# EVRIM ACAR (ATAMAN)

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## Research Interests

- Data mining, mathematical modeling, matrix/tensor factorizations.
- Applications of matrix/tensor factorizations in chemometrics, metabolomics, computational neuroscience and social network analysis.

## Education

- Ph.D., Computer Science, Rensselaer Polytechnic Institute, Troy, New York, May 2008. Dissertation: *Understanding Epilepsy Seizure Structure Using Tensor Analysis*.
- M.S., Computer Science, Rensselaer Polytechnic Institute, Troy, New York, December 2006. Dissertation: *Chatroom Communication Analysis Using Tensor Decompositions*.
- B.S., Computer Engineering, Bogazici University, Istanbul, Turkey, July 2003.

## Professional Experience

- Senior Research Scientist (January 2018 - ...), Simula Metropolitan Center for Digital Engineering, Oslo, Norway.
- Assistant Professor (March 2012 - 2017), Chemometrics and Analytical Technology, Faculty of Science, University of Copenhagen, Denmark.
  - Instructor (September - December 2017), Computer Engineering Department, Bogazici University, Istanbul, Turkey.
  - Visiting Scholar (April - June 2013), Institute for Computational and Mathematical Engineering (ICME), Stanford University, California.
- Postdoctoral Researcher (March 2011 - February 2012), Spectroscopy and Chemometrics, Faculty of Science, University of Copenhagen, Denmark.
- Senior Research Scientist (April 2010 - February 2011), National Research Institute of Electronics and Cryptology (TUBITAK-BILGEM), Gebze, Turkey.
- Postdoctoral Researcher (June 2008 - November 2009), Computational Sciences and Mathematics Research Department, Sandia National Laboratories, Livermore, California.
- Research/Teaching Assistant (August 2003 - May 2008), Computer Science Department, Rensselaer Polytechnic Institute (RPI), Troy, New York.
  - Visiting Researcher (Summers 2006 & 2007), Spectroscopy and Chemometrics, Faculty of Science, University of Copenhagen, Denmark.

## Honors and Awards

- The Danish Council for Independent Research Sapere Aude Young Elite Researcher, 2012.
- Travel Award (EU FP6) to attend ISMB/ECCB, Vienna, Austria, 2007.
- Travel Award (SIAM) to attend ICIAM, Zurich, Switzerland, 2007.
- Participant/Travel Grant (NSF) to attend IPAM Graduate Summer School on Intelligent Extraction of Information from Graphs and High Dimensional Data, UCLA, CA, 2005.
- High-Honor Student, Computer Engineering Department, Bogazici University, Istanbul, Turkey, 2003.
- High-Honor Award, Ranked 2, Class of 1998, TED Ankara College, Ankara, Turkey, 1998.
- Three-year Scholarship, Ranked 1, Class of 1995, TED Ankara College, Ankara, Turkey, 1995.

**Research Grants**

- [Joint Data Analysis for Enhanced Knowledge Discovery in Metabolomics](), The Danish Council for Independent Research - Technology and Production Sciences, March 1, 2012 - December 31, 2016 (kr 4,426,322).

**Refereed Journal Articles**

21. **E. Acar**, G. Gürdeniz, F. Savorani, L. Hansen, A. Olsen, A. Tjønneland, L. O. Dragsted and R. Bro. *Forecasting Chronic Diseases using Data Fusion.* Journal of Proteome Research, 16(7):2435-2444, 2017.

20. A. K. Smilde, I. Mage, T. Næs, T. Hankemeier, M. A. Lips, H. A. L. Kiers, **E. Acar** and R. Bro. *Common and Distinct Components in Data Fusion.* Journal of Chemometrics, 31:e2900, 2017.

