. Domain decomposition and Schwarz methods. Applications to Markov chains and Markov processes. Nonnegative matrices and applications. Linear and nonlinear matrix equations. Linear and nonlinear eigenvalue problems.

TEACHING POSITIONS (selection)

Department of Mathematics, Temple University, Professor (since 1995), Associate Professor (1990-1995).

Department of Computer Science, Duke University, Assistant Professor (1986–1990), Visiting Assistant Professor (1985–1986).

AWARDS AND HONORS

Dean’s Distinguished Award for Excellence in Research, College of Science of Technology, Temple University, October 2011.

Featured in the book *Hall of Fame* containing linocuts portraits of scientists in the field of scientific computing made by Henk van der Vorst. Published by SARA, the High Performance Computing Agency of the Netherlands, December 2010.

Distinguished Scholar, Department of Mathematics, Temple University, academic year 2008–2009.

Commemorative Medal of the School of Physics and Mathematics, Charles University, Prague, June 1997, for “outstanding work in Numerical Linear Algebra.”

SELECTED RECENT GRANTS

National Science Foundation Research Grant, Division of Mathematical Sciences, Program in Computational Mathematics, Multiple Preconditioning for Saddle-Point and other Problems, August 2014 – August 2017, \$150,000.

National Science Foundation Research Grant, Division of Mathematical Sciences, Program in Computational Mathematics, Eigenvalues problems, Krylov subspace methods, and subspace recycling, August 2011 – July 2014, \$280,000 (with Fei Xue, Co-PI).

Department of Energy Research Grant, Office of Science, Program of Advanced Scientific Computing Research, Division of Applied Mathematics, Krylov Subspace and Schwarz Methods for PDEs and Control Problems, 2008–2010, \$540,000.

Department of Energy Research Grant, Office of Science, Program of Advanced Scientific Computing Research, Division of Applied Mathematics, Schwarz Preconditioners for Krylov Methods: Theory and Practice, 2005–2008, \$569,000.

EDITORIAL WORK (selection)

Electronic Transactions on Numerical Analysis, Editor, 1998–2004. 2014–present. Editor in Chief, 2005–2013.

Linear Algebra and its Applications, Associate Editor, 2011–2018.

Mathematics of Computation, Associate Editor, 2007–2018.

Numerical Linear Algebra with Applications, Member of the Editorial Board, 2008–present.

SIAM Journal on Matrix Analysis and Applications, Member of the Editorial Board, 2003–2014. Editor-in-Chief 2015–2017.

Electronic Journal of Linear Algebra, Associate Editor, 1995–2001; Advisory Editor 2001–2016.

CONFERENCE ORGANIZATION (most recent, selection)

Minisymposium on Iterative Methods and Preconditioning, eighth International Congress on Industrial and Applied Mathematics (ICIAM), 10–14 August 2015, Beijing, China. Co-organizer.

Mid-Atlantic Numerical Analysis Day, 7 November 2014, Temple University, Philadelphia. Co-organizer.

Member of the Scientific Program Committee, Eighth International workshop on Parallel Matrix Algorithms and Applications (PMAA'14), University of Lugano, Switzerland, 2–4 July 2014.

Member of the Program Committee, 8th International Conference on Matrix Analytic Methods in Stochastic Models, National Institute of Technology Calicut, Kerala, India, 6–10 January 2014.

Member of the Program Committee, Computer Aspects of Numerical Algorithms (CANA'13), Krakow, Poland, 8–11 September 2013.

New Frontiers in Numerical Analysis and Scientific Computing - A conference on the occasion of Lothar Reichel's 60th birthday and on the 20th anniversary of ETNA, 19–20 April 2013, Kent State University, Kent, Ohio. Member of the Program Committee.

Workshop on Theoretical and Applied Aspects of Nonnegative Matrices, 27–29 July 2012, Banff International Research Station for Mathematical Innovation and Discovery, Banff, Alberta, Canada. Co-organizer.

Minisymposium on Challenges for the Solution and Preconditioning of Multiple Linear Systems, SIAM Conference on Applied Linear Algebra, 18–22 June 2012, Valencia, Spain. Co-organizer.

OTHER PROFESSIONAL SERVICE (selection):

External review panel for the Department of Mathematics, Baruch College, City University of New York, May 2000.

Member of the Board of the International Linear Algebra Society (ILAS), 2001–2004.

Chair of the SIAM Activity Group on Linear Algebra, 2007–2009.

