

CURRICULUM VITAE

Daniel M. Dunlavy

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Research Interests

- Numerical optimization, numerical linear algebra, machine learning, data mining, tensor decompositions, text analysis, parallel computing, cyber security

Education

- Ph.D., Applied Mathematics and Scientific Computation, University of Maryland, College Park, 2005
- M.S., Applied Mathematics and Scientific Computation, University of Maryland, College Park, 2003
- M.S., Applied Mathematics, Western Michigan University, 2001
- B.A., Computer Studies, Northwestern University, 1994

Professional Experience

- Principal Member of Technical Staff (2011–present), Data Analysis and Informatics Department, Sandia National Laboratories, Albuquerque, NM
- Senior Member of Technical Staff (2007–2011), Computer Science and Informatics Department, Sandia National Laboratories, Albuquerque, NM
- John von Neumann Postdoctoral Fellow (2005–2007), Optimization and Uncertainty Estimation Department, Sandia National Laboratories, Albuquerque, NM
- Graduate Research Assistant (2001–2005), Department of Computer Science, University of Maryland, College Park, MD
- Student Intern (2002–2004), Center for Computing Sciences, Bowie, MD
- Student Intern (2001), Sandia National Laboratories, Livermore, CA
- Graduate Research Assistant (2000–2001), Department of Mathematics and Statistics, Western Michigan University, Kalamazoo, MI
- Visitor in Residence (2000), Institute for Mathematics and Its Applications, Minneapolis, MN
- Graduate Teaching Assistant (1999), Department of Mathematics and Statistics, Western Michigan University, Kalamazoo, MI
- Math Tutor, (1998–1999), Sylvan Learning Center, Stevensville, MI
- Computer Instructor (1998–1999), Lakeshore Public Schools, Stevensville, MI
- Computer Programmer (1995–1998), Sperling Sampson West, San Francisco, CA
- Computer Technician (1994–1995), DechTar Direct, Inc., San Francisco, CA
- Computer Technician (1993–1994), Northwestern University, Evanston, IL
- Research Assistant (1992–1993), Electrical Engineering and Computer Science Department, Northwestern University, Evanston, IL
- Computer Programmer (1991–1993), GD Searle, Skokie, IL

Book Chapters

- [B1] Daniel M. Dunlavy, Tamara G. Kolda, and W. Philip Kegelmeyer, [Tensor Decompositions for Analyzing Similarity Graphs with Multiple Linkages](#), in *Graph Algorithms in the Language of Linear Algebra*, J. Kepner and J. Gilbert, eds, SIAM, Philadelphia, PA, 2011.

Refereed Journal Articles

- [J7] Patricia Crossno, Andrew Wilson, Timothy Shead, Warren L. Davis IV and Daniel Dunlavy, [TopicView: Visual Analysis of Topic Models and their Impact on Document Clustering](#), *International Journal on Artificial Intelligence Tools*, 2013 (accepted).
- [J6] Daniel M. Dunlavy, Tamara G. Kolda and Evrim Acar, [Temporal Link Prediction using Matrix and Tensor Factorizations](#), *ACM Transactions on Knowledge Discovery from Data*, 5(2):1–27, 2011.
- [J5] Evrim Acar, Daniel M. Dunlavy, Tamara G. Kolda and Morten Mørup, [Scalable Tensor Factorizations for Incomplete Data](#), *Chemometrics and Intelligent Laboratory Systems*, 106(1):41–56, 2011.
- [J4] Evrim Acar, Daniel M. Dunlavy and Tamara G. Kolda, [A Scalable Optimization Approach for Fitting Canonical Tensor Decompositions](#), *Journal of Chemometrics*, 25(2):67–86, 2011.
- [J3] Daniel M. Dunlavy, Dianne P. O’Leary, John M. Conroy and Judith D. Schlesinger, [QCS: A System for Querying, Clustering, and Summarizing Documents](#), *Information Processing & Management*, 43(6), p. 1588–1605, 2007.
- [J2] Daniel M. Dunlavy, Dianne P. O’Leary, Dmitri Klimov and Devarajan Thirumalai, [HOPE: A Homotopy Optimization Method for Protein Structure Prediction](#), *Journal of Computation Biology*, 12(10):1275-1288, December 2005.
- [J1] D. Steven Mackey, Niloufer Mackey and Daniel M. Dunlavy, [Structure Preserving Algorithms for Perplectic Eigenproblems](#), *Electronic Journal of Linear Algebra*, 13:10-39, 2005.

