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BRENDAN P.W. AMES, PhD

ACADEMIC EMPLOYMENT

The University of Alabama, Tuscaloosa AL — *Assistant Professor, Department of Mathematics*
AUGUST 2014 - PRESENT

California Institute of Technology, Pasadena CA — *von Kármán Instructor, Department of Computing + Mathematical Sciences*
SEPTEMBER 2013 - AUGUST 2014

Institute for Mathematics and its Applications, University of Minnesota, Minneapolis, MN — *Postdoctoral Research Fellow*
SEPTEMBER 2011 - AUGUST 2013

EDUCATION

University of Waterloo, Waterloo ON — *Ph.D. in Combinatorics and Optimization*
SEPTEMBER 2007 - AUGUST 2011, DEPARTMENT OF COMBINATORICS AND OPTIMIZATION
Thesis: Convex relaxation for the planted clique, biclique, and clustering problems
Advisor: Dr. Stephen Vavasis

University of Guelph, Guelph ON — *M.Sc. in Applied Mathematics*
JANUARY 2006 - MAY 2007, DEPARTMENT OF MATHEMATICS AND STATISTICS
Thesis: Taylor expansions of the spectrum of a symmetric matrix
Advisor: Dr. Hristo Sendov

University of Guelph, Guelph ON — *B.Sc. in Mathematics, With Distinction.*
SEPTEMBER 2001 - DECEMBER 2005, DEPARTMENT OF MATHEMATICS AND STATISTICS
Major: Mathematics, *Minor:* Physics

PUBLICATIONS AND TECHNICAL REPORTS

1. N. Laffey and **B. Ames.** *A sparse regression approach for evaluating and predicting NHL results.* Technical report. Available from: bit.ly/2HcbdIV (Conference paper accepted as part of the 2017 Alabama Program in Sports Communication competive panel).
2. **B. Ames** and M. Hong. *Alternating direction method of multipliers for penalized zero-variance discriminant analysis.* Computational Optimization and Applications. 64(3): 725-754. 2016.
3. **B. Ames** and H. Sendov. *Derivatives of compound matrix valued functions.* Journal of Mathematical Analysis and Applications. 433(2): 1459-1485. 2016.
4. **B. Ames**. *Guaranteed recovery of planted cliques and dense subgraphs by convex relaxation.* Journal of Optimization Theory and Applications. 167(2): 653-675. 2015.
5. **B. Ames**, A. Beveridge, R. Carlson, C. Djang, V. Isler, S. Ragain, and M. Savage. *A leapfrog strategy for pursuit-evasion in a polygonal environment*. International Journal of Computational Geometry and Applications. 25(77), 2015.

6. R. Horstmeyer, R.Y. Chen, X. Ou, **B. Ames**, J.A. Tropp, and C. Yang. *Solving ptychography with a convex relaxation.* New Journal of Physics, Vol 17, May 2015.
7. **B. Ames**. *Guaranteed clustering and biclustering via semidefinite programming.* Mathematical Programming. 147(1): 429-465. 2014.
8. **B. Ames** and S. Vavasis. *Convex optimization for the planted k-disjoint-clique problem.* Mathematical Programming. 143(1-2): 299-337, 2014.
9. **B. Ames** and H. Sendov. *A new derivation of a formula by Kato.* Linear Algebra and Its Applications, 436: 722-730, 2012.
10. **B. Ames** and S. Vavasis. *Nuclear norm minimization for the planted clique and biclique problems.* Mathematical Programming, 129(1): 69-89, 2011.
11. **B. Ames** and H. Sendov. *Asymptotic expansions of the ordered spectrum of symmetric operators*. Nonlinear Analysis, Series A: Theory, Methods and Applications, 72(11): 4288-4297, 2010.