Member of the International Advisory Board, GAMM Activity Group on Applied and Numerical Linear Algebra, 2013–present.

Member of the Joint Policy Board of Mathematics Committee for the Mathematics Awareness Month 2008.

Chair of the Gene Golub SIAM Summer School Committee, 2010–2013.

Member of the Board of Advisors of Accelogic (a software company for High Performance Computing), since 2012.

Vice President at Large, SIAM, Society of Industrial and Applied Mathematics, 2014–2015.

External member of several doctoral committees for the Federal University of Rio de Janeiro, Brazil, the Instituto Nacional de Matemática Pura e Aplicada (IMPA), Rio de Janeiro, Brazil, the University of Wuppertal, Germany, the Technical University of Berlin, Germany, the Delft University of Technology, The Netherlands, the University of Valencia, Spain, the University of Alicante, Spain, the Univeristy of Mauritius, Drexel University, and Emory University.

RESEARCH ARTICLES IN REFEREED JOURNALS (selection):

5. Wassily Leontief, Faye Duchin and Daniel B. Szyld, New Approaches in Economic Analysis, *Science* **228** (1985) 419–422.
6. Daniel B. Szyld, Conditions for the Existence of a Balanced Growth Solution for the Leontief Dynamic Input-Output Model, *Econometrica* **53** (1985) 1411–1419.
8. Daniel B. Szyld, Criteria for Combining Inverse and Rayleigh Quotient Iteration, *SIAM Journal on Numerical Analysis*, **25** (1988) 1369–1375.
10. Ivo Marek and Daniel B. Szyld, Comparison Theorems for Weak Splittings of Bounded Operators, *Numerische Mathematik*, **58** (1990) 387–397.
16. Andreas Frommer and Daniel B. Szyld, H -splittings and Two-stage Iterative Methods, *Numerische Mathematik* **63** (1992) 345–356.
- 17 Daniel B. Szyld and Olof B. Widlund, Variational Analysis of Some Conjugate Gradient Methods, *East-West Journal of Numerical Mathematics*, **1** (1993) 51–74.

19. Daniel B. Szyld, Equivalence of Convergence Conditions for Iterative Methods for Singular Equations, *Numerical Linear Algebra with Applications*, **1** (1994) 151–154.
21. Andreas Frommer and Daniel B. Szyld, Asynchronous Two-stage Methods, *Numerische Mathematik*, **69** (1994) 141–153.
23. Ricardo D. Pantazis and Daniel B. Szyld, Regions of Convergence of the Rayleigh Quotient Iteration Method, *Numerical Linear Algebra with Applications*, **2** (1995) 251–269.
25. Mark T. Jones and Daniel B. Szyld, Two-stage Multisplitting Methods with Overlapping Blocks, *Numerical Linear Algebra with Applications*, **3** (1996) 113–124.
28. Michele Benzi and Daniel B. Szyld, Existence and Uniqueness of Splittings for Stationary Iterative Methods with Applications to Alternating Methods, *Numerische Mathematik*, **76** (1997) 309–321.
30. Daniel B. Szyld, Different Models of Parallel Asynchronous Iterations with Overlapping Blocks, *Computational and Applied Mathematics*, **17** (1998) 101–115.
33. Michele Benzi, Daniel B. Szyld, and Arno van Duin, Orderings for Incomplete Factorization Preconditionings of Nonsymmetric Problems, *SIAM Journal on Scientific Computing*, **20** (1999) 1652–1670.
34. Andreas Frommer and Daniel B. Szyld, Weighted Max Norms, Splittings, and Overlapping Additive Schwarz Iterations, *Numerische Mathematik*, **83** (1999) 259–278.
35. Kostas Blathras, Daniel B. Szyld, and Yuan Shi, Timing Models and Local Stopping Criteria for Asynchronous Iterative Algorithms, *Journal of Parallel and Distributed Computing*, **58** (1999) 446–465.
36. Andreas Frommer and Daniel B. Szyld, On Asynchronous Iterations, *Journal of Computational and Applied Mathematics* **123** (2000) 201–216.
40. Michele Benzi, Andreas Frommer, Reinhard Nabben, and Daniel B. Szyld, Algebraic Theory of Multiplicative Schwarz Methods, *Numerische Mathematik*, **89** (2001) 605–639.
41. Andreas Frommer and Daniel B. Szyld, An Algebraic Convergence Theory for Restricted Additive Schwarz Methods Using Weighted Max Norms, *SIAM Journal on Numerical Analysis* **39** (2001) 463–479.
43. Ludwig Elsner, Andreas Frommer, Reinhard Nabben, Hans Schneider, and Daniel B. Szyld, Conditions for strict inequality in comparisons of spectral radii of splittings of different matrices, *Linear Algebra and its Applications* **363** (2003) 65–80.
44. Ivo Marek and Daniel B. Szyld, Comparison of Convergence of General Stationary Iterative Methods for Singular Matrices, *SIAM Journal on Matrix Analysis and Applications*, **24** (2002) 68–77.

