

## RESEARCH SUMMARY

My research focuses on “**large-scale machine learning and optimization.**” I design, analyze, and implement algorithms and models for large-scale problems in **machine learning, statistics, data analytics, and scientific computing.** My mathematical tools are drawn from: convex optimization, nonlinear programming, statistics, computer science, signal processing, differential geometry, {convex, functional, harmonic, *matrix*, and *numerical*} *analysis.*

## EDUCATION

### Ph.D. in Computer Science

The University of Texas at Austin, Aug. 2007

Title: *Matrix Nearness Problems in Data Mining.* Advisor: I. S. Dhillon

### M.S. in Computer Science

University of Texas at Austin, Aug. 2006

### B. Engg. (Hons.) in Computer Science

Birla Inst. of Tech. & Science, Pilani, India, Jun. 1999

## POSITIONS HELD

**Visiting Assistant Professor**, Machine Learning Department, School of Computer Science (SCS), Carnegie Mellon University, Pittsburgh; Sep. 2013–

**Visiting faculty**, EECS, University of California, Berkeley; Jan.–May 2013

**Senior Research Scientist** in Prof. Bernhard Schölkopf’s group

Max Planck Institute for Intelligent Systems Tübingen, Germany; Jul. 2012–Present

**Research Scientist** hosted by Prof. Bernhard Schölkopf

Max Planck Institute for Intelligent Systems Tübingen, Germany;  
(formerly MPI for Biological Cybernetics). Oct. 2007–Jun. 2012

**Visiting Researcher** hosted by Prof. Jeff Bilmes

EE Department, University of Washington, Seattle. Jul.–Aug. 2011

**Research Assistant** to Prof. I. S. Dhillon

Univ. of Texas at Austin, Austin, TX, USA. Jan. 2002–Aug. 2007 (*several times*)

**Research Intern** with Arun Surendran in John Platt’s group

Microsoft Research, Redmond, WA, USA. May 2005–Aug. 2005.

## HONORS & AWARDS

**SIAM Outstanding Paper Prize**, July 2011

For the paper “*The Metric Nearness Problem,*” (with J. Brickell, I. Dhillon, and J. Tropp in *SIMAX* 2008)—**one of three papers amongst all papers published in SIAM journals within 2008–2010.**  
(More information at: [http://www.siam.org/prizes/sponsored/outstanding\\_paper.php](http://www.siam.org/prizes/sponsored/outstanding_paper.php))

**Best Paper Runner Up Award**, Sep., 2011

European Conference on Machine Learning (ECML 2011), Athens, Greece.

**Householder Symposium Attendance Award**, Jun., 2011

Award for attending the Householder Symposium XVIII, Tahoe City.

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**MIC Postdoc Trainee Award**, Oct. 2009  
IEEE Nuclear Science Symposium, Medical Imaging Conference (NSS / MIC)

**Best poster award**, Jul. 2009  
(with S. Harmeling, M. Hirsch, and B. Schölkopf)  
Int. Conf. on Cosmology and Statistics (COSMOSTATS), Ascona, Switzerland

**Best Student Paper**, Jun. 2007  
(with J. Davis, B. Kulis, P. Jain, and I. S. Dhillon)  
Int. Conference on Machine Learning (ICML)

**Best of SDM Papers** Apr. 2007  
(with D. Kim and I. S. Dhillon)  
SIAM Data Mining Conference (SDM)

**Recipient of Microelectronics and Computer Development (MCD) Fellowship**  
Univ. of Texas at Austin, Aug. 2000–Aug. 2004

**Careful reading rewarded** (1998–2001)  
Received  $\geq 7$  checks from Donald Knuth for reporting errors in:  
*The Art of Computer Programming* and *Concrete Mathematics*

## TEACHING EXPERIENCE

**Advanced Optimization and Randomized Methods** (Spring 2014)  
Graduate course, *ML Department, Carnegie Mellon University, Pittsburgh*  
(co-teaching with Prof. Alex Smola)