Refereed Conference and Workshop Proceedings

- [C11] Brian Wylie, Daniel Dunlavy, Warren Davis IV and Jeff Baumes, [Using NoSQL Databases for Streaming Network Analysis](#), in *Proceedings of the IEEE Symposium on Large Scale Data Analysis and Visualization (LDAV)*, October 2012.
- [C10] Patricia J. Crossno, Andrew T. Wilson, Timothy M. Shead and Daniel M. Dunlavy, [TopicView: Visually Comparing Topic Models of Text Collections](#), in *Proceedings of the 2011 IEEE International Conference on Tools with Artificial Intelligence (ICTAI), Special Session on Text and Web Mining (TWM)*, November 2011.
- [C9] Patricia J. Crossno, Andrew T. Wilson, Daniel M. Dunlavy and Timothy M. Shead, [TopicView: Understanding Document Relationships Using Latent Dirichlet Allocation Models](#), in *Proceedings of the IEEE Workshop on Interactive Visual Text Analytics for Decision Making*, October 2011.
- [C8] Evrim Acar, Tamara G. Kolda and Daniel M. Dunlavy, [All-at-once Optimization for Coupled Matrix and Tensor Factorizations](#), in *Proceedings of Mining and Learning with Graphs (MLG)*, August 2011.
- [C7] Daniel M. Dunlavy, Timothy M. Shead and Eric T. Stanton, [ParaText: Scalable Text Modeling and Analysis](#), in *HPDC10: Proceedings of the 19th International ACM Symposium on High Performance Distributed Computing*, June 2010.
- [C6] Evrim Acar, Daniel M. Dunlavy, Tamara G. Kolda and Morten Mørup, [Scalable Tensor Factorizations with Missing Data](#), in *SDM10: Proceedings of the 2010 SIAM Conference on Data Mining*, April 2010.
- [C5] Evrim Acar, Tamara G. Kolda and Daniel M. Dunlavy, [Link Prediction on Evolving Data using Matrix and Tensor Factorization](#), in *LDMTA2009: Proceedings of the 1st Workshop on Large-Scale Data Mining: Theory and Applications*, December 2009.
- [C4] Patricia J. Crossno, Daniel M. Dunlavy and Timothy M. Shead, [LSAView: A Tool for Visual Exploration of Latent Semantic Modeling](#), in *IEEE Symposium on Visual Analytics Science and Technology*, October 2009.
- [C3] Michael S. Eldred and Daniel M. Dunlavy, [Formulations for Surrogate-Based Optimization with Data](#), AIAA-2006-7117, in *Proceedings of the 11th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, September 2006.
- [C2] John M. Conroy, Dianne P. O’Leary and Daniel M. Dunlavy, [From TREC to DUC to TREC Again](#), in *Proceedings of the Twelfth Text Retrieval Conference (TREC)*, 2003.

- [C1] Daniel M. Dunlavy, John M. Conroy, Judith D. Schlesinger, Sarah A. Goodman, Mary E. Okurowski, Dianne P. O’Leary and Hans van Halteren, [Performance of a Three-Stage System for Multi-Document Summarization](#), in *Proceedings of the Document Understanding Conference (DUC)*, 2003.

Other Conference and Workshop Proceedings

- [O2] Evrim Acar, Tamara G. Kolda and Daniel M. Dunlavy, [CPOPT: Optimization for Fitting CANDECOMP/PARAFAC Models](#), in *CASTA 2008: Workshop on Computational Algebraic Statistics, Theories and Applications*, December 2008.
- [O1] Daniel M. Dunlavy, John M. Conroy and Dianne P. O’Leary, [QCS: A Tool for Querying, Clustering, and Summarizing Documents](#), in *HLT-NAACL03: Proceedings of the Human Language Technology Conference of the North American Chapter of the Association for Computational Linguistics*, June 2003.

