Anastasios Kyrillidis

CONTACT INFORMATION

The Wireless Networking and Communications Group (WNCG)
The University of Texas at Austin
Texas, United states

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RESEARCH INTERESTS

Data analytics, machine learning, convex and non-convex analysis and optimization, structured low dimensional models, compressed sensing.

EDUCATION

École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland

Ph.D., School of Computer and Communication Sciences, March 2011 - October 2014.

- Thesis Title: "Rigorous optimization recipes for sparse and low rank inverse problems with applications in data sciences".
- Supervisor: Professor Volkan Cevher
- Graduation date: 13th of October, 2014

Technical University of Crete, Chania (Crete), Greece

M.Sc., Electronic and Computer Engineering (2-year program), September 2008 - August 2010.

- Thesis Title: "Polynomial-complexity computation of the M-phase vector that maximizes a rank-deficient quadratic form".
- Supervisor: Professor G. Karystinos

Diploma, Electronic and Computer Engineering (5-year program), September 2002 - August 2008.

- Thesis Title:"JPEG2000 Based Scalable and Adaptive Video and Image Transmission over Wired and Wireless Networks".
- Supervisor: Professor M. Zervakis

PROFESSIONAL EXPERIENCE

University of Texas, Austin (US)

Simons Foundation PostDoc **November 2014 - Now**

IBM Research Lab, Zürich (Switzerland)

Developer/programmer on recommender systems **August 2013 - January 2014**

- Development of co-clustering algorithm for customer-product recommendation system.
- Design and implementation of low space- and time-complexity compression schemes for fast access and search in time-series databases.

Dialogos Ltd. Chania (Greece)

Developer/programmer on automated speech-enabled systems **June 2006 - September 2006**

- Development of phone-based application that allows access to financial information and other banking services.
- Development of speech-based application for individuals with special needs.

PUBLICATIONS

Journals

- Quoc Tran Dinh, Anastasios Kyrillidis and Volkan Cevher, "*Composite self-concordant minimization*", Journal of Machine Learning Research, 16(Mar):371416, 2015.
- Michail Vlachos, Nikolaos Freris and Anastasios Kyrillidis, "*Compressive mining: fast and optimal data mining in the compressed domain*", Very Large Data Bases (VLDB) Journal, Volume 24 Issue 1, February 2015.
- Quoc Tran-Dinh, Anastasios Kyrillidis and Volkan Cevher, "*An inexact proximal path-following algorithm for constrained convex minimization*", SIAM Journal on Optimization (SIOPT), vol. 24, num. 4, p. 1718-1745, 2014.
- Anastasios Kyrillidis and George. N. Karystinos, "*Fixed-rank Rayleigh quotient maximization by an M-PSK sequence*," IEEE Trans. on Communications, Volume:62, Issue:3, pages 961-975, 2014.
- Anastasios Kyrillidis and Volkan Cevher, "*Matrix recipes for hard thresholding methods*," Journal of Mathematical Imaging and Vision (JMIV), April 2013, Springer.

- Nikolaos D. Sidiropoulos and Anastasios Kyrillidis, "*Multi-way compressed sensing for sparse low rank tensors*," IEEE Signal Processing Letters, 19(11):757-760, Oct. 2012.

Book chapters

- Volkan Cevher, Sina Jafarpour and Anastasios Kyrillidis, "*Linear inverse problems with norm and sparsity constraints*,", in Practical Applications of Sparse Modeling, Sept. 2014, MIT Press. (*Authors listed in alphabetical order.)*

- Anastasios Kyrillidis, Luca Baldassarre, Marwa El-Halabi, Quoc Tran-Dinh and Volkan Cevher, "*Structured sparsity: discrete and convex approaches*", to appear as book chapter in "Compressed sensing and its application", Springer, 2014.

Conference Papers

- Anastasios Kyrillidis, Bubacarr Bah, Rouzbez Seyed Hasheminezhad, Luca Baldassarre, Quoc Tran-Dinh and Volkan Cevher, "*Convex block-sparse linear regression with expanders, provably*", accepted to AISTATS, 2016.

- Megasthenis Asteris, Anastasios Kyrillidis, Dimitris Papailiopoulos and Alex Dimakis, "*Bipartite correlation clustering - Maximizing agreements*", accepted to AISTATS, 2016.

- Hemant Tyagi, Anastasios Kyrillidis, Andreas Krause and Bernd Gartner, "*Learning sparse additive models with interactions in high dimensions*", accepted to AISTATS, 2016.

- Megasthenis Asteris, Dimitris Papailiopoulos, Anastasios Kyrillidis, and Alex Dimakis, "*Space PCA via bipartite matchings*", Neural Information Processing Systems (NIPS), 2015.