**Introduction to Machine Learning** (April 2014)  
*Invited short-course at the EU Regional School, 2014. RWTH Aachen, Germany.*

**Convex optimization; EE 227A** (Spring 2013) (by invitation)  
Graduate course, *EECS Department, University of California, Berkeley.*

**Introduction to large-scale optimization;** (Jan 2013) (by invitation)  
Intensive graduate level course (20 hrs); *University Carlos III of Madrid (Spain)*

**Optimization in Machine Learning.** (April 2011)  
*Invited lecture for CS graduate students at: Universidad Autónoma de Madrid (Spain).*

**Introductory Lectures on Scientific Writing.** (Sep.–Oct. 2009)  
*Three lectures in Scientific Writing, given at Max-Planck Institute, Tübingen, Germany*

**Matrix Factorization and Approximation Problems.** (April 2010)  
*Invited short-course at the EU Regional School, 2010. RWTH Aachen, Germany.*

**Introduction to Logic.** (Univ. of Texas at Austin; Spring 2006)  
*Teaching Assistant for CS313K; Lecturing component: 3 hours per week*

**Elements of Java.** (Univ. of Texas at Austin; Spring 2005, Fall 2003)  
*Teaching Assistant for CS303E; Lecturing component: 3 hours per week*

**Graduate level numerical linear algebra.** (Univ. of Texas at Austin; Fall 2002)  
*Teaching Assistant for CS383C*

**Analysis of Programs.** (Univ. of Texas at Austin; Fall 2001)  
*Teaching Assistant for CS336*

## GRANTS / FUNDING

- Submitted (Nov 2013) an NSF-Medium (3 yrs) proposal (with A. Smola, D. Andersen @ CMU)

- **Funding for OPT 2013**, 6th Int. Workshop on Optimization for Machine Learning  
Value: GBP 2000 from **MSR, Cambridge**
- **OPT 2012**: €3040 from **PASCAL2**  
**OPT 2011**: €2500 from **PASCAL2**  
**OPT 2010**: €1550 from **PASCAL2**, \$4000 from Microsoft.  
**OPT 2009**, €1000 from **PASCAL2**, \$2500 from **MOSEK**, \$1000 from **Microsoft Research**  
**OPT 2008**, €4855 from **PASCAL2**, Oct. 2008
- **Funding for NUMML 2010**, NIPS Workshop on Numerical Challenges in Machine Learning  
Value: €2500 from **PASCAL2**  
**NUMML 2009**, ICML 2009 Workshop, €4100, Mar. 2009
- **Helped prepare NSF proposal** (PI: Inderjit Dhillon): *Non-Negative Matrix and Tensor Approximations: Algorithms, Software and Applications*, NSF, CCF-0728879, \$250,000, 01/01/08-12/31/10

## PUBLICATIONS

### Important notes about the publications

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1. Author ordering on some of my earlier (upto 2008) papers is *alphabetic*.
  2. A star (e.g., A. Name\*) signifies a student who worked under my supervision.
  3. My publications are roughly classified into the following areas: ◇—machine learning, statistics, & related; □—optimization; ▲—scientific computing; §—mathematics.
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## In the pipeline

### SELECTED WORKS IN THE PIPELINE

1. **S. Sra**, R. Hoesseini, L. Theis, and M. Bethge. “Modelling image data using Elliptical Gamma distributions”. *Preprint*, Jan 2014. ◇□
2. A. Malek, **S. Sra**, F. Hedyati, and P. Bartlett. “Minimax Optimal Horizon-dependent Priors in Online Binary Prediction with Bernoulli Experts”. 2014. ◇§
3. **S. Sra**. “The Thompson metric: properties, inequalities, and applications”. Dec 2013. §▲◇
4. **S. Sra** and R. Hosseini. “Conic geometric optimisation on the manifold of positive definite matrices”. *Preprint; arXiv:1312.1039*, Nov 2013. §□◇
5. **S. Sra**. “Efficient computation of the Fréchet mean of positive definite matrices”. Mar. 2013. §□