ARTICLES IN PREPARATION OR UNDER REVIEW

12. A. Pirinen and **B. Ames**. *Clustering of Sparse and Approximately Sparse Graphs by Semidefinite Programming.* Submitted for publication March 2016. Preprint available from http://arxiv.org/abs/1603.05296
13. G. Einarsson, R. Paulsen, and **B. Ames**. *Semi-supervised Sparse Discriminant Analysis.* Submitted for publication February 2017.
14. S. Atkins, G. Einarsson, **B. Ames**, and L. Clemmensen. *Proximal methods for sparse optimal scoring and discriminant analysis.* Submitted for publication April 2017. Preprint available from https://arxiv.org/abs/1705.07194
15. G. Einarsson, **B. Ames**, R. Paulsen, L. Clemmensen. *Ordinal Sparse Discriminant Analysis.* Submitted for publication December 2017.
16. **B. Ames** and P. Bombina. *Sparse and low-rank decomposition for clique and dense submatrix recovery*. In preparation.

SOFTWARE

1. *accSDA proximal gradient methods for sparse optimal scoring discriminant analysis.* R package available from the Comprehensive R Archive Network (CRAN) at the following: https://cran.r-project.org/web/packages/accSDA/index.html. Published August 24, 2017.

CONFERENCE AND SEMINAR PRESENTATIONS

1. Semidefinite relaxations of the clustering problem and first-order methods for their solution. September 29, 2017. University of Alabama Applied Math Seminar, The University of Alabama, Tuscaloosa, Alabama.
2. Semidefinite relaxations of the clustering problem and first-order methods for their solution. July 7, 2017. Workshop on Modern Convex Optimization and Applications (AN70). The Fields Institute for Research in Mathematical Sciences, University of Toronto, Toronto, Ontario.
3. Proximal methods for sparse discriminant analysis. May 24, 2017. 2017 SIAM Conference on Optimization, Session CP16 Sparse Optimization, Vancouver, British Columbia.
4. A sparse regression approach for evaluating and predicting NHL results. January 27, 2017. 2017 Alabama Program in Sports Communication Symposium, University of Alabama, Tuscaloosa, Alabama.

5. Ptychographic phase retrieval by convex relaxation. March 12, 2016. 2016 SIAM Southeastern Atlantic Section Conference, session on Inverse Problems and Imaging, University of Georgia, Athens, Georgia.
6. Alternating Direction Methods for Dimension Reduction, Classification, and Feature Selection. November 7, 2015. University of Alabama System Applied Mathematics Meeting, The University of Alabama in Huntsville, Huntsville, Alabama.
7. Proximal methods for sparse discriminant analysis. November 1, 2015. INFORMS 2015 Annual Meeting, session on Theory and Applications of Coordinate Descent and Alternating Direction Methods, Philadelphia Convention Center, Philadelphia, Pennsylvania, November 1-4, 2015.
8. Alternating Direction Methods for Dimension Reduction, Classification, and Feature Selection. August 13, 2015. DTU Compute Seminar, The Technical University of Denmark, Lyngby, Denmark.
9. Alternating Direction Methods for Penalized Classification. November 10, 2014. 2014 INFORMS Annual Meeting, session on Optimization Modeling and Methodologies in Big Data, Hilton San Francisco Union Square & Parc 55 Wyndham, San Francisco, California, November 9-12, 2014.
10. Robust convex relaxation for the sparse planted clique problem. November 9, 2014. 2014 INFORMS Annual Meeting, session on Applications of Conic Optimization, Hilton San Francisco Union Square & Parc 55 Wyndham, San Francisco, California, November 9-12, 2014.
11. Alternating Direction Methods for Dimensionality Reduction, Classification, and Feature Selection. October 10, 2014. University of Alabama Applied Math Seminar, The University of Alabama, Tuscaloosa, Alabama.
12. Alternating Direction Methods for Penalized Classification. May 20, 2014. 2014 SIAM Conference on Optimization, MS52 Optimization for Clustering and Classification, Town and Country Resort and Convention Center, San Diego, California, May 19-22, 2014.
13. Finding hidden cliques and clusters by convex optimization. March 20, 2014. CUNY College of Staten Island, Staten Island, New York.
14. Finding hidden cliques and clusters by convex optimization. February 28, 2014. Georgia Southern University, Statesboro, Georgia.
15. Finding hidden cliques and clusters by convex optimization. February 20, 2014. University of Alabama, Tuscaloosa, Alabama.
16. Finding hidden cliques and clusters by convex optimization. February 4, 2014. Math and Stat Colloquium, Oakland University, Rochester, Michigan.
17. Finding hidden cliques and clusters using convex optimization. January 30, 2014. Computational and Applied Mathematics Colloquium, Rice University, Houston, Texas.
18. Finding hidden cliques and dense subgraphs via convex optimization. August 16, 2013, Modeling and Optimization: Theory and Applications (MOPTA) Conference, technical session on Semidefinite Optimization, Lehigh University, Bethlehem, Pennsylvania.
19. How to find a hidden clique. April 11, 2013, Clemson University Algebra and Discrete Math (ADM) Seminar, Clemson University, Clemson, South Carolina.
20. How to find a hidden clique. March 21, 2013, Department of Mathematics Colloquium, University of Idaho, Moscow, Idaho.
21. How to find a hidden clique. March 15, 2013, MSCS Research Seminar, St. Olaf College, Northfield, Minnesota.
22. Clique and cluster identification using convex optimization. February 8, 2013, Applied Math Colloquium, University of Maryland, Baltimore County, Baltimore, Maryland.
23. Clique and cluster identification using convex optimization. February 5, 2013, IMA Postdoc Seminar, University of Minnesota, Minneapolis, Minnesota.

