

# Curriculum Vitae

Adrian Lewis

January 21, 2009

## 1 Personal Data

**Name:** Adrian Stephen Lewis

**Date of birth:** January 25, 1962

**Citizenship:** British and Canadian, U.S. Permanent Resident

**Employer:** Cornell University, School of Operations Research and Information Engineering, Ithaca, NY 14853, USA.

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## Degrees

- B.A. (Mathematics), 1983, Cambridge University, U.K.
- M.A., 1987, Cambridge University, U.K.
- Ph.D. (Engineering), July 1987, Cambridge University, U.K.  
(Dissertation: Extreme point methods for infinite linear programming.)

## Positions

1. July 2004 onwards: **Full Professor** (with tenure), School of Operations Research and Industrial Engineering, Cornell University.
2. Apr. 2001 – Apr. 2006: Full Professor (with tenure), Department of Mathematics, Simon Fraser University.
3. July 1997 – Apr. 2003: Full Professor (with tenure), Combinatorics and Optimization Dept., University of Waterloo.
4. July 1999 – Apr. 2000: Visiting Member, Courant Institute, N.Y.
5. June 1999, Professeur Invité, Université de Montpellier II, France.
6. Sep. 1998, Visiting Professor, M.S.R.I. Berkeley, U.S.A.
7. Feb. – Apr. 1998: Visiting Scientist, Cornell University.
8. July 1993 – July 1997: Associate Professor (with tenure), Combinatorics and Optimization Dept., University of Waterloo.
9. Mar. 1996: Invited Professor, University of Milan, Italy.
10. June 1995, Jan. 1996, and Apr. 2003: Professeur Invité, Université Paul Sabatier, France.
11. Aug. 1988 – June 1993: Assistant Professor (Tenure-track), Combinatorics and Optimization Dept., University of Waterloo.
12. Apr. 1993: Visiting Lecturer, Engineering Science Dept., University of Auckland, New Zealand.
13. Apr. 1991: Maître de Conférences, Université de Limoges, France.
14. June 1989: Maître de Conférences, Université de Pau, France.
15. Aug. 1988: Visiting Research Fellow, Centre for Mathematical Analysis, Australian National University.
16. Jan. 1987 – June 1989: Research Fellow, Dalhousie University.
17. Sep. 1986 – Aug. 1989: Research Fellow, Queens' College, Cambridge University, U.K.

## 2 Research and Scholarship

### Prizes and other honours

- **2005 Outstanding Paper Prize**, from the Society for Industrial and Applied Mathematics, for “Active sets, nonsmoothness, and sensitivity”. (Awarded, for originality, to a paper published in a SIAM journal in the period 2001–4.)
- **2003 Lagrange Prize for Continuous Optimization**, from the Mathematical Programming Society and SIAM. (Awarded every three years for an outstanding work in continuous optimization. My paper “Nonsmooth analysis of eigenvalues” was the first winner.)
- **1995 Aisenstadt Prize** from Centre de Recherches Mathématiques, Montréal. (Awarded annually to a Canadian within 7 years of Ph.D.)

### Major plenary presentations

- Matheon Colloquium, Berlin, Feb. 2008.
- Second Mathematical Programming Society International Conference on Continuous Optimization, Aug. 2007. (Opening Plenary Speaker. 400 participants.)
- Fiftieth Annual Meeting of the Australian Mathematical Society, Sydney, Sep. 2006. (Plenary speaker. 500 participants.)
- Fifth Conference on Foundations of Computational Mathematics, Santander, July 2005. (Plenary speaker. 500 participants.)
- Twelfth Conference of the International Linear Algebra Society, Regina, June 2005. (Plenary speaker. 200 participants.)
- Eighteenth International Symposium on Mathematical Programming, Copenhagen, Aug. 2003. (Semi-plenary speaker. 1,000 participants.)
- Fifth SIAM Conference on Optimization, Victoria, May 1996. (Plenary speaker. 400 participants.)

In my lists of publications I have indicated graduate students (at the time of the work) by \*, and postdoctoral fellows by \*\*.

## Monographs

- J.M. Borwein and A.S. Lewis, ‘Convex Analysis and Nonlinear Optimization’, 273 pages, Springer, New York (2000). Expanded Second Edition appeared in 2006.

