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

Optimization for machine learning, convex and non-convex analysis and optimization, structured low dimensional models, data analytics, 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 (REVERSE CHRONOLOGICAL ORDER)

Journals

- Georgios Skoumas, Dieter Pfoser, Anastasios Kyrillidis and Timos Sellis, "*Location estimation using crowdsourced spatial relations*", ACM Transactions on Spatial Algorithms and Systems, vol. 2, issue 2, 2016.
- 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

- Srinadh Bhojanapalli, Anastasios Kyrillidis, and Sujay Sanghavi, "*Dropping convexity for faster semi-definite optimization*", Conference on Learning Theory (COLT), 2016.

- Megasthenis Asteris, Anastasios Kyrillidis, Oluwasanmi Koyejo, and Russell Poldrack, "*A simple and provable algorithm for sparse diagonal CCA*", International Conference on Machine Learning (ICML), 2016.

- Anastasios Kyrillidis, Bubacarr Bah, Rouzbez Seyed Hasheminezhad, Luca Baldassarre, Quoc Tran-Dinh and Volkan Cevher, "*Convex block-sparse linear regression with expanders, provably*", Conference on AI & Statistics (AISTATS), 2016.

- Megasthenis Asteris, Anastasios Kyrillidis, Dimitris Papailiopoulos and Alex Dimakis, "*Bipartite correlation clustering - Maximizing agreements*", Conference on AI & Statistics (AISTATS), 2016.

- Hemant Tyagi, Anastasios Kyrillidis, Andreas Krause and Bernd Gartner, "*Learning sparse additive models with interactions in high dimensions*", Conference on AI & Statistics (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

- Dohyung Park, Anastasios Kyrillidis, Constantine Caramanis, and Sujay Sanghavi, "*Finding low-rank solutions to matrix problems, efficiently and provably*", preprint, 2016.
- Dohyung Park, Anastasios Kyrillidis, Srinadh Bhojanapalli, Constantine Caramanis, and Sujay Sanghavi, "*Provable non-convex projected gradient descent for a class of constrained matrix optimization problems*", preprint, 2016.
- Hemant Tyagi, Anastasios Kyrillidis, Bernd Grtner, and Andreas Krause, "*Algorithms for learning sparse additive models with interactions in high dimensions*", preprint 2016.
- Quoc Tran-Dinh, Anastasios Kyrillidis, and Volkan Cevher, "*A single-phase, proximal path-following framework*", preprint 2016.
- 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.)*

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).

Selected among 461 applicants to participate in the Machine Learning Summer School 2016 (Spain) (Acceptance rate $< 30\%$).

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 (current position) - EPFL

- 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.

Student/Intern supervision (current position) - UT Austin

- Vatsal Shah (Ph.D. student at WNCG group) -
- Srinadh Bhojanapalli (B.Sc. at Sharif University of Technology) - worked on brain functional connectivity via EEG signals.
- Dohyung Park (Ph.D. student at WNCG group) -
- Kiyeon ? (Ph.D. student at WNCG group) -

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).