19. B. Khakimov, S. K. Poulsen, F. Savorani, **E. Acar**, G. Gürdeniz, T. M. Larsen, A. Astrup, L. O. Dragsted and S. B. Engelsen. *New Nordic diet versus average Danish diet: a randomized controlled trial revealed healthy long-term effects of the new Nordic diet by GC-MS blood plasma metabolomics.* Journal of Proteome Research, 15(6):1939-1954, 2016.

18. **E. Acar**, R. Bro and A. K. Smilde. *Data Fusion in Metabolomics using Coupled Matrix and Tensor Factorizations.* Proceedings of the IEEE, 103:1602-1620, 2015.

17. J. Escudero, **E. Acar**, A. Fernández and R. Bro. *Multiscale Entropy Analysis of Resting-State Magnetoencephalogram with Tensor Factorisations in Alzheimer's Disease.* Brain Research Bulletin, 119:136-144, 2015.

16. B. Ermiş, **E. Acar** and A. T. Cemgil. *Link Prediction in Heterogeneous Data via Generalized Coupled Tensor Factorization.* Data Mining and Knowledge Discovery, 29:203-236, 2015.

15. **E. Acar**, E. E. Papalexakis, G. Gürdeniz, M. A. Rasmussen, A. J. Lawaetz, M. Nilsson and R. Bro. *Structure-Revealing Data Fusion.* BMC Bioinformatics, 15:239, 2014.

14. **E. Acar**, M. A. Rasmussen, F. Savorani, T. Næs and R. Bro. *Understanding Data Fusion within the Framework of Coupled Matrix and Tensor Factorizations.* Chemometrics and Intelligent Laboratory Systems, 129:53-63, 2013.

13. G. Gürdeniz, L. Hansen, M. A. Rasmussen, **E. Acar**, A. Olsen, J. Christensen, T. Barri, A. Tjønneland and L. O. Dragsted. *Patterns of Time Since Last Meal Revealed by Sparse PCA in an Observational LC-MS based Metabolomics Study.* Metabolomics, 9:1073-1081, 2013.

12. **E. Acar**, G. Gürdeniz, M. A. Rasmussen, D. Rago, L. O. Dragsted and R. Bro. *Coupled Matrix Factorization with Sparse Factors to Identify Potential Biomarkers in Metabolomics.* International Journal of Knowledge Discovery in Bioinformatics, 3:22-43, 2012.

11. R. Bro, E. E. Papalexakis, **E. Acar** and N. D. Sidiropoulos. *Coclustering - a Useful Tool for Chemometrics.* Journal of Chemometrics, 26:256-263, 2012.

10. **E. Acar**, G. E. Plopper and B. Yener. *Coupled Analysis of in Vitro and Histology Tissue Samples to Quantify Structure-Function Relationship.* PLoS One, 7(3):e32227, 2012.

9. **E. Acar**, D. M. Dunlavy, T. G. Kolda and M. Mørup. *Scalable Tensor Factorizations for Incomplete Data.* Chemometrics and Intelligent Laboratory Systems, 106:41-56, 2011.

8. D. M. Dunlavy, T. G. Kolda and **E. Acar**. *Temporal Link Prediction Using Matrix and Tensor Factorizations.* ACM Transactions on Knowledge Discovery from Data, 5(2), Article 10, 2011.

7. **E. Acar**, D. M. Dunlavy and T. G. Kolda. *A Scalable Optimization Approach for Fitting Canonical Tensor Decompositions.* Journal of Chemometrics, 25:67-86, 2011.

6. **E. Acar** and B. Yener. *Unsupervised Multiway Data Analysis: A Literature Survey.* IEEE Transactions on Knowledge and Data Engineering, 21:6-20, 2009.

5. R. Bro, **E. Acar** and T. G. Kolda. *Resolving the Sign Ambiguity in the Singular Value Decomposition.* Journal of Chemometrics, 22:135-140, 2008.

4. **E. Acar**, R. Bro and B. Schmidt. *New Exploratory Clustering Tool.* Journal of Chemometrics, 22:91-100, 2008.