## Articles submitted to refereed journals

1. J. Bolte, A. Daniilidis and A.S. Lewis, ‘Generic identifiability and second-order sufficiency in tame convex optimization’, submitted to *Mathematics of Operations Research*.
2. A.S. Lewis and S.J. Wright, ‘A proximal method for composite minimization’, submitted to *Mathematical Programming*.
3. A.S. Lewis and S.J. Wright, ‘Identifying activity’, submitted to *SIAM Journal on Optimization*.
4. A.S. Lewis and M.L. Overton, ‘Behavior of BFGS with an exact line search on nonsmooth examples’, submitted to *SIAM Journal on Optimization*.
5. A.S. Lewis and M.L. Overton, ‘Nonsmooth optimization via BFGS ’, submitted to *SIAM Journal on Optimization*.
6. A.S. Lewis and C.H.J. Pang\*, ‘Lipschitz behavior of the robust regularization’, 32 pages, submitted to *SIAM Journal on Control and Optimization*.
7. D. Leventhal\* and A.S. Lewis, ‘Randomized methods for linear constraints: convergence rates and conditioning’, 24 pages, submitted to *Mathematics of Operations Research*.
8. D. Leventhal\* and A.S. Lewis, ‘Randomized Hessian estimation and directional search’, 21 pages, submitted to *Optimization*.

## Articles in refereed journals

1. A.S. Lewis, D.R. Luke and J. Malick, ‘Local convergence for alternating and averaged nonconvex projections’, 32 pages, *Foundations of Computational Mathematics*. DOI 10.1007/s10208-008-9036-y.

2. J. Bolte, A. Daniilidis and A.S. Lewis, ‘Tame mappings are semi-smooth’, *Mathematical Programming B* 117 (2009), 5–19.
3. A. Daniilidis, A.S. Lewis, J. Malick and H. Sendov, ‘Prox-regularity of spectral functions and spectral sets’, *Journal of Convex Analysis* 15 (2008), 547–560.
4. J.V. Burke, A.S. Lewis and M.L. Overton, ‘The speed of Shor’s R-algorithm’, *IMA Journal on Numerical Analysis* 28 (2008), 711–720.
5. A.S. Lewis and C.H.J. Pang\*, ‘Variational analysis of pseudospectra’, *SIAM Journal on Optimization* 19 (2008), 1048–1072.
6. A.S. Lewis and J. Malick\*\*, ‘Alternating projections on manifolds’, *Mathematics of Operations Research* 33 (2008), 216–234.
7. A.D. Ioffe and A.S. Lewis, ‘Critical points of simple functions’, *Optimization* 57 (2008), 3–16.
8. A.S. Lewis, ‘Nonsmooth optimization and robust control’, *Annual Reviews in Control* 31 (2007), 167–177.
9. J.V. Burke, A.S. Lewis and M.L. Overton, ‘Spectral conditioning and pseudospectral growth’, *Numerische Mathematik* 107 (2007), 27–37.
10. W.L. Hare\* and A.S. Lewis, ‘Identifying active manifolds’, *Algorithmic Operations Research* 2 (2007), 75–82.
11. J. Bolte, A. Daniilidis, A.S. Lewis and M. Shiota, ‘Clarke subgradients of stratifiable functions’, *SIAM Journal on Optimization* 18 (2007) 556–572.
12. J. Bolte\*\*, A. Daniilidis\*\* and A.S. Lewis, ‘The Lojasiewicz inequality for nonsmooth subanalytic functions with applications to subgradient dynamical systems’, *SIAM Journal on Optimization* 17 (2007), 1205–1223.
13. J.V. Burke, A.S. Lewis and M.L. Overton, ‘Convexity and Lipschitz behavior of small pseudospectra’, *SIAM Journal on Matrix Analysis and Applications* 29 (2007) 586–595.

14. J.V. Burke, D. Henrion, A.S. Lewis and M.L. Overton, ‘Stabilization via nonsmooth, nonconvex optimization’, *IEEE Transactions on Automatic Control* 51 (2006), 1760–1769.
15. S. Fitzpatrick and A.S. Lewis, ‘Weak-star convergence of convex sets’, *Journal of Convex Analysis* 13 (2006), 711–719.
16. J. Bolte, A. Daniilidis and A.S. Lewis, ‘A nonsmooth Morse-Sard theorem for subanalytic functions’, *Journal of Mathematical Analysis and Applications* 321 (2006), 729–740.
17. R. Henrion, A.S. Lewis and A. Seeger, ‘The distance to uncontrollability for convex processes’, *SIAM Journal on Control and Optimization* 45 (2006), 26–50.
18. J. Bolte, A. Daniilidis, A.S. Lewis and M. Shiota, ‘Clarke critical values of subanalytic Lipschitz continuous functions’, *Annales Polonici Mathematici* 87 (2005), 13–25.
19. W.L. Hare\* and A.S. Lewis, ‘Estimating tangent and normal cones without calculus’, *Mathematics of Operations Research* 30 (2005), 785–799.
20. A.L. Dontchev and A.S. Lewis, ‘Perturbations and metric regularity’, *Set-Valued Analysis* 13 (2005), 417–438.
21. A.S. Lewis and H.S. Sendov\*, ‘Nonsmooth analysis of singular values. Part I: Theory’, *Set-Valued Analysis* 13 (2005), 213–241.
22. A.S. Lewis and H.S. Sendov\*, ‘Nonsmooth analysis of singular values. Part II: Applications’, *Set-Valued Analysis* 13 (2005), 243–264.
23. J.V. Burke, A.S. Lewis and M.L. Overton, ‘Variational analysis of functions of the roots of polynomials’, *Mathematical Programming* 104 (2005), 263–292.
24. J.V. Burke, A.S. Lewis and M.L. Overton, ‘A robust gradient sampling algorithm for nonsmooth, nonconvex optimization’, *SIAM Journal on Optimization* 15 (2005), 751–779.