24. Clique and cluster identification using convex optimization. November 28, 2012, Kansas State University Mathematics Colloquium, Kansas State University, Manhattan, Kansas.
25. Guaranteed biclustering via semidefinite programming. July 12, 2012, CP18: Optimization, 2012 SIAM Annual Meeting, Hyatt Regency, Minneapolis, Minnesota.
26. Finding overlapping communities. July 5, 2012, IMA Postdoc Seminar, University of Minnesota, Minneapolis, Minnesota.
27. Robust convex relaxation for the clique and densest k-subgraph problems. May 22, 2012, IMA Postdoc Seminar, University of Minnesota, Minneapolis, Minnesota.
28. Semidefinite relaxation for the clustering and biclustering problems. February 25, 2012, 2012, INFORMS Optimization Society Conference, University of Miami School of Business Administration, Coral Gables, Florida.
29. Derivatives of eigenvalue functions. December 13, 2011, IMA Postdoc Seminar, University of Minnesota, Minneapolis, Minnesota.
30. Exact semidefinite relaxation for the clustering and biclustering problems. November 8, 2011, IMA Postdoc Seminar, University of Minnesota, Minneapolis, Minnesota.
31. Semidefinite relaxation for the clique partitioning and clustering problems. July 19, 2011, MS144 Semidefinite Approaches to Combinatorial Problems - Part I of III, 7th International Congress on Industrial and Applied Mathematics - ICIAM 2011, Vancouver Conference Center, Vancouver, British Columbia.
32. Convex relaxation for the clique and clustering problems. May 19, 2011, MS83 An Algebraic View of Sparse Optimization, 2011 SIAM Conference on Optimization, Darmstadtium Conference Center, Darmstadt, Germany. Also presented May 2 at Optimization Days 2011, GERAD-HEC Montreal, May 2-4, 2011.
33. Convex relaxation for the planted cluster problem. July 14, 2010, MS68 Minisymposium on Matrix Rank Minimization, 2010 SIAM Annual Meeting, The David Lawrence Convention Center, Pittsburgh, Pennsylvania.
34. Convex relaxation for the clique, biclique and clustering problem. March 2, 2010 at the Workshop on Randomization, Relaxation, and Complexity (10w5119), Banff International Research Station, Alberta.

