Anastasios Kyrillidis

CONTACT INFORMATION

Working address: 3119 Duncan Hall
6100 Main Street, 77005
Houston, United States

Tel: (+1) 713-348-4741
E-mail: anastasios@rice.edu
Website: akyrillidis.github.io

RESEARCH INTERESTS

Optimization for machine learning, convex and non-convex analysis and optimization, efficient large scale training, budgeted optimization, variational methods in quantum computing, structured low dimensional models / pruning / compression.

ACADEMIC APPOINTMENTS

Rice University, Houston, USA

Noah Harding Assistant Professor at Computer Science Dept. **July 2018 - now**

University of Texas at Austin, Austin, USA

Simons Foundation Postdoctoral Researcher **November 2014 - August 2017**
Member of WNCG

PROFESSIONAL APPOINTMENTS

Microsoft Resarch, Redmond (USA)

Academic collaborator - consultant **February 2022 - now**

IBM T.J. Watson Research Center, New York (USA)

Goldstine Fellowship PostDoctoral Recipient **September 2017 - July 2018**

EDUCATION

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

Ph.D., School of Computer and Communication Sciences, September 2010 - October 2014.

TEACHING EXPERIENCE

Instructor

Rice University

- **COMP 414/514 — Optimization: Algorithms, complexity & approximations**

— Fall '22
- Students enrolled: 38 (27 G/14 UG)
- Class evaluation — Overall quality: 1.41 (Rice mean: 1.73); Organization: 1.38 (Rice mean: 1.72); Challenge: 1.29 (Rice 1.72)
- Instructor evaluation — Effectiveness: 1.26 (Rice mean: 1.62); Presentation: 1.26 (Rice mean: 1.67); Knowledge: 1.21 (Rice mean: 1.53).

— Fall '21
- Students enrolled: 41 (27 G/14 UG)
- Class evaluation — Overall quality: 1.51 (Rice mean: 1.75); Organization: 1.54 (Rice mean: 1.73); Challenge: 1.41 (Rice 1.73)
- Instructor evaluation — Effectiveness: 1.35 (Rice mean: 1.68); Presentation: 1.35 (Rice mean: 1.68); Knowledge: 1.27 (Rice mean: 1.55).

— Fall '20
- Students enrolled: 30 (8 G/22 UG)
- Class evaluation — Overall quality: 1.29 (Rice mean: 1.69); Organization: 1.28 (Rice mean: 1.69); Challenge: 1.31 (Rice 1.68)
- Instructor evaluation — Effectiveness: 1.21 (Rice mean: 1.58); Presentation: 1.17 (Rice mean: 1.63); Knowledge: 1.14 (Rice mean: 1.49).

— Fall '19
- Students enrolled: 30 (28 G/2 UG)
- Class evaluation — Overall quality: 1.54 (Rice mean: 1.76); Organization: 1.57 (Rice mean: 1.75); Challenge: 1.5 (Rice 1.73)
- Instructor evaluation — Effectiveness: 1.43 (Rice mean: 1.67); Presentation: 1.39 (Rice mean: 1.73); Knowledge: 1.29 (Rice mean: 1.56).

- **COMP 545 — Advanced topics in optimization: From simple to complex ML systems**

  — Spring '21
  - Students enrolled: 10
  - Class evaluation — Overall quality: 1.83 (Rice mean: 1.74); Organization: 2.17 (Rice mean: 1.73); Challenge: 1.67 (Rice mean: 1.71).
  - Instructor evaluation — Effectiveness: 1.5 (Rice mean: 1.61); Presentation: 1.67 (Rice mean: 1.68); Knowledge: 1.33 (Rice mean: 1.53).

  — Spring '20
  - Students enrolled: 13
  - Class evaluation — Overall quality: 1.55 (Rice mean: 1.69); Organization: 1.55 (Rice mean: 1.69); Challenge: 1.55 (Rice mean: 1.69).
  - Instructor evaluation — Effectiveness: 1.27 (Rice mean: 1.59); Presentation: 1.36 (Rice mean: 1.67); Knowledge: 1.18 (Rice mean: 1.5).

  — Spring '19
  - Students enrolled: 10
  - Class evaluation — Overall quality: 1.31 (Rice mean: 1.78); Organization: 1.23 (Rice mean: 1.79); Challenge: 1.46 (Rice mean: 1.75).
  - Instructor evaluation — Effectiveness: 1.23 (Rice mean: 1.68); Presentation: 1.23 (Rice mean: 1.75); Knowledge: 1.23 (Rice mean: 1.57).