25. A.S. Lewis, P. Parrilo and M. Ramana, ‘The Lax conjecture is true’, *Proceedings of the American Mathematical Society* 133 (2005), 2495–2499.
26. J.V. Burke, A.S. Lewis and M.L. Overton, ‘Pseudospectral components and the distance to uncontrollability’, *SIAM Journal on Matrix Analysis and Applications* 26 (2004), 350–361.
27. W.L. Hare\* and A.S. Lewis, ‘Identifying active constraints via partial smoothness and prox-regularity’, *Journal of Convex Analysis* 11 (2004), 251–266.
28. A.S. Lewis, ‘The structured distance to ill-posedness for conic systems’, *Mathematics of Operations Research* 29 (2004), 776–785.
29. J.V. Burke, A.S. Lewis and M.L. Overton, ‘Variational analysis of the abscissa mapping for polynomials and the Gauss-Lucas theorem’, *Journal of Global Optimization* 28 (2004), 259–268.
30. A.S. Lewis, ‘The mathematics of eigenvalue optimization’, *Mathematical Programming* 97 (2003), 155–176.
31. J.V. Burke, A.S. Lewis and M.L. Overton, ‘Optimization and pseudospectra, with applications to robust stability’, *SIAM Journal on Matrix Analysis and Applications* 25 (2003), 80–104.
32. J.V. Burke, A.S. Lewis and M.L. Overton, ‘Robust stability and a criss-cross algorithm for the pseudospectral abscissa’, *IMA Journal of Numerical Analysis* 23 (2003), 359–375.
33. J.M. Borwein, J.V. Burke and A.S. Lewis, ‘Differentiability of cone-monotone functions on separable Banach space’, *Proceedings of the American Mathematical Society* 132 (2003), 1067–1076.
34. A.S. Lewis, ‘Active sets, nonsmoothness and sensitivity’, *SIAM Journal on Optimization* 13 (2003), 702–725.
35. A.L. Dontchev, A.S. Lewis and R.T. Rockafellar, ‘The radius of metric regularity’, *Transactions of the American Mathematical Society* 355 (2003), 493–517.

36. J.V. Burke, A.S. Lewis and M.L. Overton, ‘Approximating subdifferentials by random sampling of gradients’, *Mathematics of Operations Research* 27 (2002), 567–584.
37. J.V. Burke, A.S. Lewis and M.L. Overton, ‘Two numerical methods for optimizing matrix stability’, *Linear Algebra and its Applications* 351/2 (2002), 117–145.
38. A.S. Lewis and H.S. Sendov\*, ‘Quadratic expansions of spectral functions’ *Linear Algebra and its Applications* 340 (2002), 97–121.
39. J.V. Burke, A.S. Lewis and M.L. Overton, ‘Optimal stability and eigenvalue multiplicity’, *Foundations of Computational Math.* 1 (2001), 205–225.
40. A.S. Lewis and H.S. Sendov\*, ‘Twice differentiable spectral functions’, *SIAM Journal on Matrix Analysis and Applications* 23 (2001), 368–386.
41. A.S. Lewis and H.S. Sendov\*, ‘Self-concordant barriers for hyperbolic means’, *Mathematical Programming* 91 (2001), 1–10.
42. H. Bauschke\*\*, O. Güler, A.S. Lewis and H.S. Sendov\*, ‘Hyperbolic polynomials and convex analysis’, *Canadian Journal of Mathematics* 53 (2001), 470–488.
43. A.S. Lewis, ‘Ill-conditioned inclusions’, *Set-Valued Analysis* 9 (2001), 375–381.
44. J.V. Burke, A.S. Lewis and M.L. Overton, ‘Optimizing matrix stability’, *Proceedings of the American Mathematical Society* 129 (2000), 1635–1642.
45. A.S. Lewis, ‘Convex analysis on Cartan subspaces’, *Nonlinear Analysis, Theory, Methods and Applications* 42 (2000), 813–820.
46. A.S. Lewis and R.E. Lucchetti, ‘Nonsmooth duality, sandwich and squeeze theorems’, *SIAM J. Control and Optimization* 38 (2000), 613–626.
47. H.H. Bauschke\*\* and A.S. Lewis, ‘Dykstra’s algorithm with Bregman projections: a convergence proof’, *Optimization* 48 (2000), 409–427.

