CURRICULUM VITAE
Daniel M. Dunlavy

Sandia National Laboratories
P.O. Box 5800, MS 1327
Albuquerque, New Mexico, 87185-1327, USA

dmdunla@sandia.gov
(505) 206-9855 / (505) 845-7442 (fax)
http://www.cs.sandia.gov/~dmdunla

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] Partricia 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 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. OLeary, 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-PaulWatson, 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-PaulWatson, 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-PaulWatson, 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)