### SUBMITTED / UNDER REVIEW

6. A. Cherian and **S. Sra**. “Sparse Coding of Covariances”. 2014. *Submitted conference article*
7. M. Wytock, Z. Kolter, and **S. Sra**. “Title suppressed for anonymous review process”. *Uncertainty in Artificial Intelligence (UAI)*, 2014. *Submitted*. ◇□
8. Á. J. Barbero and **S. Sra**. “Modular proximal optimization with application to total variation regularization”. Oct. 2013. *Submitted*. □◇▲
9. A. Cherian, **S. Sra**, V. Morellas, and N. Papanikolopoulos. “Efficient nearest neighbors via robust sparse hashing”. *IEEE Tran. Image Proc.*, 2013. *Submitted*. ▲◇
10. **S. Sra**. “Nonconvex proximal splitting with computational errors”. 2013. *Submitted; Preprint: arXiv:1109.0258*. □▲
11. **S. Sra**. “Positive Definite Matrices and the Stein Divergence”. Oct. 2012. *Submitted; Preprint: arXiv:1110.1773v4*. ◇§

## Books and Monographs

12. S. Sra, S. Nowozin, and S. J. Wright, editors. *Optimization for Machine Learning*. MIT Press, Oct. 2011. Our book distills research at the confluence of optimization and machine learning. It includes contributions from leading researchers in both fields; we aim to achieve a cogent summary of the state-of-the-art, while still remaining didactic. □◇▲

## Journal Articles and Book Chapters

13. S. Sra. "Tractable Large-Scale Optimization in Machine Learning". In L. Bordeaux, Y. Hamadi, P. Kohli, and R. Mateescu, editors, *Advances in Tractability*. Cambridge University Press, December 2013. 29 pages. □◇
14. C. M. Alaíz\*, F. Dinuzzo, and S. Sra. "Correlation matrix nearness and completion under observation uncertainty". *IMA Journal of Numerical Analysis*, Oct. 2013. 16 pages. □▲
15. S. Sra. "Explicit eigenvalues of certain scaled trigonometric matrices". *Linear Algebra and its Applications (LAA)*, 438:173–181, 2013. 9 pages. §
16. S. Sra and D. Karp. "The multivariate Watson distribution: Maximum-likelihood estimation and other aspects". *Journal of Multivariate Analysis (JMVA)*, 114:256–269, 2013. ◇
17. A. Cherian\*, S. Sra, A. Banerjee, and N. Papanikolopoulos. "Jensen-Bregman LogDet Divergence with Application to Efficient Similarity Search for Covariance Matrices". *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, Dec. 2012. 14 pages. ◇
18. S. Sra. "Fast projections onto mixed-norm balls with applications". *Data Mining and Knowledge Discovery (DMKD)*, 25(2), Nov. 2012. 20 pages. □◇▲
19. D. Kim, S. Sra, and I. S. Dhillon. "A non-monotonic method for large-scale non-negative least squares". *Optimization Methods and Software (OMS)*, Dec. 2011. 28 pages. □▲
20. M. Schmidt, D. Kim, and S. Sra. "Projected Newton-type methods in machine learning". In S. Sra, S. Nowozin, and S. J. Wright, editors, *Optimization for Machine Learning*. MIT Press, Oct. 2011. 25 pages. □◇
21. M. Hirsch, S. Harmeling, S. Sra, and B. Schölkopf. "Online Multi-frame Blind Deconvolution with Super-resolution and Saturation Correction". *Astronomy & Astrophysics (AA)*, Feb. 2011. 11 pages. ▲
22. S. Sra. "A short note on parameter approximation for von Mises-Fisher distributions: and a fast implementation of  $I_s(x)$ ". *Computational Statistics*, Jan. 2011. 14 pages. ◇
23. D. Kim, S. Sra, and I. S. Dhillon. "Tackling box-constrained convex optimization via a new projected quasi-Newton approach". *SIAM J. Scientific Computing (SISC)*, 32(6):3548–3563, Dec. 2010. 16 pages. □▲
24. A. Banerjee, I. S. Dhillon, J. Ghosh, and S. Sra. *Text Mining: Theory, Applications, and Visualization*. A. Srivastava and M. Sahami (eds.), chapter Text clustering with mixture of von Mises-Fisher distributions. Data Mining & Knowledge Discovery Series. Chapman-Hall / CRC Press, 2009. ◇
25. J. Brickell, I. S. Dhillon, S. Sra, and J. A. Tropp. "The Metric Nearness Problem". *SIAM J. Matrix Analysis and Applications (SIMAX)*, 30(1):375–396, 2008. **SIAM Outstanding Paper Prize, 2011 (one out of three papers selected from papers across all SIAM Journals in the years 2008–2010)**. □◇
26. D. Kim, S. Sra, and I. S. Dhillon. "Fast Projection-Based Methods for the Least Squares Nonnegative Matrix Approximation Problem". *Statistical Analysis and Data Mining*, 1:38–51, 2007. □◇
27. A. Banerjee, I. S. Dhillon, J. Ghosh, and S. Sra. "Clustering on the Unit Hypersphere using von Mises-Fisher Distributions". *J. Mach. Learning Research (JMLR)*, 6:1345–1382, Sep 2005. ◇

