**Brendan P.W. Ames, PhD**

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**ACADEMIC EMPLOYMENT**

**Assistant Professor.** August 2014 to present.

**The University of Alabama. Tuscaloosa, AL**

Department of Mathematics

**von Kármán Instructor.** September 2013 to August 2014.

**California Institute of Technology, Pasadena, CA**

Department of Computing + Mathematical Sciences

**Postdoctoral Fellow.** September 2011 to August 2013.

**University of Minnesota, Minneapolis, MN**

Institute for Mathematics and its Applications

**EDUCATION**

**Ph.D. in Mathematics.** August 2011.

**University of Waterloo, Waterloo, ON**

Department of Combinatorics and Optimization

*Thesis:* Convex relaxation for the planted clique, biclique, and clustering problems

*Advisor:* Dr. Stephen Vavasis

**M. Sc. in Applied Mathematics.** April 2007.

**University of Guelph, Guelph, ON**

Department of Mathematics and Statistics

*Thesis:* Taylor expansions of the spectrum of a symmetric matrix

*Advisor:* Dr. Hristo Sendov

**B. Sc. (Honours) in Mathematics (minor in Physics).**  December 2005.

**University of Guelph, Guelph, ON**

Department of Mathematics and Statistics. *With Distinction.*

**RESEARCH INTERESTS**

My research interests include convex analysis, matrix analysis, conic programming, and their applications to nonlinear optimization. My current focus is on the relaxation of combinatorial optimization problems arising from applications in machine learning and high-dimensional statistics, specifically, convex relaxations for learning tasks such as clustering and classification.

**PUBLICATIONS AND TECHNICAL REPORTS**

1. N. Laffey and **B. Ames.** *A sparse regression approach for evaluating and predicting NHL results.* Technical report. (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.

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| 1. **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**

1. 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>
2. G. Einarsson, R. Paulsen, and **B. Ames**. *Semi-supervised Sparse Discriminant Analysis.*Submitted for publication February 2017.
3. S. Atkins, G. Einarsson, **B. Ames**, and L. Clemmensen. *Proximal methods for sparse optimal scoring and discriminant analysis.* Submitted for publication April 2017.

**CONFERENCE AND SEMINAR PRESENTATIONS**

1. *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.
2. *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.
3. *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.
4. *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.
5. *Alternating Direction Methods for Dimension Reduction, Classification, and Feature Selection.* August 13, 2015. DTU Compute Seminar, The Technical University of Denmark, Lyngby, Denmark.
6. *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.
7. *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.
8. *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.
9. *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.
10. *Finding hidden cliques and clusters by convex optimization.* March 20, 2014. CUNY College of Staten Island, Staten Island, New York.
11. *Finding hidden cliques and clusters by convex optimization.* February 28, 2014. Georgia Southern University, Statesboro, Georgia.
12. *Finding hidden cliques and clusters by convex optimization.* February 20, 2014. University of Alabama, Tuscaloosa, Alabama.
13. *Finding hidden cliques and clusters by convex optimization.* February 4, 2014. Math and Stat Colloquium, Oakland University, Rochester, Michigan.
14. *Finding hidden cliques and clusters using convex optimization.* January 30, 2014. Computational and Applied Mathematics Colloquium, Rice University, Houston, Texas.
15. *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.
16. *How to find a hidden clique.* April 11, 2013, Clemson University Algebra and Discrete Math (ADM) Seminar, Clemson University, Clemson, South Carolina.
17. *How to find a hidden clique.* March 21, 2013, Department of Mathematics Colloquium, University of Idaho, Moscow, Idaho.
18. *How to find a hidden clique.* March 15, 2013, MSCS Research Seminar, St. Olaf College, Northfield, Minnesota.
19. *Clique and cluster identification using convex optimization.* February 8, 2013, Applied Math Colloquium, University of Maryland, Baltimore County, Baltimore, Maryland.
20. *Clique and cluster identification using convex optimization.* February 5, 2013, IMA Postdoc Seminar, University of Minnesota, Minneapolis, Minnesota.
21. *Clique and cluster identification using convex optimization.* November 28, 2012, Kansas State University Mathematics Colloquium, Kansas State University, Manhattan, Kansas.
22. *Guaranteed biclustering via semidefinite programming.* July 12, 2012, CP18: Optimization, 2012 SIAM Annual Meeting, Hyatt Regency, Minneapolis, Minnesota.
23. *Finding overlapping communities*. July 5, 2012, IMA Postdoc Seminar, University of Minnesota, Minneapolis, Minnesota.
24. *Robust convex relaxation for the clique and densest k-subgraph problems*. May 22, 2012, IMA Postdoc Seminar, University of Minnesota, Minneapolis, Minnesota.
25. *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.
26. *Derivatives of eigenvalue functions*. December 13, 2011, IMA Postdoc Seminar, University of Minnesota, Minneapolis, Minnesota.
27. *Exact semidefinite relaxation for the clustering and biclustering problems*. November 8, 2011, IMA Postdoc Seminar, University of Minnesota, Minneapolis, Minnesota.
28. *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.
29. *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.
30. *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.
31. *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 total)

*Convergence and consistency of penalized classification* (RG14678).

Held May 15, 2015 to May 14, 2017

**NSERC Postgraduate Scholarship (Doctoral)***.* ($21000/year)

Held September 2009 to August 2011.

**Department of Combinatorics and Optimization Outstanding Teaching Assistant Award.** University of Waterloo, Winter semester 2011.

**Ontario Graduate Scholarship.** ($15000/year)

Awarded each year 2007 to 2009 (declined 2009).

**University of Waterloo President's Scholarship.** ($10000/year)

Awarded each academic year 2007 to 2010.

**STUDENT SUPERVISION**

**Phylisicia Carter, University of Alabama.** Thesis Advisor. January 2016 to present.

**David Neal, University of Alabama.** Thesis Advisor. August 2015 to present.

**Alexander Barnes, University of Alabama.** Thesis Advisor. August 2015 to present.

**Summer Atkins, University of Alabama.** Master’s Project Advisor. August 2015 to present.

**PROFESSIONAL SERVICE**

**Manuscript reviewer.**

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, Mathematics of Operations Research, Neural Processing Letters, Networks. Optimization Letters, SIAM Journal on Matrix Analysis and Applications, SIAM Review.

**Memberships.**

Society for Industrial and Applied Mathematics (SIAM).

SIAM Activity Group on Optimization.

Institute for Operations Research and Management Sciences (INFORMS).

INFORMS Optimization Society.

**Minisymposium Organizer/Chair.**

**INFORMS 2015 Annual Meeting. Philadelphia, PA. November 1-4, 2015.**

Session on *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.**

Minisymposium *MS52: Optimization for Clustering and Classification.* May 19-22, 2014.

**Seminar Organizer.**

**Institute for Mathematics and its Applications, Minneapolis, MN.**

IMA Postdoc Seminar. Fall 2012.

**Community Outreach.**

**Twin Cities Regional Science Fair, Minneapolis, MN.**

Project Presentation and Research Paper judge (February 2013).

**Institute for Mathematics and its Applications, Minneapolis, MN.**

Minnesota State Fair (Sept 2011, Sept 2012), Math & Science Family Fun Fair (Nov 2011, Nov 2012), CSE Alumni Homecoming Celebration (Oct 2012).