Supervising Experience

Leader of OptimaLab — Student Advising

Rice University

- **Chen Dun** (PhD / 2019 - now) — *Distributed learning of neural networks, federated learning, mixture of experts*.
- **Lyle Kim** (PhD / 2019 - now) — *Fast inverse algorithms for quantum state tomography, game theoretic optimization, acceleration, optimization in quantum computing, stability and robustness (distributed) gradient-based solvers.*
- **Carlos Quintero** (PhD—co-adv. Lydia Kavraki / 2019 - now) — *Robustness in optimization for robotics.*
- **Zhiwei Zhang** (PhD—co-adv. Moshe Vardi / 2019 - now) — *From discrete to continuous methods for SAT*.
- **John Chen** (PhD / 2020 - now) — *Hyperparameter techniques in ML, semi-supervised learning, overparameterization, contrastive learning*.
- **Cameron Wolfe** (PhD / 2020 - now) — *Distributed learning of neural networks, pruning neural networks, streaming learning, quantization in training*.
- **Jasper Liao** (PhD / 2021 - now) — *Provable optimization methods in nonconvex objectives (neural networks)*.
- **Ria Stevens** (PhD / 2022 - now) — *Adversarial training in neural networks, theory of non-convex smooth games based on neural networks, Byzantine attacks*.
- **David Quiroga** (PhD / 2022 - now) — *Fast inverse algorithms for quantum process tomography, efficient methods for distributed estimation of excited quantum states, quantum variational methods*.

Alumni

- **Qihan Wang** (MSc / 2021 / now in Microsoft) — *Efficient distributed techniques on lottery ticket hypothesis for neural networks*.

Funding, Awards, Distinctions & Misc.

Funding - Total amount: $\mathbf{\$2.623M}$

Academic year 2022-2023
— **Amazon Research Award**, $90K, "*Efficient and affordable transformers for distributed platforms*".
— **Microsoft Research Award**, $75K, "*Large-scale zero-shot Mixture of Experts in distributed systems*".
— Rice Conference and Workshop Development Fund, $13K, "*Future-Proof Distributed Machine Learning*", Lead-PI: Anastasios Kyrillidis.
— Rice Engineering Innovation Conference and Workshop Fund, $20K, "*Future-Proof Distributed Machine Learning*", Lead-PI: Anastasios Kyrillidis.
— Edinburgh - Rice Strategic Collaboration Awards (SCA), $20K, "*Algorithmic foundations for variational quantum algorithms*", Lead-PI: Anastasios Kyrillidis.

Academic year 2021-2022
— **NSF CAREER Award**, #2145629, $650K, 2022 - 2027, "*Algorithmic foundations for practical acceleration in computational sciences*".
— Welch Foundation Research Grant, #964181, $300K, 2022 - 2025, "*Machine Learning Solutions to the Crystallographic Phase Problem*".

Academic year 2020-2021
— NSF-CMMI (Co-PI with Leonardo Duenas Osorio, Kaden Hazzard, and Moshe Vardi), #2037545, $460K, 2021/05 - 2024/04, "*Classical and Quantum Algorithms for the Principled Quantification of Infrastructure Safety*".
— Creative Venture Funds (PI with Leonardo Duenas-Osorio and Kaden Hazard), $75K, 2020 - 2021, "*Classical Optimization meets Quantum Computation for Practical Quantum Approximation Optimization Algorithms*".

Academic year 2019-2020
— NSF/Intel MLWiNS (Co-PI with Chris Jermaine and Yingyan Lin), #2003137, $450K, 2020/06 - 2023/05, "*Wireless On-the-Edge Training of Deep Networks Using Independent Subnets*".

Academic year 2018-2019
— NSF CCF core program (small), #1907936, $470K, 2019/10 - 2022/09, "*Efficient and robust characterization of quantum systems*".

Misc.

Workshop at Rice 2022: ***(QuantIPS): Quantum Information Processing Systems workshop***

Workshop at Rice 2022: ***Future-proof Distributed/Federated ML Computing***

Workshop at Rice 2022: ***FLSML Workshop: Future of Large-Scale Machine Learning***

Workshop at INFORMS 2021: *Efficiency in distributed ML environments: data parallel, model parallel and federated learning solutions.*

Workshop at INFORMS 2021: *Accelerated methods in convex and non-convex optimization.*

Workshop at INFORMS 2021: *Optimization for quantum computing and vice versa.*

Workshop on non-convex methods at **ICML 2020, 2021**: *Beyond first-order methods in ML systems.*

Workshop on non-convex methods at **NeurIPS 2019**: *Beyond first-order methods in ML.*

Workshop on non-convex methods at **ICML 2016**: *Advances in non-convex analysis and optimization.*

Awards

Rice Engineering award for outstanding teaching and research.