48. J.M. Borwein, A.S. Lewis, J. Read\*\* and Q. Zhu, ‘Convex spectral functions of compact operators’, *Journal of Nonlinear and Convex Analysis* 1 (2000), 17–35.
49. A.S. Lewis, ‘Ill-conditioned convex processes and conic linear systems’, *Mathematics of Operations Research* 24 (1999), 829–834.
50. A.S. Lewis, ‘Lidskii’s theorem via nonsmooth analysis’, *SIAM Journal on Matrix Analysis and Applications* 21 (1999), 379–381.
51. A.S. Lewis, ‘Nonsmooth analysis of eigenvalues’, *Mathematical Programming* 84 (1999), 1–24.
52. J.-B. Hiriart-Urruty and A.S. Lewis, ‘The Clarke and Michel-Penot sub-differentials of the eigenvalues of a symmetric matrix’, *Computational Optimization and Applications* 13 (1999), 13–23.
53. A.S. Lewis, ‘Eigenvalue-constrained faces’, *Linear Algebra and Applications* 269 (1998), 159–181.
54. A.S. Lewis and M.L. Overton, ‘Eigenvalue optimization’, *Acta Numerica* 5 (1996) 149–190.
55. A.S. Lewis, ‘Group invariance and convex matrix analysis’, *SIAM Journal on Matrix Analysis* 17 (1996), 927–949.
56. A.S. Lewis, ‘Derivatives of spectral functions’, *Mathematics of Operations Research* 21 (1996), 576–588.
57. J.M. Borwein, A.S. Lewis and D. Noll, ‘Maximum entropy reconstruction using derivative information part 1: Fisher information and convex duality’, *Mathematics of Operations Research* 21 (1996), 442–468.
58. A.S. Lewis, ‘Superresolution in the Markov moment problem’, *Journal of Mathematical Analysis and Applications* 197 (1996) 774–780.
59. A.S. Lewis and D. Ralph, ‘A nonlinear duality result equivalent to the Clarke-Ledyev mean value inequality’, *Nonlinear Analysis* 26 (1996) 343–350.
60. A.S. Lewis, ‘Convex analysis on the Hermitian matrices’, *SIAM Journal on Optimization* 6 (1996) 164–177.

61. A.S. Lewis, ‘The convex analysis of unitarily invariant matrix norms’, *Journal of Convex Analysis* 2 (1995) 173–183.
62. A.S. Lewis and A.B. Philpott, ‘Experiments with affine scaling and semi-infinite programming’, *New Zealand Journal of Mathematics* 24 (1995), 49–71.
63. A.S. Lewis, ‘Consistency of moment systems’, *Canadian Journal of Mathematics* 47 (1995) 995–1006.
64. J.M. Borwein, A.S. Lewis, M.N. Limber\*\* and D. Noll, ‘Maximum entropy reconstruction using derivative information part 2: computational results’, *Numerische Mathematik* 69 (1995) 243–256.
65. J.M. Borwein, A.S. Lewis and M.A. Limber\*\*, ‘Entropy minimization with lattice bounds’, *Journal of Approximation Theory* 79 (1994) 1–16.
66. J.M. Borwein, A.S. Lewis and R. Nussbaum, ‘Entropy minimization, DAD problems, and doubly stochastic kernels’, *Journal of Functional Analysis* 123 (1994) 264–307.
67. A.S. Lewis, ‘Facial reduction in partially finite convex programming’, *Mathematical Programming* 65 (1994) 123–138.
68. P. Borwein and A.S. Lewis, ‘Moment matching and best entropy estimation’, *Journal of Mathematical Analysis and Applications* 185 (1994) 596–604.
69. M. Chamberland\* and A.S. Lewis, ‘Contours of Liapunov functions’, *Journal of Optimization Theory and Applications* 80 (1994) 149–160.
70. J.M. Borwein and A.S. Lewis, ‘Strong rotundity and optimization’, *SIAM Journal on Optimization* 4 (1994) 146–158.
71. J.M. Borwein and A.S. Lewis, ‘Convergence of decreasing sequences of convex sets in nonreflexive Banach spaces’, *Set-Valued Analysis* 1 (1993) 355–363.
72. A.S. Lewis, ‘The convergence of entropy-based approximations for moment problems’, *Optimization* 28 (1993) 383–395.

