

KATYA SCHEINBERG

tel: (610) 758-4039
cell: (917) 873-7981
fax: (610) 758-4886
email: katyas@lehigh.edu
url: <http://coral.ie.lehigh.edu/~katyas/>

Department of ISE
Lehigh University
Mohler Lab
200 W Packer ave
Bethlehem, PA

Education

- **Columbia University**, School of Arts and Sciences, New York, NY
Ph. D. in Operations Research, 1994-1997, Thesis: Issues related to interior point methods for linear and semidefinite programming. Thesis advisor: Professor D. Goldfarb.
- **Columbia University**, School of Engineering and Applied Sciences, New York, NY
M. S. in Operations Research, 1992-1994.
- **Lomonosov Moscow State University**, Department of Computational Mathematics and Cybernetics, Moscow, Russia.
B. S.-M. S. program, 1988-1992.

Selected Employment and Affiliation History

- 01/2017-07/2017 **Visiting Academic**, Alan Turing Institute, London, UK
- 01/2017-07/2017 **Visiting Professor**, Mathematical Institute, University of Oxford, Oxford, UK
- 09/2016-01/2017 **Visiting Researcher**, Google Research, New York, NY
- 06/2014-present **Harvey E. Wagner Endowed Chair Professor**, Dept. of Industrial and Systems Engineering, Lehigh University, Bethlehem, PA
- 10/2014-10/2015 **Lehigh ADVANCE Chair in Sciences, Technology, Engineering and Mathematics (STEM)**, Lehigh University, Bethlehem, PA
- 08/2010-06/2014 **Associate Professor**, Dept. of Industrial and Systems Engineering, Lehigh University, Bethlehem, PA
- 01/2010-05/2010 **Adjunct Faculty**, Department of Computer Science, New York University, New York, NY
- 03/2009-07/2010 **Research Scientist**, Department of IEOR, Columbia University, New York, NY
- 06/1997-02/2009 **Research Staff Member**, Mathematical Sciences Department, IBM Thomas J. Watson Research Center, Yorktown Heights, NY

Books and Selected Chapters

- Conn A. R., Scheinberg K., Vicente L. N.,
Introduction to Derivative Free Optimization, MPS/SIAM Book Series on Optimization, SIAM, Philadelphia, Dec. 2008.

- Conn A. R., Scheinberg K., Toint Ph. L.,
On the convergence of derivative-free methods for unconstrained optimization. *Approximation Theory and Optimization: Tributes to M. J. D. Powell*, eds. Iserles, A. and Buhmann, M., pp 83–108, Cambridge University Press, 1997
- Scheinberg, K., Ma, S.,
Optimization Methods for Sparse Inverse Covariance Selection Problem. In *Optimization for Machine Learning*, eds. Sra, A., Nowozin, S. and Wright, S.J., pp 455-477, MIT Press, 2010
- Wen, Z., Goldfarb, D., Scheinberg, K.
Block Coordinate Descent Methods for Semidefinite Programming. In *Handbook of Semidefinite, Conic and Polynomial Optimization*, eds. Anjos, M.F. and Lasserre, J.B., pp 533-564, Springer, 2012.

Selected Refereed Journal Papers

- Nemirovskii A., Scheinberg K.,
Extension of Karmarkar’s algorithm to convex quadratically constrained quadratic problems. *Mathematical Programming* 72 (1996), pp. 273-289.
- Conn A. R., Scheinberg K., Toint Ph. L.,
Recent progress in unconstrained nonlinear optimization without derivatives. *Mathematical Programming* 79 (1997), pp. 397-414.
- Goldfarb D., Scheinberg K.,
On parametric semidefinite programming. *Applied Numerical Mathematics* 29(3) (1999), pp. 361-377.
- Fine S., Scheinberg K.,
Efficient SVM training using low-rank Kernel representations . *J. of Machine Learning Research*, special issue on Kernel methods, 2 (2001), pp. 243-264.
- Goldfarb D., Scheinberg K.,
A product-form Cholesky factorization method for handling dense columns in interior point methods for linear programming. *Mathematical Programming* 99 (2004), pp. 1-34.
- Goldfarb D., Scheinberg K.,
Product-form Cholesky (LDL^T) factorization in interior point methods for second-order cone programming. *Mathematical Programming* 103 (2005), pp. 153-179.
- Scheinberg K.,
An efficient implementation of an active set method for SVM. *Journal of Machine Learning Res.* 7 (2006), pp. 2237-2257.
- Conn A. R., Scheinberg K., Vicente L. N.,
Geometry of interpolation sets in derivative free optimization. *Mathematical Programming*, 111 (2008), pp. 141-172.
- Conn A. R., Scheinberg K., Vicente L. N.,
Geometry of sample sets in derivative free optimization: polynomial regression and incomplete interpolation. *IMA Journal of Numerical Analysis* 28 (2008), pp. 721-748.

