Brian Kulis

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Research Interests

Machine learning, data mining, large-scale data analysis, numerical optimization, applications to computer vision and other domains

Education

- **Ph.D. Student in Computer Science** **University of Texas at Austin**
  August, 2003 - Present
  Research Advisor: Inderjit S. Dhillon
  Graduate GPA: 4.0 / 4.0
- **B.A. Computer Science and Mathematics** **Cornell University**
  August, 1999 - May, 2003
  Graduated With Honors

Research Experience

- **Research Fellow** **Inst. for Pure & Applied Mathematics, UCLA, Los Angeles, CA, USA**
  9/2007 - 12/2007
  Visiting fellow at UCLA for a semester-long program on Mathematics of Knowledge and Search Engines.
- **Research Intern** **Microsoft Research, Redmond, WA, USA**
  6/2006 - 9/2006
  Worked with: John Platt and Arun Surendran
  Topics: Low-rank semidefinite programming
- **Research Assistant** **University of Texas at Austin, Austin, TX, USA**
  1/2004 - Present
  Worked with: Inderjit Dhillon
  Topics: Spectral methods, kernel methods, semi-supervised clustering, metric learning, large-scale optimization, learning with Bregman divergences
- **Research Assistant** **Cornell University, Ithaca, NY, USA**
  5/2002 - 6/2003
  Worked with: John Hopcroft and Bart Selman
  Topics: Tracking topics in networks over time
- **Research Assistant** **Cornell University, Ithaca, NY, USA**
  9/2001 - 5/2002
  Worked with: Robert Constable
  Topics: Automated reasoning for graph theory using NuPrl

Teaching Experience

- **Teaching Assistant** **University of Texas at Austin**
  1/2007 - 5/2007
  Data Mining: A Statistical Learning Perspective (Graduate Level)
  Supervising professor: Inderjit Dhillon.
- **Teaching Assistant** **University of Texas at Austin**
  9/2006 - 12/2006
  Machine Learning (Graduate Level)
  Supervising professor: Raymond Mooney.
- **Teaching Assistant** **University of Texas at Austin**
  9/2004 - 12/2004
  Large-scale Data Mining (Graduate Level)
  Supervising professor: Inderjit Dhillon.
- **Teaching Assistant** **Cornell University**
  1/2003 - 5/2003
  Introduction to Algorithms (Undergraduate Level)
  Supervising professors: Jon Kleinberg and Eva Tardos.
- **Teaching Assistant** **Cornell University**
  9/2002 - 12/2002
  Introduction to the Theory of Computing (Undergraduate Level)
  Supervising professor: John Hopcroft.

Major Honors and Awards

- Best Student Paper Award, 2008 IEEE Conference on Computer Vision and Pattern Recognition 2008
- Best Student Paper Award, 2007 International Conference on Machine Learning 2007
- Best Student Paper Award, 2005 International Conference on Machine Learning 2005
- MCD Fellowship from the University of Texas at Austin 2003
- Award of Excellence from College of Natural Sciences at the University of Texas at Austin 2003

Reviewing

- **Journals**
  - IEEE Transactions on Pattern Analysis and Machine Intelligence (2007)
  - IEEE Transactions on Neural Networks (2007)
  - Journal of Machine Learning Research (2005—2007)
- **Conferences**
  - Neural Information Processing Systems (NIPS) (2006—2008)
  - International Conference on Machine Learning (ICML) (2005—2007)
  - ACM SIGKDD Conference (2004—2008)
  - SIAM Data Mining Conference (SDM) (2004—2007)
  - IEEE International Conference on Data Mining (ICDM) (2004—2005)
  - World Wide Web Conference (WWW) (2007)

Publications

- **Journal Publications**

1. B. Kulis, M. Sustik, and I. Dhillon. *Low-Rank Kernel Learning with Bregman Matrix Divergences*. To appear in Journal of Machine Learning Research, 2008.
2. B. Kulis, S. Basu, I. Dhillon, and R. Mooney. *Semi-supervised Graph Clustering: A Kernel Approach*. To appear in Machine Learning, 2008.
3. I. Dhillon, Y. Guan, and B. Kulis. *Weighted Graph Cuts without Eigenvectors: A Multilevel Approach*. IEEE Transactions on Pattern Analysis and Machine Intelligence, Vol. 29, No. 11, pp. 1944–1957, 2007.
4. J. Hopcroft, O. Khan, B. Kulis, and B. Selman. *Tracking Evolving Communities in Large Linked Networks*. Proceedings of the National Academy of Sciences, Vol. 101, pp. 5249–5253, April, 2004.