73. J.M. Borwein and A.S. Lewis, ‘Partially finite programming in  $L_1$  and the existence of maximum entropy estimates’, *SIAM Journal on Optimization* 3 (1993) 248–267.
74. J.M. Borwein and A.S. Lewis, ‘Decomposition of multivariate functions’, *Canadian Journal of Mathematics* 44 (1992) 463–482.
75. J.M. Borwein and A.S. Lewis, ‘Partially-finite convex programming, Part I: Quasi relative interiors and duality theory’, *Mathematical Programming, Series B* 57 (1992) 15–48.
76. J.M. Borwein and A.S. Lewis, ‘Partially-finite convex programming, Part II, Explicit lattice models’, *Mathematical Programming, Series B* 57 (1992) 49–84.
77. J.M. Borwein and A.S. Lewis, ‘Duality relationships for entropy-like minimization problems’, *SIAM Journal on Control and Optimization* 29 (1991) 325–338.
78. J.M. Borwein and A.S. Lewis, ‘Convergence of best entropy estimates’, *SIAM Journal on Optimization* 1 (1991) 191–205.
79. J.M. Borwein and A.S. Lewis, ‘On the convergence of moment problems’, *Transactions of the American Mathematical Society* 325 (1991) 249–271.
80. E.J. Anderson and A.S. Lewis, ‘An extension of the simplex algorithm for semi-infinite linear programming’, *Mathematical Programming* 44 (1989) 247–269.
81. E.J. Anderson, A.S. Lewis and S.Y. Wu, ‘The capacity problem’, *Optimization* 20 (1989) 725–742.

### Articles in refereed conference proceedings

1. J.V. Burke, D. Henrion, A.S. Lewis and M.L. Overton, ‘HIFOO — A MATLAB package for fixed-order controller design and  $H_\infty$  optimization’, 6 pages, to appear in: *Proceedings of the 5th IFAC Symposium on Robust Control Design, ROCOND’06*.

2. A.S. Lewis, ‘Eigenvalues and nonsmooth optimization’, in: L.M. Pardo, A. Pinkus, E. Süli and M.J. Todd (eds), *Foundations of Computational Mathematics: Santander 2005*, Cambridge University Press (2006), 208–229.
3. J.V. Burke, A.S. Lewis and M.L. Overton, ‘A nonsmooth, nonconvex optimization approach to robust stabilization by static output feedback and low-order controllers’, 7 pages, in: *Proceedings of the 4th IFAC Symposium on Robust Control Design, ROCOND’03*.
4. J.M. Borwein, A.S. Lewis and Q.J. Zhu, ‘Convex spectral functions of compact operators, Part II: lower semicontinuity and rearrangement invariance’, in: A. Rubinov and B. Glover (eds), ‘Optimization and Related Topics’, Kluwer (2001), 179–196.
5. A.S. Lewis and J.-S. Pang, ‘Error bounds for convex inequality systems’, in: J.-P. Crouzeix, J.-E. Martinez-Legaz and M. Volle (eds), *Generalized Convexity, Generalized Monotonicity* (1998) 75–110.
6. H. Bauschke\*, J.M. Borwein, and A.S. Lewis, ‘The method of cyclic projections for closed convex sets in Hilbert space’, in: Y. Censor and S. Reich (eds), ‘Recent Developments in Optimization Theory and Non-linear Analysis’, *Contemporary Mathematics* 204, AMS, Providence RI, 1997, 1–38.
7. J.M. Borwein and A.S. Lewis, ‘Practical conditions for Fenchel duality in infinite dimensions’, in: M. Théra and J.-B. Baillon (eds.), *Fixed Point Theory and Applications* (Longman, U.K., 1991) 83–89.
8. A.S. Lewis, ‘The convergence of entropic estimates for moment problems’, in: J.R. Giles and S. Fitzpatrick (eds.), *Functional Analysis/Optimization, Proceedings of the Centre for Mathematical Analysis, Canberra, Australia, Vol. 20*, (1989) 100–115.
9. A. Brace, A.S. Lewis and G.N. Newsam, ‘The valuation of contingent securities’, in: J.R. Giles and S. Fitzpatrick (eds.), *Functional Analysis/Optimization, Proceedings of the Centre for Mathematical Analysis, Canberra, Australia, Vol. 20*, (1989) 205–206.
10. A.S. Lewis, ‘Extreme points of infinite transportation problems’, in: M.J. Beckmann, K.-W. Gaede, K. Ritter and H. Schneeweiss (eds.),

*Proceedings of the Tenth Symposium on Operations Research, Munich* (Verlag Anton Hain, 1986) 115–126.