## Refereed Conference Papers

28. S. Azadi\* and S. Sra. “Towards optimal stochastic alternating direction method of multipliers”. In *Int. Conf. on Mach. Learning (ICML)*, 2014. ◇□
29. D. Lopez-Paz, S. Sra, A. J. Smola, Z. Ghahramani, and B. Schölkopf. “Randomized nonlinear component analysis”. In *Int. Conf. Machine Learning (ICML)*, 2014. *To appear*. ◇
30. S. Jegelka, F. Bach, and S. Sra. “Reflection methods for user-friendly submodular optimization”. In *Advances in Neural Information Processing Systems (NIPS)*, December 2013. □◇
31. S. Sra and R. Hosseini. “Geometric optimization on positive definite matrices with application to elliptically contoured distributions”. In *Advances in Neural Information Processing Systems (NIPS)*, December 2013. □§
32. S. Sra. “A new metric on the manifold of kernel matrices with application to matrix geometric means”. In *Advances in Neural Information Processing Systems (NIPS)*, December 2012. ◇▲§
33. S. Sra. “Scalable nonconvex inexact proximal splitting”. In *Advances in Neural Information Processing Systems (NIPS)*, December 2012. □◇
34. A. Cherian\*, S. Sra, A. Banerjee, and N. Papanikolopoulos. “Efficient Similarity Search for Covariance Matrices via the Jensen-Bregman LogDet Divergence”. In *International Conference on Computer Vision (ICCV)*, Nov. 2011. □◇
35. S. Sra and A. Cherian\*. “Generalized Dictionary Learning for Symmetric Positive Definite Matrices with Application to Nearest Neighbor Retrieval”. In *European Conf. Machine Learning (ECML)*, Sep. 2011. ◇▲
36. S. Sra. “Fast projections onto  $\ell_{1,q}$ -norm balls for grouped feature selection”. In *European Conf. Machine Learning (ECML)*, Sep. 2011. **Best paper runner up award**. □◇▲
37. Á. J. Barbero\* and S. Sra. “Fast Newton-type Methods for Total-Variation with Applications”. In *Proceedings of the International Conference on Machine Learning (ICML)*, Jun. 2011. □◇
38. A. Cherian\*, S. Sra, and N. Papanikolopoulos. “Denoising sparse noise via online dictionary learning”. In *Int. Conf. Acoustics, Speech, and Signal Processing (ICASSP)*, May 2011. □▲◇
39. M. Hirsch, S. Sra, B. Schölkopf, and S. Harmeling. “Efficient Filter Flow for Space-Variant Multiframe Blind Deconvolution”. In *IEEE Conf. Computer Vision & Pattern Recognition (CVPR)*, Jun. 2010. ▲
40. S. Harmeling, S. Sra, M. Hirsch, and B. Schölkopf. “Multiframe Blind Deconvolution, Super-Resolution, and Saturation Correction via Incremental EM”. In *IEEE Int. Conf. Image Processing (ICIP)*, 2010. ▲
41. D. Kim, S. Sra, and I. S. Dhillon. “A scalable trust-region algorithm with application to mixed-norm regression”. In *Int. Conf. Machine Learning (ICML)*, 2010. □◇
42. S. Sra, D. Kim, I. S. Dhillon, and B. Schölkopf. “A new non-monotonic algorithm for PET image reconstruction”. In *IEEE Nuclear Science Symp. / Medical Imaging Conf. (NSS/MIC)*, Oct. 2009. ▲
43. S. Jegelka, S. Sra, and A. Banerjee. “Approximation Algorithms for Tensor clustering”. In *Algorithmic Learning Theory (ALT)*, Jun. 2009. also arXiv: cs.DS/0812.0389. ◇
44. S. Harmeling, M. Hirsch, S. Sra, and B. Schölkopf. “Online Blind Deconvolution for Astronomy”. In *IEEE Int. Conf. on Computational Photography (ICCP)*, Apr. 2009. ▲
45. B. Kulis, S. Sra, and I. S. Dhillon. “Convex Perturbations for Scalable Semidefinite Programming”. In D. van Dyk and M. Welling, editors, *Int. Conf. Artificial Intelligence and Statistics (AISTATS)*, volume 5 of *JMLR W & CP*, pages 296–303, Apr. 2009. □◇
46. S. Sra. “Block-Iterative Algorithms for Non-negative Matrix Approximation”. In *IEEE Int. Conf. Data Mining (ICDM)*, pages 1037–1042, Dec. 2008. □◇