Technical Reports

- [T19] Daniel M. Dunlavy, Timothy M. Shead, Patricia J. Crossno, and Eric T. Stanton, [ParaText—Scalable Solutions for Processing and Searching Very Large Document Collections: Final LDRD Report](#), Technical Report Number SAND2010-6269, Sandia National Laboratories, Albuquerque, NM and Livermore, CA, September 2010.
- [T18] Daniel M. Dunlavy, Tamara G. Kolda and Evrim Acar, [Poblano v1.0: A Matlab Toolbox for Gradient-Based Optimization](#), Technical Report Number SAND2010-1422, Sandia National Laboratories, Albuquerque, NM and Livermore, CA, March 2010.
- [T17] Evrim Acar, Daniel M. Dunlavy, Tamara G. Kolda and Morton Mørup, [Scalable Tensor Factorizations with Missing Data](#), Technical Report Number SAND2009-6764, Sandia National Laboratories, Albuquerque, NM and Livermore, CA, October 2009.
- [T16] Sean A. Gilpin and Daniel M. Dunlavy, [Relationships Between Accuracy and Diversity in Heterogeneous Ensemble Classifiers](#), Technical Report Number SAND2009-6940C, Sandia National Laboratories, Albuquerque, NM and Livermore, CA, September 2009.
- [T15] Taylor P. Turpen and Daniel M. Dunlavy, [Semisupervised Named Entity Recognition](#), Technical Report Number SAND2010-3083P, Sandia National Laboratories, Albuquerque, NM and Livermore, CA, September 2009.
- [T14] Evrim Acar, Tamara G. Kolda and Daniel M. Dunlavy, [An Optimization Approach for Fitting Canonical Tensor Decompositions](#), Technical Report Number SAND2009-0857, Sandia National Laboratories, Albuquerque, NM and Livermore, CA, February 2009.
- [T13] Sean A. Gilpin and Daniel M. Dunlavy, [Heterogeneous Ensemble Classification](#), Technical Report Number SAND2009-0203P, Sandia National Laboratories, Albuquerque, NM and Livermore, CA, January 2009.
- [T12] Roscoe A. Bartlett, Daniel M. Dunlavy, Esteban J. Guillen and Tim Shead, [Trilinos CMake Evaluation](#), Technical Report Number SAND2008-7593, Sandia National Laboratories, Albuquerque, NM and Livermore, CA, November 2008.
- [T11] Sean A. Gilpin and Daniel M. Dunlavy, [Heterogeneous Ensemble Classification](#), Technical Report Number SAND2009-0203P, Sandia National Laboratories, Albuquerque, NM and Livermore, CA, January 2009.
- [T10] James M. Brandt, Daniel M. Dunlavy and Ann C. Gentile, [Proceedings of the 2008 Sandia Workshop on Data Mining and Data Analysis](#), Technical Report Number SAND2008-6109, Sandia National Laboratories, Albuquerque, NM and Livermore, CA, September 2008.
- [T9] Justin D. Basilico, Daniel M. Dunlavy, Stephen J. Verzi, Travis L. Bauer and Wendy Shaneyfelt, [Yucca Mountain LSN Archive Assistant](#), Technical Report Number SAND2008-1622, Sandia National Laboratories, Albuquerque, NM and Livermore, CA, March 2008.

- [T8] Daniel M. Dunlavy, Dianne P. O’Leary, John M. Conroy and Judith D. Schlesinger [QCS: A System for Querying, Clustering, and Summarizing Documents](#), Technical Report Number SAND2006-5000, Sandia National Laboratories, Albuquerque, NM and Livermore, CA, October 2006.
- [T7] Michael S. Eldred, Shannon L. Brown, Brian M. Adams, Daniel M. Dunlavy, David M. Gay, Laura P. Swiler, Anthony A. Giunta, William E. Hart, Jean-Paul Watson, John P. Eddy, Josh D. Griffin, Patty D. Hough, Tammy G. Kolda, Monica L. Martinez-Canales and Pamela J. Williams, [DAKOTA, A Multilevel Parallel Object-Oriented Framework for Design Optimization, Parameter Estimation, Uncertainty Quantification, and Sensitivity Analysis: Version 4.0 Users Manual](#), Technical Report Number SAND2006-6637, Sandia National Laboratories, Albuquerque, NM and Livermore, CA, October 2006.
- [T6] Michael S. Eldred, Shannon L. Brown, Brian M. Adams, Daniel M. Dunlavy, David M. Gay, Laura P. Swiler, Anthony A. Giunta, William E. Hart, Jean-Paul Watson, John P. Eddy, Josh D. Griffin, Patty D. Hough, Tammy G. Kolda, Monica L. Martinez-Canales and Pamela J. Williams, [DAKOTA, A Multilevel Parallel Object-Oriented Framework for Design Optimization, Parameter Estimation, Uncertainty Quantification, and Sensitivity Analysis: Version 4.0 Developers Manual](#), Technical Report Number SAND2006-4056, Sandia National Laboratories, Albuquerque, NM and Livermore, CA, September 2006.
- [T5] Michael S. Eldred, Shannon L. Brown, Brian M. Adams, Daniel M. Dunlavy, David M. Gay, Laura P. Swiler, Anthony A. Giunta, William E. Hart, Jean-Paul Watson, John P. Eddy, Josh D. Griffin, Patty D. Hough, Tammy G. Kolda, Monica L. Martinez-Canales and Pamela J. Williams, [DAKOTA, A Multilevel Parallel Object-Oriented Framework for Design Optimization, Parameter Estimation, Uncertainty Quantification, and Sensitivity Analysis: Version 4.0 Reference Manual](#), Technical Report Number SAND2006-4055, Sandia National Laboratories, Albuquerque, NM and Livermore, CA, September 2006.
- [T4] Daniel M. Dunlavy, Tamara G. Kolda, W. Philip Kegelmeyer, [Multilinear Algebra for Analyzing Data with Multiple Linkages](#), Technical Report Number SAND2006-2079, Sandia National Laboratories, Albuquerque, NM and Livermore, CA, April 2006.
- [T3] Daniel M. Dunlavy and Dianne P. O’Leary, [Homotopy Optimization Methods for Global Optimization](#), Technical Report Number SAND2005-7495, Sandia National Laboratories, Albuquerque, NM and Livermore, CA, December 2005.
- [T2] D. Steven Mackey, Niloufer Mackey and Daniel M. Dunlavy, [Structure Preserving Algorithms for Perplectic Eigenproblems](#), *Numerical Analysis Report No. 427*, Manchester Centre for Computational Mathematics, Manchester, England, May 2003.
- [T1] Danny Dunlavy, Sookhyung Joo, Runchang Lin, Roummel Marcia, Aurelia Minut and Jianzhong Sun, [Numerical Steady-State Solutions of Non-Linear DAE’s Arising in RF Communication Circuit Design](#), Technical Report Number 1752-1, *Institute for Mathematics and Its Applications (IMA) Preprint Series*, February 2001.