3. B. Yener, **E. Acar**, P. Aguis, K. P. Bennett, S. L. Vandenberg and G. E. Plopper. *Multiway Modeling and Analysis in Stem Cell Systems Biology.* BMC Systems Biology, 2:63, 2008.

2. K. P. Bennett, C. Bergeron, **E. Acar**, R. F. Klees, S. L. Vandenberg, B. Yener and G. E. Plopper. *Proteomics Reveals Multiple Routes to the Osteogenic Phenotype in Mesenchymal Stem Cells.* BMC Genomics, 8:380, 2007.

1. **E. Acar**, C. A. Bingöl, H. Bingöl, R. Bro and B. Yener. *Multiway Analysis of Epilepsy Tensors.* Bioinformatics, 23(13): i10-i18, 2007.

**Refereed Conference/Workshop Articles**

16. **E. Acar**, Y. Levin-Schwartz, V. D. Calhoun and T. Adali. *ACMTF for Fusion of Multi-Modal Neuroimaging Data and Identification of Biomarkers.* In EUSIPCO 2017: Proceedings of the 25th European Signal Processing Conference, 2017.

15. **E. Acar**, Y. Levin-Schwartz, V. D. Calhoun and T. Adali. *Tensor-Based Fusion of EEG and FMRI to Understand Neurological Changes in Schizophrenia.* In IEEE ISCAS 2017: Proceedings of the 50th Annual International Symposium on Circuits and Systems, pp. 314-317, 2017.

14. **E. Acar**, M. Nilsson and M. Saunders. *A Flexible Modeling Framework for Coupled Matrix and Tensor Factorizations.* In EUSIPCO 2014: Proceedings of the 22nd European Signal Processing Conference, pp. 111-115, 2014.

13. W. Swinnen, B. Hunyadi, **E. Acar**, S. Van Huffel and M. De Vos. *Incorporating Higher Dimensionality in Joint Decomposition of EEG and fMRI.* In EUSIPCO 2014: Proceedings of the 22nd European Signal Processing Conference, pp. 121-125, 2014.

12. U. Şimşekli, B. Ermiş, A. T. Cemgil and **E. Acar**. *Optimal Weight Learning For Coupled Tensor Factorization with Mixed Divergences.* In EUSIPCO 2013: Proceedings of the 21st European Signal Processing Conference, pp. 1-5, 2013.

11. **E. Acar**, A. J. Lawaetz, M. A. Rasmussen and R. Bro. *Structure-Revealing Data Fusion Model with Applications in Metabolomics.* In IEEE EMBS 2013: Proceedings of the 35th International Conference of IEEE Engineering in Medicine and Biology Society, pp. 6023-6026, 2013.

10. **E. Acar**, G. Lozanski and M. N. Gürcan. *Tensor-based Computation and Modeling in Multi-Resolution Digital Pathology Imaging: Application to Follicular Lymphoma Grading.* In Proceedings of SPIE 8676, Medical Imaging 2013: Digital Pathology, 867603, 2013.

9. **E. Acar**, G. Gürdeniz, M. A. Rasmussen, D. Rago, L. O. Dragsted and R. Bro. *Coupled Matrix Factorization with Sparse Factors to Identify Potential Biomarkers in Metabolomics.* In ICDM 2012 Workshop Proceedings for the 3rd Workshop on Biological Data Mining and Its Applications in Healthcare, pp. 1-8, 2012.

8. B. Ermiş, **E. Acar** and A. T. Cemgil. *Link Prediction via Generalized Coupled Tensor Factorisation.* ECML/PKDD Workshop on Collective Learning and Inference on Structured Data, 2012.

7. **E. Acar**, T. G. Kolda and D. M. Dunlavy. *All-at-once Optimization for Coupled Matrix and Tensor Factorizations.* KDD Workshop on Mining and Learning with Graphs, 2011.