Goldstine fellowship at IBM among more than 100 applicants.

Simons Foundation scholarship for PostDoc studies at UT Austin.

AAAI 2014 Travel Student award ($1000).

Graduate Studies Fellowship Award:

- EPFL Ph.D. fellowship, 2010 (60,000 CHF).
- Alexander S. Onassis Public Benefit Foundation (€20,000 between 2008-2010).
- Special Research Fund Account, Technical University of Crete, 2008-2010 (€5,000 between 2008-2010).

PUBLICATIONS (REVERSE CHRONOLOGICAL ORDER)

Conference Papers

- Qihan Wang, Chen Dun, Fangshuo Liao, Chris Jermaine, Anastasios Kyrillidis, "*LOFT: Finding Lottery Tickets through Filter-wise Training*", Conference on Artificial Intelligence & Statistics (AISTATS), 2023.
- Chen Dun, Mirian Hipolito, Chris Jermaine, Dimitrios Dimitriadis, Anastasios Kyrillidis, "*Efficient and Light-Weight Federated Learning via Asynchronous Distributed Dropout*", Conference on Artificial Intelligence & Statistics (AISTATS), 2023.
- Zheyang Xiong, Fangshuo Liao, Anastasios Kyrillidis, "*Strong Lottery Ticket Hypothesis with ε–perturbation*", Conference on Artificial Intelligence & Statistics (AISTATS), 2023.
- Carlos Quintero-Pena, Zachary Kingston, Tianyang Pan, Rahul Shome, Anastasios Kyrillidis, and Lydia E. Kavraki, "*Optimal Grasps and Placements for Task and Motion Planning in Clutter*", IEEE International Conference on Robotics and Automation (ICRA), 2023.
- Syed Rizvi, Chen Dun, Anastasios Kyrillidis, "*PCRIST: Variance Reduction through Periodic Centralized Training in Distributed Subnetwork Training of Residual Networks*", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), in proceedings of "Timely and Private Machine Learning over Networks" workshop, 2023.
- Junhyung Lyle Kim, Mohammad Taha Toghani, César A. Uribe, Anastasios Kyrillidis, "*Local Stochastic Factored Gradient Descent for Distributed Quantum State Tomography*", IEEE Conference on Decision and Control (CDC), 2022.