Expository Articles, Etc.

- [E2] Daniel M. Dunlavy, Bruce A. Hendrickson and Tamara G. Kolda, [Mathematical Challenges in Cybersecurity](#), Technical Report Number SAND2009-0805, Sandia National Laboratories, Albuquerque, NM and Livermore, CA, February 2009.
- [E1] Danny Dunlavy, Chris Danforth, Aaron Lott and Bob Shuttleworth, [Survival Guide for Graduate Students in Scientific Computation](#), Applied Mathematics and Scientific Computation Program, University of Maryland, Fall 2004.

Dissertation and Thesis

- [D2] Daniel M. Dunlavy, [Homotopy Optimization Methods and Protein Structure Prediction](#), PhD thesis, Applied Mathematics and Scientific Computation Program, University of Maryland, College Park, August 2005.

- [D1] Daniel M. Dunlavy, [QCS: An Information Retrieval System for Improving Efficiency in Scientific Literature Searches](#), *M.S. Thesis*, Applied Mathematics and Scientific Computation Program, University of Maryland, College Park, August 2003.

Software Development

- [STREAM](#) (Python): framework for data modeling and analysis of computer network traffic (*team*)
- [ParaText/Titan](#)(C++): large-scale text modeling and analysis (*lead*)
- [Poblano Toolbox](#) (Matlab): large-scale nonlinear optimization (*lead*)
- [Tensor Toolbox](#) (Matlab): Higher-order operations of multidimensional arrays (*team*)
- [HEMLOCK](#) (Java): heterogeneous ensemble classification (*lead*)
- [QCS](#) (C++/Java): information retrieval, clustering, and summarization tool (*lead*)
- [HOPE](#) (Matlab): homotopy optimization for unconstrained problems (*lead*)
- [LSALIB](#) (C++): text data modeling using latent semantic analysis (LSA) (*lead*)
- [DAKOTA](#) (C++)large-scale optimization; surrogate-based optimization (*team*)
- [Trilinos](#) (C++): large-scale linear and nonlinear solvers; space-time preconditioning (*team*)