47. J. V. Davis, B. Kulis, P. Jain, **S. Sra**, and I. S. Dhillon. "Information-theoretic Metric Learning". In *Int. Conf. Machine Learning (ICML)*, Jun. 2007. **Best Student Paper**. ◇
48. D. Kim, **S. Sra**, and I. S. Dhillon. "Fast Newton-type Methods for the Least Squares Nonnegative Matrix Approximation Problem". In *SIAM Int. Conf. Data Mining (SDM)*, Apr. 2007. Recognized within **Best of SDM** papers. □◇
49. **S. Sra**. "Efficient Large Scale Linear Programming Support Vector Machines". In *Euro. Conf. Machine Learning (ECML)*, pages 767–774, Sep. 2006. □◇
50. A. Surendran and **S. Sra**. "Incremental Aspect Models for Mining Document Streams". In *Principles and Practice of Knowledge Discovery in Databases (PKDD)*, Sep. 2006. ◇
51. **S. Sra** and J. A. Tropp. "Row-action Methods for Compressed Sensing". In *Int. Conf. on Acoustics, Speech, and Signal Processing (ICASSP)*. IEEE, May 2006. □
52. I. S. Dhillon and **S. Sra**. "Generalized Nonnegative Matrix Approximations with Bregman Divergences". In *Advances Neural Information Processing Systems (NIPS)*, Dec. 2005. □▲◇
53. I. S. Dhillon, **S. Sra**, and J. A. Tropp. "Triangle Fixing Algorithms for the Metric Nearness Problem". In *Advances in Neural Information Processing Systems (NIPS)*, Dec. 2004. □
54. H. Cho, I. S. Dhillon, Y. Guan, and **S. Sra**. "Minimum Sum Squared Residue based Co-clustering of Gene Expression data". In *SIAM Conf. on Data Mining (SDM)*, Apr. 2004. ◇
55. A. Banerjee, I. S. Dhillon, J. Ghosh, and **S. Sra**. "Generative Model-Based Clustering of Directional Data". In *ACM Int. Conf. Knowledge Discovery and Data Mining (KDD)*, Aug. 2003. ◇