- Conn A. R., Scheinberg K., Vicente L. N.,
Global convergence of general derivative-free trust-region algorithms to first and second order critical points. *SIAM J. on Optimization*, 20 (2009) pp. 387-415.
- Zhang H., Conn A. R. and Scheinberg K.,
A Derivative-free algorithm for the least-square minimization. *SIAM J. on Optimization*, 20(6) (2010), pp. 3555-3576.
- Scheinberg K., Toint Ph. T.,
Self-correcting geometry in model-based algorithms for derivative-free unconstrained optimization. *SIAM J. on Optimization*, 20(6), (2010), pp. 3512-3532.
- Scheinberg K., Ma S., Goldfarb D.,
Fast alternating linearization methods for minimizing the sum of two convex functions. *Mathematical Programming*, (2012), pp. 1-34.
- Bandeira A., Scheinberg K., Vicente L.N.,
Computation of sparse low degree interpolating polynomials and their application to derivative-free optimization. *Mathematical Programming* 134(1) (2012), pp. 223-257.
- Qin Z., Scheinberg K., Goldfarb D.,
Efficient block-coordinate descent algorithms for the group LASSO, *Mathematical Programming Computation* 5(2), (2013), pp. 143-169.
- Scheinberg K., Goldfarb D., Xi B.
Fast first-order methods for composite convex optimization with backtracking. *Journal of FOCM* 14, (2014), pp. 389-417.
- Bandeira A., Scheinberg K., Vicente L.N.,
Convergence of trust-region methods based on probabilistic models. *SIAM J. on Optimization*, 14(3), (2014), pp. 1238-1264.
- Scheinberg K., Tang, X.,
Efficient Inexact Proximal Newton Method with Global Complexity Analysis, *Mathematical Programming Journal*, (2016), 160(2), 495-529.
- Chen, R., Menickelly, M., Scheinberg, K.,
Stochastic Optimization Using a Trust-Region Method and Random Models, *Mathematical Programming Journal*, 2017.
- Cartis, C., Scheinberg, K.,
Global convergence rate analysis of unconstrained optimization methods based on probabilistic models, *Mathematical Programming Journal*, 2017.
- Curtis, F. E., Scheinberg, K.,
Optimization Methods for Supervised Machine Learning: From Linear Models to Deep Learning, *Informatics Tutorials*, 2017.

Selected Refereed Conference Proceedings

- Conn A. R., Scheinberg K., Toint Ph. L.,
A derivative free optimization algorithm in practice. In Proceedings of
7th AIAA/USAF/NASA/ISSMO Symposium on Multidisciplinary Analysis and Optimization, St. Louis, MO, 1998.

- Fine S., Scheinberg K.,
Incremental learning and selective sampling via parametric optimization framework for SVM. In *Advances in Neural Information Processing Systems* 14 (2002), pp. 705-711.(30% acceptance rate).
- Bani Asadi N., Rish I., Scheinberg K., Kanevsky D., Ramabhadran B.,
A Bayesian approach to learning sparse gaussian Markov networks. In Proceedings of *ICASSP 2009* (55% acceptance rate).
- Scheinberg K., Ma S., Goldfarb D.,
Sparse inverse covariance selection via alternating linearization methods. In Proceedings of *NIPS 2010* (24% acceptance rate).
- Nguyen, L., Liu, J., Scheinberg, K., Takáč, M.
SARAH: A novel method for machine learning problems using stochastic recursive gradient In Proceedings of *ICML 2017*

Selected Awards

- Lagrange Prize in Continuous Optimization, MOS-SIAM prize for the best publication in past 6 years in the field of continuous optimization. Received jointly with Andrew R. Conn and Lus Nunes Vicente for the manuscript "Introduction to Derivative Free Optimization".
- IBM Research Division Award for contributions to COIN-OR, 2007.

Editorial board membership and activities

- SIAM-MOS Book Series on Optimization Editor-in-Chief, 2014 - present.
- Optima - the newsletter of Mathematical Programming Society, 2006-2010 - member of editorial board, 2011-2013 - the editor.
- SIAM J. on Optimization, 2011-present, Associate editor in the area of derivative-free optimization, machine learning, compressed sensing and large scale optimization.
- Mathematical Programming, Series A, 2016-present, Associate editor.
- SIAM Mathematics in Industry Book series, 2012-2014, member of the editorial board.

Plenary and Semiplenary conference presentations

- "Geometry of Sample Sets in Derivative Free Optimization", invited semiplenary, **FOCM'05**, Santander, Spain, 07/05.
- "Model based derivative free optimization", invited semiplenary talk, **ICCOPT**, Hamilton, Canada, 08/07.
- "Recent advances in model based derivative free optimization", invited plenary talk, **VOCAL** Conference, Vezsprem, Hungary, 12/08.
- "Accelerating first order methods in convex optimization", invited plenary talk, Workshop on Nonlinear Optimization, Variational Inequalities and Equilibrium Problems, Erice, Italy, 07/10.
- "Machine Learning for Optimization", invited plenary talk, Ninth US-Mexico Workshop on Optimization and its Applications, Oaxaca, Mexico, 01/11.

- “Using Random Models in Derivative Free Optimization”, invited semiplenary talk, **International Symposium of Mathematical Programming** (2000 participants), Berlin, Germany, 08/12.
- “Classical unconstrained optimization based on ”occasionally accurate” random models”, invited semiplenary, **FOCM’14**, Montevideo, Uruguay, 12/14.
- ”Optimization methods in machine learning”, invited plenary, **Optimization Days**, Montreal, Canada, 05/17.
- ”Using curvature information in optimization methods for machine learning problems”, invited plenary, **SIOPT’17**, Vancouver, Canada, 05/17.