- Megasthenis Asteris, Anastasios Kyrillidis, Alex Dimakis, Han-Gyol Yi and Bharath Chandrasekaran, "*Stay on path: PCA along graph paths*", International Conference on Machine Learning (ICML), 2015.

- Michail Vlachos, Francesco Fusco, Harry Mavroforakis, Anastasios Kyrillidis and Vassilis Vasileiadis, "*Scalable and robust co-clustering of large customer-product graphs*", International Conference on Information and Knowledge Management (CIKM), 2014.

- Dimitris Papailiopoulos, Anastasios Kyrillidis and Christos Boutsidis, "*Provable deterministic leverage scores sampling*", ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), 2014.

- Anastasios Kyrillidis, Rabeeh Karimi Mahabadi, Quoc Tran-Dinh and Volkan Cevher, "*Scalable sparse covariance estimation via self-concordance*", AAAI Conference on Artificial Intelligence (AAAI-14), 2014.

- Anastasios Kyrillidis, Michail Vlachos and Anastasios Zouzias, "*Approximate matrix multiplication with application to linear embeddings*", IEEE ISIT Symposium, 2014.

- Anastasios Kyrillidis and Anastasios Zouzias, "*Non-uniform feature sampling in decision tree ensembles*", IEEE ICASSP, Florence, Italy, 2014.

- George Skoumas, Dieter Pfoser and Anastasios Kyrillidis, "*On quantifying qualitative geospatial data: A probabilistic approach*", ACM GEOCROWD 2013.

- Stephen Becker, Volkan Cevher and Anastasios Kyrillidis, "*Randomized low-memory singular value projection*", 10th International Conference on Sampling Theory and Applications (SampTA), 2013. (*Authors listed in alphabetical order.)*

- Anastasios Kyrillidis, Stephen Becker, Volkan Cevher and Christoph Koch, "*Sparse projections onto the simplex*,", International Conference on Machine Learning (ICML), 2013.

- Quoc Tran Dinh, Anastasios Kyrillidis and Volkan Cevher, "*A proximal Newton framework for composite minimization: Graph learning without Cholesky decompositions and matrix inversions*," International Conference on Machine Learning (ICML), 2013.

- Anastasios Kyrillidis and Volkan Cevher, "*Fast proximal algorithms for self-concordant minimization with application to sparse graph selection*," IEEE ICASSP, Vancouver, Canada, May 2013.

- Anastasios Kyrillidis and Volkan Cevher, "*Matrix ALPS: Accelerated low rank and sparse matrix reconstruction*," IEEE SSP, Ann Arbor, MI USA, August 2012.

- Anastasios Kyrillidis and Volkan Cevher, "*Combinatorial selection and least absolute shrinkage via the CLASH algorithm*," IEEE ISIT, Cambridge, MA USA, July 2012.

- Anastasios Kyrillidis, Gilles Puy and Volkan Cevher, "*Hard thresholding with norm constraints*," IEEE ICASSP, Kyoto, Japan, March 2012.

- Anastasios Kyrillidis and Volkan Cevher, "*Recipes on hard thresholding methods*,", 4th IEEE CAMSAP, Puerto Rico, Dec. 2011.

- Anastasios Kyrillidis and George. N. Karystinos, "*Rank-deficient quadratic-form maximization over M-phase alphabet: Polynomial-complexity solvability and algorithmic developments,*" IEEE ICASSP, Prague, Czech Republic, May 2011.

PREPRINTS

Pending

- Srinadh Bhojanapalli, Anastasios Kyrillidis and Sujay Sanghavi, "*Dropping convexity for faster semidefinite optimization*", available online, 2015.
- Vatsal Shah, Megasthenis Asteris, Anastasios Kyrillidis and Sujay Sanghavi, "*Trading-off variance and complexity in stochastic gradient descent*", available upon request, 2015.
- Luca Baldassarre, Nirav Bhan, Volkan Cevher and, Anastasios Kyrillidis, "*Group-sparse model selection: Hardness and relaxations,*" submitted to IEEE Trans. on Information Theory, 2015. (*Authors listed in alphabetical order.)*
- George Skoumas, Dieter Pfoser, Anastasios Kyrillidis and Timos Sellis, "*Location estimation using crowdsourced spatial relations*", accepted to Transactions on Spatial Algorithms and Systems, 2015.