### Selected Technical Reports (with $\geq 5$ citations)

56. **S. Sra**, D. Kim, and B. Schölkopf. "Non-monotonic Poisson likelihood maximization". Technical Report 170, Jun. 2008. **(7 citations)**. □▲
57. **S. Sra**, **S. Jegelka**, and A. Banerjee. "Approximation algorithms for Bregman clustering, co-clustering and tensor clustering". Technical Report 177, MPI for Biological Cybernetics, Jun. 2008. **(7 citations)**. □▲
58. **S. Sra** and I. S. Dhillon. "Nonnegative Matrix Approximation: Algorithms and Applications". Technical Report TR-06-27, Jun. 2006. **(44 citations)**. □◇
59. **D. Kim**, **S. Sra**, and I. S. Dhillon. "A New Projected Quasi-Newton Approach for Nonnegative Least Squares Problem". Technical Report TR-06-54, May 2006. **(16 citations)**. □◇
60. I. S. Dhillon, **S. Sra**, and J. A. Tropp. "Triangle fixing algorithms for the Metric Nearness problem". Technical Report TR-04-22, Jun. 2004. **(9 citations)**. □
61. **A. Banerjee**, I. S. Dhillon, J. Ghosh, and **S. Sra**. "Clustering on Hyperspheres using Expectation Maximization". Technical Report TR-03-07, Feb. 2003. **(10 citations)**. ◇
62. I. S. Dhillon and **S. Sra**. "Modeling data using directional distributions". Technical Report TR-03-06, Jan. 2003. **(42 citations)**. ◇

### Miscellaneous

63. **S. Sra**. "A new metric on the manifold of kernel matrices". In *NIPS Workshop on Algebraic Topology and Machine Learning*, Dec. 2012. §◇
64. M. Langovoy and **S. Sra**. "Statistical estimation for optimization problems on graphs". In *NIPS Workshop on Discrete Optimization for Machine Learning*, Dec. 2011. ◇
65. **S. Sra**. *Matrix Nearness Problems in Data Mining*. PhD thesis, Univ. of Texas at Austin, Aug. 2007. □◇▲
66. J. V. Davis, B. Kulis, **S. Sra**, and I. S. Dhillon. "Information-theoretic Metric Learning". In *NIPS Workshop on Learning to Compare Examples*, Dec. 2006. ◇