45. Valeria Simoncini and Daniel B. Szyld, Flexible Inner-Outer Krylov Subspace Methods, *SIAM Journal on Numerical Analysis* **40** (2003) 2219–2239.
47. Valeria Simoncini and Daniel B. Szyld, Theory of Inexact Krylov Subspace Methods and Applications to Scientific Computing. *SIAM Journal on Scientific Computing*, **25** (2003) 454–477.
50. Valeria Simoncini and Daniel B. Szyld, On the Occurrence of Superlinear Convergence of Exact and Inexact Krylov Subspace Methods, *SIAM Review*, **47** (2005) 247–272.
51. Valeria Simoncini and Daniel B. Szyld, The effect of non-optimal bases on the convergence of Krylov Subspace Methods, *Numerische Mathematik*, **100** (2005) 711–733.
53. Rafael Bru, Francisco Pedroche, and Daniel B. Szyld, Additive Schwarz Iterations for Markov Chains. *SIAM Journal on Matrix Analysis and Applications*, **27** (2005) 445–458.
55. Daniel B. Szyld, The many proofs of an Identity on the Norm of Oblique Projections, *Numerical Algorithms*, **42** (2006) 309–323.
56. Reinhard Nabben and Daniel B. Szyld, Schwarz iterations for symmetric positive semidefinite problems, *SIAM Journal on Matrix Analysis and Applications*, **29** (2006) 98–116.
57. Valeria Simoncini and Daniel B. Szyld, Recent computational developments in Krylov Subspace Methods for linear systems, *Numerical Linear Algebra with Applications*, **14** (2007) 1–59.
58. Marcus Sarkis and Daniel B. Szyld, Optimal Left and Right Additive Schwarz Preconditioning for Minimal Residual Methods with Euclidean and Energy Norms, *Computer Methods in Applied Mechanics and Engineering*, **196** (2007) 1612–1621.
61. David Fritzsche, Volker Mehrmann, Daniel B. Szyld, and Elena Virnik, An SVD approach to identifying meta-stable states of Markov chains. *Electronic Transactions on Numerical Analysis*, **29** (2008), 46–69.
62. Valeria Simoncini and Daniel B. Szyld, New conditions for non-stagnation of minimal residual methods. *Numerische Mathematik*, **109** (2008) 477–487.
64. Abed Elhashash and Daniel B. Szyld, On general matrices having the Perron-Frobenius property, *Electronic Journal on Linear Algebra*, **17** (2008) 389–413.
67. Andreas Frommer, Reinhard Nabben, and Daniel B. Szyld, Convergence of Stationary Iterative Methods for Hermitian Semidefinite Linear Systems and Applications to Schwarz Methods, *SIAM Journal on Matrix Analysis and Applications*, **30** (2008) 925–938.