- Ahmed Imtiaz Humayun, Randall Balestriero, Anastasios Kyrillidis, Richard Baraniuk, "*No More Than 6ft Apart: Robust K-Means via Radius Upper Bounds*", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2022.
- Cheng Wan, Youjie Li, Cameron R. Wolfe, Anastasios Kyrillidis, Nam Sung Kim, Yingyan Lin, "*PipeGCN: Efficient Full-Graph Training of Graph Convolutional Networks with Pipelined Feature Communication*", International Conference on Learning Representations (ICLR), 2022.
- Binhang Yuan, Cameron Wolfe, Chen Dun, Yuxin Tang, Anastasios Kyrillidis and Chris Jermaine, "*Distributed Learning of Deep Neural Networks Using Independent Subnet Training*", International Conference on Very Large Databases (VLDB), 2022.
- John Chen, Cameron Wolfe, Zhao Li and Anastasios Kyrillidis, "*Demon: Decaying momentum helps neural network training*", IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2022.
- Chen Dun, Cameron Wolfe, and Anastasios Kyrillidis, "*ResIST: Layer-Wise Decomposition of ResNets for Distributed Training*", Conference on Uncertainty in Artificial Intelligence (UAI), 2022.
- John Chen Samarth Sinha, and Anastasios Kyrillidis, "*StackMix: A complementary Mix algorithm*", Conference on Uncertainty in Artificial Intelligence (UAI), 2022.
- John Chen, Cameron Wolfe, Anastasios Kyrillidis, "*REX: Revisiting Budgeted Training with an Improved Schedule*", 5th Conference on Machine Learning and Systems (MLSys), 2022.
- Cameron R Wolfe, Anastasios Kyrillidis, "*i-SpaSP: Structured Neural Pruning via Sparse Signal Recovery*", 4th Annual Learning for Dynamics & Control Conference (L4DC), 2022.
- Junhyung Lyle Kim, Panos Toulis, Anastasios Kyrillidis, "*Convergence and Stability of the Stochastic Proximal Point Algorithm with Momentum*", 4th Annual Learning for Dynamics & Control Conference (L4DC), 2022.
- John Chen, Qihan Wang, and Anastasios Kyrillidis, "*Mitigating Deep Double Descent by Concatenating Inputs*", 30th ACM International Conference on Information and Knowledge Management (CIKM), 2021.
- Carlos Quintero-Pena, Anastasios Kyrillidis, Lydia E Kavraki, "*Robust Optimization-based Motion Planning for high-DOF Robots under Sensing Uncertainty*", IEEE International Conference on Robotics and Automation (ICRA), 2021.
- Jacky Zhang, Rajiv Khanna, Anastasios Kyrillidis, Sanmi Koyejo, "*Bayesian Coresets: Revisiting the Nonconvex Optimization Perspective*", Conference on Artificial Intelligence & Statistics (AISTATS), 2021 **(Oral - 2%)**.
- Anastasios Kyrillidis, Moshe Vardi, and Zhiwei Zhang (main contributor), "*On Continuous Local BDD-Based Search for Hybrid SAT Solving*", Conference on Artificial Intelligence (AAAI), 2021.
- John Chen, Vatsal Shah and Anastasios Kyrillidis, "*Negative sampling in semi-supervised learning*", International Conference on Machine Learning (ICML), 2020.
- Kelly Geyer, Anastasios Kyrillidis, and Amir Kalev, "*Low-rank regularization and solution uniqueness in over-parameterized matrix sensing*", Conference on Artificial Intelligence & Statistics (AISTATS), 2020.
- Anastasios Kyrillidis, Anshumali Shrivastava, Moshe Vardi, and Zhiwei Zhang (main contributor), "*FourierSAT: A Fourier Expansion-Based Algebraic Framework for Solving Hybrid Boolean Constraints*", Conference on Artificial Intelligence (AAAI), 2020.
- Jacky Y. Zhang, Rajiv Khanna, Anastasios Kyrillidis, and Oluwasanmi O. Koyejo, "*Learning Sparse Distributions using Iterative Hard Thresholding*", Neural Information Processing Systems (NeurIPS), 2019.
- Ryan Spring, Anastasios Kyrillidis, Vijai Mohan, Anshumali Shrivastava, "*Compressing Gradient Optimizers via Count-Sketches*", International Conference on Machine Learning (ICML), 2019.
- Anastasios Kyrillidis, "*Simple and practical algorithms for ℓ_p-norm low-rank approximation*", Conference on Uncertainty in Artificial Intelligence (UAI), 2018.
- Rajiv Khanna and Anastasios Kyrillidis, "*IHT dies hard: Provable accelerated Iterative Hard Thresholding*", Conference on Artificial Intelligence & Statistics (AISTATS), 2018.
- Tianyang Li, Liu Liu, Anastasios Kyrillidis, and Constantine Caramanis, "*Statistical inference using SGD*", Conference on Artificial Intelligence (AAAI), 2018.
- Dohyung Park, Anastasios Kyrillidis, Constantine Caramanis, and Sujay Sanghavi, "*Non-square matrix sensing without spurious local minima via the Burer-Monteiro approach*", Conference on AI & Statistics (AISTATS), 2017.
- Dohyung Park, Anastasios Kyrillidis, Constantine Caramanis, and Sujay Sanghavi, "*Finding low-rank solutions to matrix problems via the Burer-Monteiro approach, efficiently and provably*", IEEE Allerton Conference, 2016.

- 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*", Conference on Artificial Intelligence (AAAI), 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, 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, 2013.
- Anastasios Kyrillidis and Volkan Cevher, "*Matrix ALPS: Accelerated low rank and sparse matrix reconstruction,*" IEEE SSP, 2012.
- Anastasios Kyrillidis and Volkan Cevher, "*Combinatorial selection and least absolute shrinkage via the CLASH algorithm,*" IEEE ISIT, 2012.
- Anastasios Kyrillidis, Gilles Puy and Volkan Cevher, "*Hard thresholding with norm constraints,*" IEEE ICASSP, 2012.
- Anastasios Kyrillidis and Volkan Cevher, "*Recipes on hard thresholding methods,*", 4th IEEE CAMSAP, 2011.
- Anastasios Kyrillidis and George. N. Karystinos, "*Rank-deficient quadratic-form maximization over M-phase alphabet: Polynomial-complexity solvability and algorithmic developments,*" IEEE ICASSP, 2011.

Journals

- Junhyung Lyle Kim, George Kollias, Amir Kalev, Ken X Wei, Anastasios Kyrillidis, "*Fast quantum state reconstruction via accelerated non-convex programming*", Photonics 2023, 10(2), MDPI.

- Sutanu Bhowmick, Satish Nagarajaiah, Anastasios Kyrillidis, "*Data-and theory-guided learning of partial differential equations using SimultaNeous basis function Approximation and Parameter Estimation (SNAPE)*", Mechanical Systems and Signal Processing, Elsevier, Volume 189, 2023.