11. A.S. Lewis, ‘Extreme points and purification algorithms in general linear programming’, in: E.J. Anderson and A.B. Philpott (eds.), *Infinite Programming, Proceedings* (Springer-Verlag, Berlin, 1985) 123–135.

### Articles in unrefereed proceedings

1. A.S. Lewis, ‘Local structure and algorithms in nonsmooth optimization’, in: F. Jarre, C. Lemaréchal and J. Zowe (eds), *Oberwolfach Proceedings, 2005*.
2. A.S. Lewis, ‘Nonsmooth analysis of eigenvalues: a summary’, *Rendiconti del Seminario Matematico e Fisico di Milano*, Vol. LXVI (1998) 33–41.
3. A.S. Lewis, ‘Convex analysis and applications’, in *Bulletin of the Centre de Recherches Mathématiques, Montréal* (1996): a summary of my research interests as Aisenstadt prize recipient.
4. J.M. Borwein and A.S. Lewis, ‘A survey of convergence results for maximum entropy methods’, in: A. Mohammad-Djafari and G. Demoments (eds), ‘Maximum Entropy and Bayesian Methods’, Kluwer, 1993.

### Miscellaneous

1. A.S. Lewis, Book review of ‘Lectures on Modern Convex Optimization’ by A. Ben-Tal and A. Nemirovski, *SIAM Review* 44, 731-734, 2002.
2. A.S. Lewis, 50 entries for: J. Bothamley (ed.), ‘Dictionary of Theories’, Gale Research, London, U.K., 1993.

### Invited presentations and colloquia (past 6 years)

I have listed major plenary presentations at the beginning of this section.

1. Oct. 2008: ‘Metric regularity illustrated’, Optimization Seminar, University of Wisconsin.

2. Sep. 2008: ‘Regularity illustrated’, Numerical Analysis Seminar, Courant Institute, New York.
3. Aug. 2008: ‘Regularity illustrated’, semi-plenary lecture, Annual German Operations Research Conference, Augsburg.
4. June 2008: ‘Metric regularity illustrated’, Conference on the Foundations of Computational Mathematics, Hong Kong.
5. May 2008: ‘Alternating projections and metric regularity’, Optimization Workshop, Politecnico di Milano.
6. Apr. 2008: ‘Metric regularity illustrated’, plenary lecture, 2nd International Conference on Nonlinear Programming with Applications, Beijing.
7. Feb. 2008: ‘Semi-algebraic ideas in nonsmooth optimization’, Humboldt University, Berlin.
8. Jan. 2008: ‘Nonsmooth optimization: foundations, special structure, and algorithms’, La Sapienza University, Rome.
9. Sep. 2007: ‘Regularity illustrated’, 11th Workshop on Well-Posedness, Alicante, Spain.
10. June 2007: ‘Semi-algebraic ideas in nonsmooth optimization’, plenary lecture, 23rd IFIP TC 7 Conference on System Modelling and Optimization, Crakow, Poland.
11. July 2007: ‘Alternating projections revisited’, plenary lecture, Joint EUROPT-OMS Meeting, Prague, Czech Republic.
12. June 2007: ‘Semi-algebraic ideas in nonsmooth optimization’, plenary lecture, C&O@40, University of Waterloo.
13. May 2007: ‘Eigenvalues and optimization’, Colloquium, Simon Fraser University.
14. May 2007: ‘Variational properties of pseudospectra’, Canadian Applied and Industrial Mathematics Conference, Banff.

15. Nov. 2006: ‘Alternating projections revisited’, Operations Research Seminar, MIT.
16. Jul. 2006: Plenary speaker at the 5th IFAC Symposium on Robust Control Design, Toulouse, France.
17. May 2006: ‘Structure in nonsmooth optimization’, International Conference on Nonlinear Programming, Shanghai, China.
18. May 2006: ‘Nonsmooth optimization and eigenvalues’, Institute of Computational Mathematics, Beijing, China.
19. Feb. 2006: ‘Nonsmooth optimization and eigenvalues’, Optimization Seminar, McMaster University, Canada.
20. Jan. 2006: ‘Eigenvalues and optimization’, Atlantic Analysis Days, Halifax, Canada.
21. Oct. 2005: ‘Semi-algebraic techniques in nonsmooth optimization’, 7th Midwest Optimization Seminar, Kalamazoo.
22. Apr. 2005: Special Lecturer at the Elisha Netanyahu Institute of Advanced Studies in Mathematics: three lectures on Variational Analysis and Eigenvalue Optimization.
23. Mar. 2005: ‘Local structure and algorithms for nonsmooth optimization’, Mathematics Colloquium, University of Washington.
24. Jan. 2005: ‘Local structure and algorithms for nonsmooth optimization’, plenary lecture, Oberwolfach Workshop on Optimization, Germany.
25. Sep. 2004: ‘Eigenvalue optimization: symmetric versus nonsymmetric matrices’, Computational Sciences Lecture Series, Madison.
26. July 2004: ‘Stable polynomials and Belgian chocolate’, Canada-France Mathematics Meeting, Toulouse, France.
27. Mar. 2004: ‘Eigenvalue optimization, robust stability, and well-posedness’, Institut Henri Poincaré, Paris.