## MAIN INVITED TALKS AND LECTURES

- ▶ *University of Cambridge, Engineering Dept., Cambridge, UK* Mar 17 2014
- ▶ *University of British Columbia, Computer Science Dept.; Vancouver* Feb 26 2014
- ▶ *Carnegie Mellon University, Machine Learning Dept.; Pittsburgh* Feb 19 2014
- ▶ *Carnegie Mellon University, Statistics Department Seminar, Pittsburgh* Nov 11 2013
- ▶ *Massachusetts Institute of Technology (MIT), LIDS, Cambridge, MA* Oct 18 2013
- ▶ *Washington University at St. Louis, CSE Dept. Colloquium, St. Louis* Oct 15 2013
- ▶ *École polytechnique fédérale de Lausanne, Math Department, Lausanne* Sep 18 2013
- ▶ *Technische Universität, München, Math Department.* Sep 17, 2013
- ▶ *École polytechnique fédérale de Lausanne, School of Computer Sci., Lausanne* Apr 15 2013
- ▶ *University of California Davis, Algebra and Discrete Math Seminar, Davis, CA* Mar 14 2013
- ▶ *Carnegie Mellon University, Machine Learning Department, Pittsburgh* Feb 28 2013
- ▶ *University College London, Gatsby Computational Neuroscience Unit, London* Feb 18 2013
- ▶ *Cornell University, Computer Science Colloquium, Ithaca* Feb 14 2013
- ▶ *Duke University, ECE Department Colloquium* Feb 11 2013
- ▶ *INRIA Rocquencourt (ENS/CNRS/ENS joint laboratory), Paris* Jan 21, 2013
- ▶ *Oxford University, The Mathematical Institute, Oxford* Jan 09, 2013
- ▶ *University of British Columbia (UBC), ECE Dept., Vancouver.* Oct 10, 2012
- ▶ *Kyungpook National Univ., Dept. of Mathematics, South Korea (5 day workshop)* Jun 26–30, 2012
- ▶ *Google Research, Mountain View, CA* May 24, 2012
- ▶ *IBM Research, New York, NY* May 8, 2012
- ▶ *University of Massachusetts Amherst, ECE Dept., Amherst, MA* Apr 10, 2012
- ▶ *Yahoo! Research Tech Talk, Sunnyvale, CA.* Mar 9, 2012
- ▶ *LinkedIn Tech Talk, Mountain View, CA.* Mar 6, 2012
- ▶ *Microsoft Research Tech Talk, Redmond, WA* Aug 29, 2011
- ▶ *University of Washington, Seattle, EE, CS, Math Seminar, Seattle* Aug 25, 2011
- ▶ *Yahoo Research, Sunnyvale, CA* Aug 18, 2011
- ▶ *Toyota Technological Institute (TTI) Chicago.* Aug 16, 2011
- ▶ *University of Chicago, Statistics Colloquium, Chicago* Aug 15, 2011
- ▶ *Householder Symposium XVIII, Tahoe* Jun 2011
- ▶ *ETH Zürich, Informatik Seminar, Zürich* Apr 2011
- ▶ *Universidad Autónoma de Madrid, CS Dept, Madrid* Apr 2011
- ▶ *University of Buffalo, Computer Sciences Colloquium, Buffalo* Mar 2011
- ▶ *Institute for Pure and Applied Mathematics, UCLA, Applications of Optimization in Science and Engineering workshop, organized by: S. Boyd, et al.* Dec 2010
- ▶ *First I.S.T. Austria Symposium on Computer Vision and Machine Learning, Klosterneuburg* Oct 2010
- ▶ *Invited short-course at the EU Regional School 2010, RWTH Aachen, Germany.* Apr 2010
- ▶ *Microsoft Research Tech Talk, Redmond.* Dec 2008
- ▶ *Google, Mountain View, CA.* Mar 2007

## PROFESSIONAL SERVICE

**ASSOCIATE EDITOR:** Optimization Methods and Software (OMS); 2014–

**AREA CHAIR**

1. Neural Information Processing Systems (NIPS), 2013, 2014
2. International Conf. Machine Learning (ICML) 2014
3. Artificial Intelligence & Statistics (AISTATS) 2014

**SPONSORSHIP CHAIR:** Artificial Intelligence and Statistics (AISTATS) 2012

**WORKSHOP ORGANIZER AND CO-CHAIR:** OPT 2008—OPT 2013

International workshops held at the *Neural Information Processing Systems (NIPS)* Conference

**PROGRAM COMMITTEE MEMBER / REVIEWER**

- ▶ International Joint Conf. Artificial Intelligence (IJCAI) 2013
- ▶ *Artificial Intelligence and Statistics (AISTATS)* 2011, 2013
- ▶ *Conference on Learning Theory (COLT)* (2011)
- ▶ *Neural Information Processing Systems (NIPS)* (2005–2010)
- ▶ *International Conference on Machine Learning (ICML)* (2006–2010)
- ▶ *ACM SIGKDD Int. Conf. Knowledge Discovery and Data Mining (KDD)* (2003–2007, 2011)
- ▶ *Snowbird Abstracts* (2008–2011)
- ▶ *IEEE Symposium on Foundations of Computer Science (FOCS)* (2009)
- ▶ *Uncertainty in Artificial Intelligence (UAI)* (2009)
- ▶ *IEEE Int. Conference on Semantic Computing (ICSC)* (2008)
- ▶ *IEEE Int. Conference Data Mining (ICDM)* (2003–2007)
- ▶ *ACM Conf. on Information and Knowledge Management (CIKM)* (2005)
- ▶ *SIAM Int. Conference on Data Mining (SDM)* (2003–2008)