6. **E. Acar**, D. M. Dunlavy, T. G. Kolda and M. Mørup. *Scalable Tensor Factorizations with Missing Data.* In SDM 2010: Proceedings of the 10th SIAM International Conference on Data Mining, pp. 701-712, 2010.

5. **E. Acar**, D. M. Dunlavy and T. G. Kolda. *Link Prediction on Evolving Data using Matrix and Tensor Factorizations.* In ICDM 2009 Workshop Proceedings for the 1st Workshop on Large-Scale Data Mining: Theory and Applications, pp. 262-269, 2009.

4. **E. Acar**, C. A. Bingöl, H. Bingöl, R. Bro and B. Yener. *Seizure Recognition on Epilepsy Feature Tensor.* In IEEE EMBS 2007: Proceedings of the 29th International Conference of IEEE Engineering in Medicine and Biology Society, pp. 4273-4276, 2007.

3. **E. Acar**, C. A. Bingöl, H. Bingöl and B. Yener. *Computational Analysis of Epileptic Focus Localization.* In BIOMED 2006: Proceedings of the 24th IASTED International Conference on Biomedical Engineering, pp. 317-322, 2006.

2. **E. Acar**, S. A. Çamtepe and B. Yener. *Collective Sampling and Analysis of High-order Tensors for Chatroom Communications.* In ISI 2006: Proceedings of IEEE International Conference on Intelligence and Security Informatics, pp. 213-224, 2006.

1. **E. Acar**, S. A. Çamtepe, M. S. Krishnamoorthy and B. Yener *Modeling and Multiway Analysis of Chatroom Tensors.* In ISI 2005: Proceedings of IEEE International Conference on Intelligence and Security Informatics, pp. 256-268, 2005.

**Conference, Workshop & Seminar Presentations**

- Invited Seminar, University of Granada, Granada, Spain, February 22-23, 2018.
- Seminar, Simula Research Laboratory, Fornebu, Norway, September 15, 2017.
- Refereed Paper, EUSIPCO, Kos, Greece, August 28 - September 1, 2017.
- Seminar, Sandia National Labs, Livermore, CA, April 24, 2017.
- Seminar, IBM Research, Zurich, Switzerland, March 13, 2017.
- Seminar, Steno Diabetes Center, Copenhagen, Denmark, October 5, 2016.
- Invited Talk, 13th NuGOweek: Phenotypes and Prevention - The Interplay of Genes, Life-style factors and Gut Environment, Copenhagen, Denmark, September 5-8, 2016.
- Invited Minisymp. Talk, 20th Conf. of the International Linear Algebra Society, Leuven, Belgium, July 11-15, 2016.
- Invited Minisymp. Talk, SIAM Conf. Parallel Processing for Scientific Computing, Paris, France, April 12-15, 2016.
- Organizer/Speaker, Dagstuhl Perspectives Workshop: Tensor Computing for Internet of Things, Schloss Dagstuhl, Germany, April 10-13, 2016.
- Invited Talk, Metabolomics Young Investigators Network Meeting, Denmark, March 30, 2016.
- Invited Seminar, The University of Edinburgh, UK, March 17, 2016.
- Workshop on Tensor Decompositions and Applications, Leuven, Belgium, January 18-22, 2016.
- Seminar, Ozyegin University, Istanbul, Turkey, December 29, 2015.
- Mini-Arctic Workshop, Nofima, Ås, Norway, November 5-6, 2015.
- Seminar, Yeditepe University, Istanbul, Turkey, September 8, 2015.
- Seminar, Bogazici University, Istanbul, Turkey, August 20, 2015.
- Refereed Paper, EUSIPCO, Lisbon, Portugal, September 1-5, 2014.