INVITED TALKS/WORKSHOPS

- *Composite self-concordant minimization and extensions to path-following schemes,* UT Simons Seminar, Austin, USA, September, 2015.
- *Composite self-concordant minimization,* International Symposium on Mathematical Programming (ISMP), Pittsburgh, USA, July, 2015.
- *Scalable solutions to some "hard" problems via self-concordance,* EcoCloud Annual Event, Lausanne, Switzerland, June 2014.
- *Composite self-concordant minimization,* ENS, Paris, France, Mar. 2014.
- *Sparse simplex projections for portfolio optimization,* 2013 IEEE GlobalSIP Symposium on Signal and Information Processing in Finance and Economics, Austin, TX US, Dec. 2013.
- *A proximal Newton framework for composite minimization: Graph learning without Cholesky decompositions and matrix inversions,* Signal Processing with Adaptive Sparse Structured Representations (SPARS) Workshop, Lausanne, Switzerland, July 2013.
- *Randomized low-memory singular value projection,* CECAM Workshop on Tensor Network Algorithms in Computational Physics and Numerical Analysis, Zurich, Switzerland, May 2013.
- *Sparse projections onto the simplex,* Discrete Optimization in Machine Learning (DISCML) NIPS Workshop, Lake Tahoe, CA US, Dec. 2012.
- *Scalable and accurate learning of sparse Gaussian Markov random fields,* Machine Learning Workshop (MLWS), Lausanne, Switzerland, Nov. 2012.
- *Fast proximal algorithms for self-concordant minimization with application to sparse graph selection,* Asilomar conference on signals, systems and computers, Pacific Grove, CA US, Nov. 2012.
- *Combinatorial selection and least absolute shrinkage via the CLASH algorithm,* Sparse representation and low rank approximation NIPS Workshop, Sierra Nevada, Spain, Dec. 2011.
- *Combinatorial selection and least absolute shrinkage via the CLASH algorithm,* IMA annual program, High dimensional phenomena workshop, Minneapolis, MN US, Sept. 2011.
- *Recipes for Hard Thresholding Methods,* Signal processing with adaptive sparse structured representations (SPARS), Edinburgh, UK, June 2011.
- *Polynomial complexity computation of the M-phase vector that maximizes a rank-deficient quadratic form,* Discrete Optimization (DisOpt) PhD Seminars, EPFL, Nov. 2010.

TECHNICAL SKILLS

Scientific programming tools

- Matlab, R.

Programming Languages

- C, Python.

OS

- Expert Linux knowledge (especially Debian-based distributions).
- Experience with distributed computing for data analysis.

Awards & Distinctions

Distinctions

Graduated 1st in a class of 137 ECE undergraduate students (July 2008 - **GPA**: 9.08/10.0).

Selected among 800 students from all around Europe to participate in Vulcanus in Japan program - internship at Sanyo Electric Std. (Osaka).

Awards

Simons Foundation scholarship for PostDoc studies

AAAI 2014 Travel Student award

Graduate Studies Fellowship Award:

- EPFL Ph.D. fellowship, 2010.
- Alexander S. Onassis Public Benefit Foundation (2008-2009-2010).
- Special Research Fund Account, Technical University of Crete, 2009.

Undergraduate Studies Fellowship Award:

- Undergraduate Studies Distinction and Fellowship Award, Technical Chamber of Greece, 2004.
- Undergraduate Studies Fellowship Award 2004 for ranking 3rd in a class of 137, Greek National Fellowship Foundation (IKY).
- Undergraduate Studies Distinction and Fellowship Award, Technical Chamber of Greece, 2003.
- Undergraduate Studies Fellowship Award 2003 for ranking 2nd in a class of 137, Greek National Fellowship Foundation (IKY).
- Undergraduate Studies Fellowship Award 2002 for ranking 1st in a class of 137, Greek National Fellowship Foundation (IKY).

Academic Experience

Teaching Assistant

EPFL

- Theory and Methods for Linear Inverse Problems (Ph.D.) — Fall '12
- Circuits and Systems I (BSc.) — Fall '11

Technical University of Crete

- Information and Coding Theory (BSc.) — Spring '09
- Estimation and Detection Theory (M.Sc.) — Fall '09
- Signals and Systems (BSc.) — Fall '08, Fall '09

Student/Intern supervision

- Hasheminezhad Seyedrouzbeh (B.Sc. at Sharif University of Technology) - worked on brain functional connectivity via EEG signals and model-based convex sparse recovery using expander matrices.
- Haddavi Amirhossein (B.Sc. at Sharif University of Technology) - worked on brain functional connectivity via EEG signals.
- Rabeeh Karimi Mahabadi (M.Sc. at ETH Zurich) - worked on sparse covariance estimation.
- Ender Tinkir (Delloitte Consulting) - worked on topic discovery using low rank tensor decomposition.
- Gizem Tabak (M.Sc. at University of Illinois) - worked on topic discovery using low rank tensor decomposition.
- Sajal Jain (Sofware Enginner, Facebook) - worked on structured sparsity.
- Nirav Bhan (Ph.D. at MIT) - worked on structured sparsity.
- Shayan Dashmiz (Ph.D. at Columbia Business School) - worked on atomic norm minimization.

Administration

Lab Administrator of DISPLAY (DIgital Image and Signal Processing LaboratorY) Lab., Dept. of Electronic and Computer Engineering, Technical University of Crete, Chania (2 years experience).