**REVIEWER FOR THE FOLLOWING JOURNALS**

1. *Machine Learning Journal (Springer)*
2. *Journal of Machine Learning Research (JMLR)*
3. *SIAM Review (SIREV)*
4. *SIAM J. on Optimization (SIOPT)*
5. *SIAM J. of Scientific Computing (SISC)*
6. *SIAM J. Control and Optimization (SICON)*
7. *SIAM J. Matrix Analysis and Applications (SIMAX)*
8. *SIAM J. on Imaging Sciences (SIIMS)*
9. *Annals of Applied Statistics (AoAS)*
10. *Statistics and Computing (STCO)*
11. *Computational Statistics and Data Analysis (CSDA)*
12. *Linear Algebra and its Applications (LAA)*
13. *Optimization (Taylor & Francis)*
14. *Signal Processing (Elsevier)*
15. *Pattern Recognition (PR)*
16. *IEEE Signal Processing Letters*
17. *IEEE Transactions on Information Theory (IT)*
18. *IEEE Transactions on Signal Processing (TSP)*
19. *IEEE Transactions on Image Processing (TIP)*
20. *IEEE Transactions Knowledge and Data Engineering (TKDE)*
21. *IEEE Transactions on Neural Networks and Learning Systems (TNNLS)*
22. *IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI)*
23. Reviewer for [MATHSCINET](#)



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## GRANT REVIEWER

Have helped review NSF and NASA grant proposals

## ADMINISTRATIVE DUTIES

Reviewing Postdoc, Ph.D., and Master's level applications at Max-Planck Institute  
Interviewing candidates at Max Planck Institute  
ACM and SCS Doctoral Dissertation Committee, Carnegie Mellon University

## STUDENTS

*Ph.D.* committee member for Álvaro Barbero (UAM Madrid; July 2011)

*Interns:* Álvaro Barbero (UAM Madrid, 2010); Rashish Tandon (IIT Kanpur, 2010); Namhyoung Kim (POSTECH, Korea, 2010); Carlos María Gudín (UAM Madrid, 2011,2012); Radha Chitta (MSU, 2013); Samaneh Azadi (2013, UC Berkeley); Veeranjaneeyulu Sadhanala (2013-14,CMU).

## PATENTS

### **Method and device for recovering a digital image from a sequence of observed digital images**

S. Harmeling, M. Hirsch, S. Sra, B. Schölkopf, and C. Schuler  
International Patent: WO/2012/041492; 5th April, 2012.

### **Combining spectral and probabilistic clustering**

A. C. Surendran and S. Sra  
United States Patent: US 7,809,704 B2

### **Incrementally building aspect models**

A. C. Surendran and S. Sra  
United States Patent Application 20080005137, Filed in: Jun. 2006

## SOFTWARE WRITTEN

MYSVD, EIGS: Sparse singular and eigenvector decomposition in C++

NMA: Optimized implementations of various nonnegative matrix factorization algorithms

SSLIB: Sparse matrix manipulation library (C/C++)

FSOLVER: Optimization software for large-scale linear and quadratic programs

Other software for clustering, co-clustering, Bessel functions, etc., available from my webpage

## PERSONAL

### LANGUAGE SKILLS

Native to near-native proficiency: English, Hindi, Punjabi

Fluent: German; Beginner++: Italian; Beginner: French.

## REFERENCES

BERNHARD SCHÖLKOPF (Director, Max Planck Institute for Intelligent Systems)

INDERJIT S. DHILLON (Professor, The University of Texas at Austin)

ALEXANDER J. SMOLA (Professor, Carnegie Mellon University)

STEPHEN J. WRIGHT (Professor, University of Wisconsin, Madison)