- Invited Minisymp. Talk, COMPSTAT, Geneva, Switzerland, August 19-22, 2014.
- Invited Seminar, KU Leuven, Belgium, June 2, 2014.
- Arctic Analysis, Ilulissat, Greenland, March 10-14, 2014.
- Invited Minisymp. Talk, ERCIM, University of London, UK, December 14-16, 2013.
- Invited Seminar, GIPSA-LAB, Grenoble, France, November 8, 2013.
- Invited Seminar, Xerox Research Centre Europe, Grenoble, France, November 7, 2013.
- Seminar, Kadir Has University, Istanbul, Turkey, October 23, 2013.
- Invited Speaker, Biomedical Eng. Society Annual Meeting, Seattle, WA, September 25-28, 2013.
- Refereed Paper, IEEE Eng. in Medicine and Biology Society, Osaka, Japan, July 3-7, 2013.
- Seminar, Stanford University, CA, June 3, 2013.
- Minisymp. Organizer/Speaker, SIAM Conf. Computational Science and Eng., Boston, MA, February 28, 2013.
- Refereed Paper, SPIE Medical Imaging Conference, Orlando, FL, February 10, 2013.
- Invited Seminar, KU Leuven, Belgium, December 14, 2012.
- Refereed Paper, ICDM Workshop: Biological Data Mining, Brussels, Belgium, December 10, 2012.
- Invited Minisymp. Talk, SIAM Conf. Applied Linear Algebra, Valencia, Spain, June 18-22, 2012.
- Three-way Methods in Chemistry and Psychology, Bruges, Belgium, June 2-7, 2012.
- Seminar, Stanford University, CA, May 10, 2012.
- Seminar, Sandia National Labs, Livermore, CA, May 7, 2012.
- Invited Speaker, RPI-NSF Workshop on Multiscale Modeling of Complex Data, Troy, NY, September 12-14, 2011.
- Invited Speaker, Workshop on Tensor Approximation in High Dimension, Hausdorff Center for Mathematics, Bonn, Germany, August 1-5, 2011.
- Seminar, Bogazici University, Istanbul, Turkey, March 11, 2011.
- Seminar, Ozyegin University, Istanbul, Turkey, October 27, 2010.
- Workshop on Tensor Decompositions and Applications, Bari, Italy, September 13-17, 2010.
- Invited Minisymp. Talk, BIT50 Trends in Numerical Computing, Lund, Sweden, June 17-20, 2010.
- Seminar, TUBITAK-UEKAE, January 11, 2010.
- Invited Minisymp. Talk, SIAM Conf. Applied Linear Algebra, Monterey, CA, October 26-29, 2009.
- Minisymp. Organizer/Speaker, SIAM Annual Meeting, Denver, Colorado, July 6-10, 2009.
- Three-way Methods in Chemistry and Psychology, Vall de Núria, Spain, June 14-19, 2009.
- Invited Seminar, Stanford University, CA, May 27, 2009.
- Minisymp. Organizer/Speaker, SIAM Conf. Computational Science and Eng., Miami, FL, March 2-6, 2009.
- Invited Speaker, Future Directions in Tensor-Based Computation, NSF, Arlington, VA, February 20-21, 2009.
- KDD Workshop: Data Mining using Matrices and Tensors, Las Vegas, NV, August 24, 2008.
- Invited Minisymp. Talk, SIAM Annual Meeting, San Diego, CA, July 7-11, 2008.
- Seminar, Sandia National Labs, Livermore, CA, December 17, 2007.
- Refereed Paper, IEEE Eng. in Medicine and Biology Society, Lyon, France, August 23-26, 2007.
- Refereed Paper, ISMB/ECCB, Vienna, Austria, July 21-25, 2007.
- Invited Minisymp. Talk, Int. Congress on Industrial and Applied Mathematics, Zurich, Switzerland, July 16-20, 2007.
- Refereed Paper, IASTED Int. Conf. Biomedical Eng., Innsbruck, Austria, February 17, 2006.
- Refereed Paper, IEEE Int. Conf. Intelligence and Security Informatics, Atlanta, Georgia, May 19-20, 2005.