71. Sébastien Loisel and Daniel B. Szyld, On the convergence of Algebraic Optimizable Schwarz Methods with applications to elliptic problems, *Numerische Mathematik*, **114** (2010) 697–728.
72. Valeria Simoncini and Daniel B. Szyld, On the field of values of oblique projections, *Linear Algebra and its Applications*, **433** (2010) 810–818.
73. Valeria Simoncini and Daniel B. Szyld, Interpreting IDR as a Petrov-Galerkin method. *SIAM Journal on Scientific Computing*, **32** (2010) 1898–1912.
75. Daniel B. Szyld and Fei Xue, Efficient preconditioned inner solves for inexact Rayleigh quotient iteration and their connections to the single-vector Jacobi-Davidson method. *SIAM Journal on Matrix Analysis and Applications*, **32** (2011) 993–1018.
76. Xingwei Yang, Daniel B. Szyld, and Longin Jan Latecki, Diffusion on a Tensor Product Graph for Semi-Supervised Learning, *Advances in Imaging and Electron Physics*, **169** (2011) 147–172.
77. Olivier Dubois, Martin J. Gander, Sébastien Loisel, Amik St-Cyr, and Daniel B. Szyld, The Optimized Schwarz Method with a Coarse Grid Correction, *SIAM Journal on Scientific Computing*, **34** (2012)
78. Mark Embree, Josef A. Sifuentes, Kirk M. Soodhalter, Daniel B. Szyld, and Fei Xue, Short-Term Recurrence Krylov Subspace Methods for Nearly-Hermitian Matrices, *SIAM Journal on Matrix Analysis and Applications*, **33** (2012) 480–500.
80. Martin J. Gander, Sébastien Loisel, and Daniel B. Szyld, An optimal block iterative method and preconditioner for banded matrices with applications to PDEs on irregular domains, *SIAM Journal on Matrix Analysis and Applications*, **33** (2012) 653–680.
81. Daniel B. Szyld and Fei Xue, Local convergence analysis of several inexact Newton-type algorithms for general nonlinear eigenvalue problems. *Numerische Mathematik*, **123** (2013) 333–362.
82. David Fritzsche, Andreas Frommer, Stephen Shank, and Daniel B. Szyld, Overlapping blocks by growing a partition with applications to preconditioning. *SIAM Journal on Scientific Computing*, **35** (2013) A453–A473.
83. Xiuhong Du, Marcus Sarkis, Christian E. Schaerer, and Daniel B. Szyld, Inexact and truncated Parareal-in-time Krylov subspace methods for parabolic optimal control problems. *Electronic Transactions on Numerical Analysis*, **30** (2013) 36–57.
84. Bryan Shader, Naomi Shaked-Monderer and Daniel B. Szyld, Nearly positive matrices, *Linear Algebra and its Applications*, **449** (2014) 520–544.
87. Valeria Simoncini, Daniel B. Szyld, and Marlliny Monsalve, On two numerical methods for the solution of large-scale algebraic Riccati equations. *IMA Journal on Numerical Analysis*, **34** (2014) 904–920.

88. Daniel B. Szyld and Fei Xue, Several properties of invariant pairs of nonlinear algebraic eigenvalue problems. *IMA Journal of Numerical Analysis*, **34** (2014) 921–954.
90. Daniel B. Szyld and Fei Xue, Local convergence of Newton-like methods for degenerate eigenvalues of nonlinear eigenproblems. I. Classical algorithms. *Numerische Mathematik*, **129** (2015) 353–381.
91. Daniel B. Szyld and Fei Xue, Local convergence of Newton-like methods for degenerate eigenvalues of nonlinear eigenproblems. II. Accelerated algorithms. *Numerische Mathematik*, **129** (2015) 382–403.

RESEARCH ARTICLES IN REFEREED PROCEEDINGS (selection):

110. Daniel B. Szyld, Perspectives on Asynchronous Computations for Fluid Flow Problems, in *Computational Fluid and Solid Mechanics*, K. J. Bathe, ed., Elsevier, 2001, pages 377–380.
116. Giorgos Kollias, Efstratios Gallopoulos, and Daniel B. Szyld. Asynchronous iterative computations with Web information retrieval structures: The PageRank case. In *Parallel Computing: Current and Future Issues of High-End Computing* (Proceedings of the International Conference Parco05), G.R. Joubert, W.E. Nagel, F.J. Peters, O. Plata, P. Tirado, E. Zapata, eds., John von Neumann-Institut für Computing (NIC), Jülich, Germany, NIC Series Volume 33, pp. 309–316, 2006.
122. Chen Greif, Tyrone Rees, and and Daniel B. Szyld, Additive Schwarz with Variable Weights, *Domain Decomposition Methods in Science and Engineering XXI*, J. Erhel, M. Gander, L. Halpern, G. Pichot, T. Sassi, and O. Widlund, eds. Lecture notes in Computer Science and Engineering, Vol. 98, Springer, Berlin and Heidelberg, 2014, pages 661–668.

SELECTED UNIVERSITY SERVICE

Senate Committee on the Status of Women, 2002–2005. Temple University.

Promotions Committee of the College (Arts and Sciences 1996–1998, Science and Technology 1998–1999, 2009–11, chair 2010–11), Temple University.

University Tenure and Promotions Committee, Temple University, 2011–13.

Latino Initiative Committee of the Provost, Temple University, 1997–1999.

Director of Undergraduate Studies, Department of Mathematics, Temple University, 1997–1999.

Director of Graduate Studies, Department of Computer Science, Duke University, 1986–1988.

Executive Committee of the Department of Mathematics, 2003–2006, 2008–2010, 2012–2015.

Dean Advisory Committee of the College of Science and Technology, 2007–2012.