Professional Service and Committee Work

- *Editorial Work*
 - Editor, [NA Digest](#), 2010–present (lead), 2008-2010 (guest)
- *Committee Work*
 - Program Committee, [IEEE Symposium on Large-Scale Data Analysis and Visualization \(LDAV 2013\)](#), Atlanta, GA, October 13-14, 2013
 - Program Committee, [SIAM International Conference on Data Mining \(SDM13\)](#), Austin, TX, May 2-4, 2013
 - Program Committee, [IEEE Symposium on Large-Scale Data Analysis and Visualization \(LDAV 2012\)](#), Seattle, WA, October 14-15, 2012
 - Program Committee, [SIAM International Conference on Data Mining \(SDM12\)](#), Anaheim, CA, April 26-28, 2012
 - Program Committee, [ACM Transactions on Knowledge Discovery from Data, Special Issue on Large-Scale Data Mining: Theory and Applications](#), 2011
 - Program Committee, [2nd Workshop on Large Scale Data Mining: Theory and Applications \(LDMTA 2010\)](#), Washington, DC, July 25-28, 2010
- *Workshop, Conference, and Minisymposium Organization*
 - Minisymposium Organizer and Professional Development Evening Co-organizer, [2009 SIAM Annual Meeting \(AN10\)](#), Pittsburgh, PA, July 12-16, 2010
 - Minisymposium Organizer and Professional Development Evening Co-organizer, [2009 SIAM Annual Meeting \(AN09\)](#), Denver, CO, July 6-10, 2009
 - Professional Development Evening Co-organizer, [SIAM Conference on Computational Science and Engineering \(CSE09\)](#), Miami, FL, March 2-6, 2009
 - Professional Development Evening Co-organizer, [SIAM Annual Meeting \(AN08\)](#), San Diego, CA, July 7-11, 2008
 - Minisymposium Organizer, [SIAM Conference on Science and Engineering](#), Costa Mesa, CA, February 19-23, 2007
- *Reviewer/Referee*
 - *Journals*

- Algorithms
- ACM Transactions on Knowledge Discovery from Data
- Data Mining and Knowledge Discovery
- IEEE Transactions on Evolutionary Computing
- Information Processing and Management
- Information Sciences
- Journal of Applied Mathematics and Computing
- Journal of Machine Learning Research
- Knowledge and Information Systems
- Linear Algebra and Applications
- Machine Learning
- SIAM Journal on Matrix Analysis and Applications
- SIAM Journal on Numerical Analysis
- SIAM Journal on Scientific Computing
- SIAM Review
- *Conferences and Workshops*
 - AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference
 - IEEE International Conference on Data Mining (ICDM)
 - IEEE Symposium on Large-Scale Data Analysis and Visualization (LDAV)
 - SIAM International Conference on Data Mining (SDM)
 - Workshop on Large Scale Data Mining: Theory and Applications (LDMTA)
- Member, Trilinos Advisory Group, 2009–2012
- Member, Titan Advisory Board, 2010–2011
- Member, SIAM Professional Development Committee, 2008–2010
- Panelist, NSF Review, Department of Mathematics, 2009
- Grand Awards Judge, International Science and Engineering Fair, Albuquerque, NM, 2007
- Student Representative, AMSC Graduate Committee, University of Maryland, 2004-2005
- President, AMSC Student Council, University of Maryland, 2004–2005
- Graduate Student Mentor, AMSC Program, University of Maryland, 2002–2004

Honors and Awards

- Award for Excellence (PANTHER Grand Challenge Proposal), Sandia National Labs, September 2012.
- Best Special Session Paper Award, IEEE Intl. Conf. on Tools with Artificial Intelligence (ICTAI), November 2011.
- Award for Excellence (MAPD Working Group Organizer), Sandia National Labs, September 2009.
- Award for Excellence (Stockpile Evaluation-Informatics), Sandia National Labs, January 2009.
- Award for Excellence (Data Analysis Workshop Organizer), Sandia National Labs, August 2008.
- Award for Excellence (Technical Contributions, Text Analysis), Sandia National Labs, June 2008.
- Award for Excellence (Data Analysis Workshop Organizer), Sandia National Labs, May 2007.
- John von Neumann Postdoctoral Fellowship, Sandia National Labs, 2005–2007.
- Award for Excellence (Recycling Program Organizaton), Sandia National Labs, September 2006.
- Biomedical Informatics Fellowship, National Library of Medicine, 2003–2005.
- SIAM Student Travel Award, SIAM Conference on the Life Sciences, July 2004.
- SIAM Student Travel Award, Applied Linear Algebra Conference, July 2003.
- Winner, Spotlight on Graduate Research, University of Maryland, February 2003.
- Graduate Research Assistantship, University of Maryland, 2001–2003.
- Block Fellowship, University of Maryland, 2001–2003.

- Graduate Teaching Assistantship, Western Michigan University, 2001–2003.
- Phi Kappa Phi Honor Society, WMU, 2001.
- Travel Award, Yousef Alavi Endowment Fund, 2000.
- Joseph Blazek Engineering Scholarship, 1989–1994.
- Marquette National Bank Scholarship, 1989.

Professional Societies

- [Society for Industrial and Applied Mathematics \(SIAM\)](#)
- [Association for Computing Machinery \(ACM\)](#)