**Software**

- Poblano Toolbox (MATLAB) - Large-scale algorithms for nonlinear optimization.
- CMTF Toolbox (MATLAB) - Coupled matrix/tensor factorization models for data fusion.

**Teaching**

- Bogazici University (Istanbul, Turkey)
  - Instructor, Numerical Linear Algebra and Its Applications, Fall 2017.
- University of Copenhagen (Copenhagen, Denmark)
  - Instructor, Data Fusion, Copenhagen School of Chemometrics, May 25-26, 2016.
  - Instructor, Data Fusion, ODIN course, November 25, 2015.
  - Instructor, Advanced MATLAB for multivariate data analysis, August 2012.
  - Instructor, Introduction to MATLAB for multivariate data analysis, May 2011.
- Rensselaer Polytechnic Institute (Troy, NY)
  - Teaching Assistant: Introduction to Programming in VB using .NET, Fall 2006.
  - Teaching Assistant: Introduction to Programming in C++ using .NET, Spring 2004.
  - Teaching Assistant: Database Systems, Fall 2003 & Fall 2004.

**Professional Service and Committee Work**

- Editorial Work:
  - Guest Editor, Special Section on CSE Software and Big Data in CSE, SIAM Journal on Scientific Computing (SISC), 2015.
- Conference, Workshop & Minisymposium Organization:
  - Organizing Committee: Dagstuhl Perspective Workshop: Tensor Computing for Internet of Things, Schloss Dagstuhl, Germany, April 10-13, 2016.
  - Organizing Committee: SIAM Conference on Computational Science and Engineering, Salt Lake City, UT, March 14-18, 2015.
  - Minisymposium Co-organizer, SIAM Conference on Computational Science and Engineering, Boston, MA, February 25-March 1, 2013.
  - Minisymposium Co-organizer, SIAM Annual Meeting, Denver, CO, July 6-10, 2009.
  - Minisymposium Co-organizer, SIAM Conference on Computational Science and Engineering, Miami, FL, March 2-6, 2009.
- Program Committee Member:
  - ACM SIGKDD International Conference on Knowledge Discovery & Data Mining, 2018.
  - European Signal Processing Conference (EUSIPCO), 2017 & 2018.
  - ASE International Conference on Big Data Science and Computing, 2014.
  - SIAM International Conference on Data Mining, 2013 & 2014.
  - ASE/IEEE International Conference on Big Data, 2013.
  - ECML/PKDD Workshop on Tensor Methods for Machine Learning, 2013.
  - 21st ACM International Conference on Information and Knowledge Management, 2012.
- Thesis Committee Member:
  - Borbala Hunyadi, KU Leuven, 2014 (Ph.D.)
    "Learning from structured EEG and fMRI data supporting the diagnosis of epilepsy"

- ○ Yusuf Kenan Yilmaz, Bogazici University, 2012 (Ph.D.)
  "Generalized Tensor Factorization"

- ○ Beyza Ermiş, Bogazici University, 2012 (M.S.)
  "Probabilistic Tensor Factorization for Link Prediction"

- Reviewer for: *Machine Learning*, *Data Mining and Knowledge Discovery*, *SIAM J. Matrix Analysis and Applications*, *Linear Algebra and its Applications*, *Numerical Linear Algebra with Applications*, *Information Sciences*, *ACM Transactions on Knowledge Discovery from Data*, *ACM Transactions on Information Systems*, *IEEE Transactions on Knowledge and Data Engineering*, *Neural Processing Letters*, *Sensors*, *IEEE Transactions on Cybernetics*, *IEEE Transactions on Image Processing*, *Chemometrics and Intelligent Laboratory Systems*, *Proceedings of the IEEE*, *IEEE Transactions on Biomedical Engineering*, *Neurocomputing*, *Journal of Neuroscience Methods*, *International Journal of Neural Systems*, *Journal of Chemometrics*, *Neural Computation*.