- **Conference Publications**

1. P. Jain, B. Kulis, I. Dhillon, and K. Grauman. *Online Metric Learning and Fast Similarity Search*. Neural Information Processing Systems (NIPS), 2008. (Oral Presentation: 2.7% Acceptance Rate)
2. P. Jain, B. Kulis, and K. Grauman. *Fast Image Search for Learned Metrics*. Proc. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2008. **(CVPR 2008 Best Student Paper Award)**
3. J. Davis, B. Kulis, P. Jain, S. Sra, and I. Dhillon. *Information-theoretic Metric Learning*. Proc. 24th International Conference on Machine Learning (ICML), 2007. **(ICML 2007 Best Student Paper Award)**
4. B. Kulis, A. Surendran, and J. Platt. *Fast Low-rank Semidefinite Programming for Embedding and Clustering*. Proc. 11th International AISTATS Conference, 2007.
5. B. Kulis, M. Sustik, and I. Dhillon. *Learning Low-Rank Kernel Matrices*. Proc. 23rd International Conference on Machine Learning (ICML), 2006.
6. I. Dhillon, Y. Guan, and B. Kulis. *A Fast Kernel-based Multilevel Algorithm for Graph Clustering*. Proc. 11th ACM SIGKDD Conference, 2005.
7. B. Kulis, S. Basu, I. Dhillon, and R. Mooney. *Semi-supervised Graph Clustering: A Kernel Approach*. Proc. 22nd International Conference on Machine Learning (ICML), 2005. **(ICML 2005 Best Student Paper Award)**
8. I. Dhillon, Y. Guan, and B. Kulis. *Kernel k-means, Spectral Clustering and Normalized Cuts*. Proc. 10th ACM SIGKDD Conference, 2004.
9. J. Hopcroft, O. Khan, B. Kulis, and B. Selman. *Natural Communities in Large Linked Networks*. Proc. 9th ACM SIGKDD Conference, 2003.

- **Workshop Papers and Technical Reports**

1. P. Jain, B. Kulis, and K. Grauman. *Fast Similarity Search for Learned Metrics*. University of Texas at Austin Technical Report # TR-07-48, September, 2007.
2. B. Kulis, S. Sra, S. Jegelka, and I. Dhillon. *Scalable Semidefinite Programming using Convex Perturbations*. University of Texas at Austin Technical Report # TR-07-47, September, 2007.
3. P. Jain, B. Kulis, and I. Dhillon. *Online Linear Regression using Burg Entropy*. University of Texas at Austin Technical Report # TR-07-08, February, 2007.
4. J. Davis, B. Kulis, S. Sra, and I. Dhillon. *Information-theoretic Metric Learning*. NIPS 2006 Workshop on Learning to Compare Examples, 2006.
5. I. Dhillon, Y. Guan and B. Kulis. *A Unified View of Kernel k-means, Spectral Clustering and Graph Cuts*. University of Texas at Austin Technical Report # TR-04-25, July, 2004.

Talks

- *Fast Image Search for Learned Metrics* — June, 2008
  CVPR 2008, Anchorage, AK, USA
- *Learning to Compare Objects* (Invited Talk) — February–March, 2008
  University of California at Santa Barbara, Santa Barbara, CA, USA
  University of North Carolina at Chapel Hill, Chapel Hill, NC, USA
- *Fast Image Search for Learned Metrics* (Invited Talk) — December, 2007
  IPAM Lake Arrowhead Workshop, Lake Arrowhead, CA, USA
- *Locality-sensitive Hashing and Fast Image Search* — October, 2007
  IPAM Research Seminar at UCLA, Los Angeles, CA, USA
- *Information-theoretic Metric Learning* — June, 2007
  ICML 2007, Corvallis, OR, USA
- *Spectral Clustering and Kernel k-means* — April, 2007
  Two Guest Lectures for CS395T Data Mining Course, Austin, TX, USA
- *Graph Cuts without Eigenvectors* — July, 2006
  Microsoft Research, Redmond, WA, USA
- *Learning Low-Rank Kernel Matrices* — June, 2006
  ICML 2006, Pittsburgh, PA, USA
- *Scalable Kernel Methods for Machine Learning* — May, 2006
  Dissertation Proposal, Austin, TX, USA
- *Semi-supervised Graph Clustering: A Kernel Approach* — August, 2005
  ICML 2005, Bonn, Germany