GRANTS, SCHOLARSHIPS, AND AWARDS

University of Alabama Research Grants Committee (RGC) — *($4500)*
MAY 2015 - MAY 2017
Title: Convergence and consistency of penalized classification (RG14678)

National Science and Engineering Research Council (NSERC) Postgraduate Scholarship—
($21000/year)
SEPTEMBER 2009 - AUGUST 2011

Department of Combinatorics and Optimization Outstanding Teaching Assistant Award
DECEMBER 2011
University of Waterloo, Department of Combinatorics and Optimization

Ontario Graduate Scholarship — *($15000/year)*
SEPTEMBER 2007 - AUGUST 2009 (declined 2009)

University of Waterloo President's Scholarship — *($10000/year)*
SEPTEMBER 2007 - AUGUST 2011

GRADUATE STUDENT SUPERVISION

Phylisicia Carter, University of Alabama — *Doctoral Thesis Advisor*
JANUARY 2016 - PRESENT (EXPECTED GRADUATION AUGUST 2018)
Title: Sparse regression and discriminant analysis for text and sentiment analysis

Alexander Barnes, University of Alabama — *Doctoral Thesis Advisor*
AUGUST 2015 - PRESENT (EXPECTED GRADUATION AUGUST 2018)
Title: Large-scale semidefinite programming for the clustering problem

Truc Phan, University of Alabama — *Master's Project Advisor*
APRIL 2018 - PRESENT (EXPECTED GRADUATION AUGUST 2018)
Title: Deflation-free methods for the sparse discriminant analysis and penalized eigenproblems

Hanqiu Tan, University of Alabama — *Master's Project Advisor*
MARCH 2018 - PRESENT (EXPECTED GRADUATION AUGUST 2018)
Title: Optimized sparse zero-variance discriminant analysis

Polina Bombina, University of Alabama — *Master's Project Advisor*
AUGUST 2017 - PRESENT (EXPECTED GRADUATION MAY 2018)
Title: Alternating direction method of multipliers for dense submatrix identification

David Neal, University of Alabama — *Master's Project Advisor*
AUGUST 2015 - PRESENT (EXPECTED GRADUATION MAY 2018)
Title: Improved zero-variance discriminant analysis

Summer Atkins, University of Alabama — *Master's Project Advisor*
AUGUST 2015 - MAY 2016 (GRADUATED MAY 2016)
Title: Proximal methods for sparse discriminant analysis

PROFESSIONAL SERVICE

MANUSCRIPT REVIEW

Alabama Journal of Mathematics, Automatica, Discrete Applied Mathematics, Foundations of Computational Mathematics, Global Optimization, IEEE Transactions on Information Theory, International Journal of Bioinformatics Research and Applications, Journal of Machine Learning Research, Mathematical Programming, Mathematics of Operations Research, Neural Processing Letters, Networks. Optimization Letters, SIAM Journal on Matrix Analysis and Applications, SIAM Review.

SEMINAR AND CONFERENCE ORGANIZATION

INFORMS 2018 Annual Meeting, Phoenix AZ
NOVEMBER 4-7, 2018
Session chair and minisymposium organizer for *MS New Theory and Methods in Nonconvex Optimization*. Invited to be part of the General Session *Conic Optimization IV*.

2017 SIAM Conference on Optimization, Vancouver, BC
MAY 22-25, 2017
Session chair for *CP16 Sparse Optimization.* May 24, 2017.

INFORMS 2015 Annual Meeting, Philadelphia, PA
NOVEMBER 1-4, 2015
Session chair and minisymposium organizer for *MS Theory and Applications of Coordinate Descent and Alternating Direction Methods.*
Part of cluster on *Modeling and Methodologies in Big Data.* November 1, 2015.

2014 SIAM Conference on Optimization, San Diego, CA
MAY 19-22, 2014
Session chair and minisymposium organizer for *MS52: Optimization for Clustering and Classification.*

IMA Postdoc Seminar (Fall 2012)
SEPTEMBER 2012 - DECEMBER 2012
Institute for Mathematics and its Applications. Minneapolis, MN.

STUDENT GROUP ADVISING

UA Machine Learning/Artificial Learning Club
AUGUST 2017 - PRESENT
Faculty advisor UA ML/AI club

Undergraduate Advising
FEBRUARY 2016 - PRESENT
Undergraduate advisor for scientific computation track for UA Department of Mathematics.