28. Feb. 2004: ‘Eigenvalue optimization, robust stability, and well-posedness’, LAAS–CNRS, Toulouse, France.
29. Feb. 2004: ‘Controllability and pseudospectra’, University of Montpellier II, France.
30. Dec. 2003: ‘Eigenvalue optimization, robust stability, and well-posedness’, National University of Singapore.
31. Oct. 2003: ‘The mathematics of eigenvalue optimization’, Institute of Mathematics, Hanoi.
32. Aug. 2003: ‘The mathematics of eigenvalue optimization’, Eighteenth International Symposium on Mathematical Programming, Copenhagen (semi-plenary).
33. Apr. 2003: ‘Eigenvalue optimization and nonsmooth analysis’, Prague Spring School on Analysis (one of four invited 8-hour lecture series).
34. Apr. 2003: ‘Eigenvalue optimization, robust stability, and well-posedness’, Cornell University.
35. Mar. 2003: ‘Robust regularization and pseudospectra’, IMA Workshop on Semidefinite Programming and Robust Optimization, Minneapolis.
36. Oct. 2002: ‘Variational properties of the spectral abscissa for symmetric and nonsymmetric matrices: a comparison’, MSRI Workshop on Semidefinite Programming and its Applications, Berkeley.
37. Sep. 2002: ‘Robust regularization in optimization’, Eleventh Franco-German-Polish Conference on Optimization, Cottbus, Germany (plenary).
38. July 2002: ‘Robust eigenvalue optimization’, Fourth Conference on the Foundations of Computational Mathematics, Minneapolis (semi-plenary).

## **Funding (past 6 years)**

### **Principal Investigator**

- A.S. Lewis: National Science Foundation 3-year grant DMS-0806057, ‘Variational Analysis for Practical Optimization’, US\$ 387,861 (total), June 2008.
- A.S. Lewis: National Science Foundation 3-year grant DMS-0504032, ‘Applied Variational Analysis: Structure, Regularity, and Algorithms’, US\$ 275,364 (total), June 2005.
- A.S. Lewis: Startup funding, US\$20,000, Cornell University.
- A.S. Lewis: NSERC 5-year Individual Research Grant, Can\$130,000 (total), Apr. 2003.
- A.S. Lewis: President’s Research Grant, Can\$10,000, Simon Fraser University, Oct. 2001.
- A.S. Lewis: Endowed fellowship, Can\$5,000, Simon Fraser University, Oct. 2001.
- A.S. Lewis: Startup funding, Can\$60,000, Simon Fraser University, May 2001.
- A.S. Lewis: University of Waterloo Mathematics Faculty Fellowship, 2000–2004. (One course per year buy-out.)
- A.S. Lewis: NSERC 4-year Individual Research Grant, Can\$84,000 (total), Apr. 1999.

## **3 Teaching activities (past six years)**

### **Prizes**

- 2007 Sonny Yau ’72 Excellence in Teaching Award (the highest award for teaching in Cornell’s College of Engineering).
- 2007 Outstanding Teaching Award at Cornell’s School of ORIE in the Undergraduate Program.

## Courses taught

(Approximate class sizes in parentheses.)

### Cornell University

- ORIE 630: Mathematical Programming I (20), Fall 2007
- ORIE 632: Nonlinear Programming (22), Spring 2007 (joint with M.J. Todd).
- ORIE 639: Convex Analysis (10), Spring 2006.
- ORIE 321/521/522: Optimization 2 (170), Spring 2006 and 2007 (joint with D. Shmoys).
- ORIE 320/520: Optimization 1 (170), Fall 2005 and 2006 (joint with D. Shmoys).
- ORIE 522: Topics in Linear Optimization (50), Spring 2005.
- SYSEN 520: 4-week module on Optimization and System Dynamics (30), Spring 2005.
- ORIE 632: Nonlinear Programming (10), Fall 2004.

### Simon Fraser University

- Math 833: Numerical Optimization (10), Summer 2004.
- Math 380: History of Mathematics (90), Summer 2003.
- Macm 316: Numerical Analysis (160), Winter 2002, Summer 2003.
- Math 833: Modern Convex Optimization (5), Winter 2002.

## Curriculum development at Cornell

**ORIE 320/520 and 321/521/522: Optimization I and II** A complete redesign (with D. Shmoys) of the year-long undergraduate/masters optimization sequence, including a thorough reworking of the lecture material, complete online lecture notes, and extensive modelling and AMPL programming sections.

**ORIE 639: Convex Analysis** Course redesign.

**Optimization/System-Dynamics Module** Design, powerpoint preparation and live video presentation of new material for SYSEN 520.

**ORIE 632: Nonlinear Programming** Course redesign.

## Supervision

1. S. Shismenos (Ph.D. student), Spring 2006 – present (joint with S. Henderson)
2. J. Pang (Applied Mathematics Ph.D. student), Spring 2005 – present.
3. D. Leventhal (Ph.D. student), Spring 2005 – present.
4. J. Malick (Postdoctoral Fellow), Spring – Summer 2006. Currently a permanent researcher at INRIA Rhône-Alpes.
5. K. Barmisch (ORIE Undergraduate), Spring 2006.
6. R. Luke (PIMS Postdoctoral Fellow), Fall 2002 – Summer 2004 (jointly with J.M. Borwein). Currently tenure-track at University of Delaware.
7. J. Bolte (postdoctoral visitor), Summer 2003. On faculty at University of Paris 6.
8. A. Daniilidis (postdoctoral visitor), Summer 2003. On faculty at Autonomous University of Barcelona.
9. W. Hare (Ph.D. student), Spring 2001 – Spring 2004. Currently Postdoctoral Fellow at Simon Fraser University.

## 4 Service (past six years)

### Cornell positions

Director of Graduate Studies in the Field of Operations Research, July 2006 – Dec. 2007.

## **Cornell committees**

- Dean's Ad Hoc Committee, Fall 2007.
- Admissions Committee, Spring 2006.
- Director Selection Committee, Spring 2005.
- Tenure Committee, Fall 2004.

## **Simon Fraser committees**

1. Department Computing Committee (Chair), Fall 2003 – Summer 2004.
2. Provost's Taskforce on the New Media Innovation Centre, Fall 2003.
3. Centre for Interdisciplinary Research in Mathematics and Computational Sciences (IRMACS) Steering Committee, Spring 2002 – Summer 2004.
4. IRMACS Appointment Committee, Spring 2003.
5. Appointments and Long Range Planning Committee, Spring 2001 – Summer 2004.
6. Department Tenure Committee, Spring 2001 – Summer 2004.
7. Lecturer Appointment Committee (Chair), Spring – Summer 2003.

## **Conferences and seminars organized**

1. Organizing Committee, Fields Institute Semester on Foundations of Computational Mathematics, 2009.
2. Organizer, weekly Continuous Optimization Seminar, Cornell University, Spring 2005, 2006.
3. Joint organizer, Canada-France Symposium on Variational Analysis and Optimization, Toulouse, 2004, 20 participants.
4. Joint organizer, West Coast Optimization Meeting (twice each year), 2001 – 2004, 20 participants.

5. Organizing Committees, Eighth and Ninth Workshops on Well-Posedness in Optimization, Warsaw, Sep. 2001 and Luminy, Sep. 2003, 50 international participants each.
6. Organizer, Applied Analysis and Optimization Seminar, Simon Fraser University, 2001 – 2004.

## 5 Professional activities

### Editorial boards

- Co-Editor, *Mathematical Programming, Series A*, Oct. 2005 – present.
- Associate Editor, *Mathematics of Operations Research*, Dec. 1998 – present.
- Associate Editor, *SIAM Journal on Matrix Analysis and Applications*, Dec. 2006 – present.
- Associate Editor, *SIAM Journal on Optimization*, June 1994 – Jan. 2007.
- Associate Editor, *SIAM Journal on Control and Optimization*, Jan. 1997 – Jan. 2000.
- Associate Editor, *Mathematical Programming*, Oct. 1999 – Oct. 2005.
- Springer SIAM/MPS Monographs in Optimization, Summer 1999 – present.

### Positions

- Lagrange Prize Committee, Aug. 2005 – Aug. 2006, and Nov. 2007 – present (Chair).
- Selection Committee for 2005 SIAG-SIOPT Best Paper Prize.
- Treasurer, Foundations of Computational Mathematics, Aug. 2005 – present.

- Selection Committee for 2004 Math. Programming Society Young Researcher Competition (Chair).
- 2006 NSF Numerical Analysis and Optimization Panel.