- Fangshuo Liao and Anastasios Kyrillidis, "*On the Convergence of Shallow Neural Network Training with Randomly Masked Neurons*", Transactions on Machine Learning Research (TMLR), 2022.

- Junhyung Lyle Kim, Mohammad Taha Toghani, César A. Uribe, Anastasios Kyrillidis, "*Local Stochastic Factored Gradient Descent for Distributed Quantum State Tomography*", IEEE Control Systems Letters (L-CSS), 2022.

- Nicolae Sapoval, Amirali Aghazadeh, Michael G Nute, Dinler A Antunes, Advait Balaji, Richard Baraniuk, CJ Barberan, Ruth Dannenfelser, Chen Dun, Mohammadamin Edrisi, RA Elworth, Bryce Kille, Anastasios Kyrillidis, Luay Nakhleh, Cameron R Wolfe, Zhi Yan, Vicky Yao, Todd J Treangen, "*Current progress and open challenges for applying deep learning across the biosciences*", Nature Communications, Nature, 2022.

- Anastasios Kyrillidis, Anshumali Shrivastava, Moshe Y Vardi, Zhiwei Zhang, "*Solving hybrid Boolean constraints in continuous space via multilinear Fourier expansions*", Artificial Intelligence, Elsevier, 2021.

- Amir Kalev, Anastasios Kyrillidis, and Norbert M Linke, "*Validating and certifying stabilizer states*", Physical Review A, 2019.

- Ya-Ping Hsieh, Yu-Chun Kao, Rabeeh Karimi Mahabadi, Alp Yurtsever, Anastasios Kyrillidis, and Volkan Cevher, "*A non-Euclidean gradient descent framework for non-convex matrix factorization*", IEEE Transactions in Signal Processing, 2018.

- Dohyung Park, Anastasios Kyrillidis, Constantine Caramanis, and Sujay Sanghavi, "*Finding low-rank solutions via non-convex matrix factorization, efficiently and provably*", SIAM Journal on Imaging Sciences (SIIMS), 2018.

- Anastasios Kyrillidis, Amir Kalev, Dohyung Park, Srinadh Bhojanapalli, Constantine Caramanis, and Sujay Sanghavi, "*Provable compressed sensing quantum state tomography via non-convex methods*", npj Quantum Information 4.1 (2018): 36, 2018.

- Quoc Tran-Dinh, Anastasios Kyrillidis, and Volkan Cevher, "*A single-phase, proximal path-following framework*", Mathematics of Operations Research, INFORMS, 2018.

- Hemant Tyagi, Anastasios Kyrillidis, Bernd Gärtner, and Andreas Krause, "*Algorithms for learning sparse additive models with interactions in high dimensions*", IMA Information and Inference Journal, Springer, 2017.

- Luca Baldassarre, Nirav Bhan, Volkan Cevher, Anastasios Kyrillidis, and Siddhartha Satpathi "*Group-sparse model selection: Hardness and relaxations,*" IEEE Trans. on Information Theory, 2016. (*Authors listed in alphabetical order.)*

- 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 (JMLR), 16(Mar):371-416, 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*", in "Compressed sensing and its application", Springer, 2014.

Preprints

- Cameron R Wolfe, Anastasios Kyrillidis, "*Better Schedules for Low Precision Training of Deep Neural Networks*", preprint - work in progress, 2023.
- Roger Paredes, Zhewen Zhang, Guido Pagano, Kaden Hazzard, Anastasios Kyrillidis, Leonardo Duenas-Osorio, "*Fair sampling solutions of the Boolean satisfiability problem with QAOA*", preprint - work in progress, 2023.
- Tom Pan, Shikai Jin, Mitchell D. Miller, Anastasios Kyrillidis and George N. Phillips, Jr, "*A Deep Learning Solution for Crystallographic Structure Determination*", preprint - work in progress, 2023.
- Ed Hu, Anastasios Kyrillidis, Chris Jermaine, "*Federated Learning Over Images: Vertical Decompositions and Pre-Trained Backbones Are Difficult to Beat*", preprint - work in progress, 2023.
- John Chen, Chen Dun, Anastasios Kyrillidis, "*Fast FixMatch: Faster Semi-Supervised Learning with Curriculum Batch Size*", preprint - work in progress, 2023.
- Jasper Liao and Anastasios Kyrillidis, "*Accelerated Convergence of Nesterov's Momentum for Deep Neural Networks under Partial Strong Convexity*", preprint - work in progress, 2023.
- Ria Stevens and Anastasios Kyrillidis, "*On the evolution of neural tangent kernels in adversarial training and neural network minimax convergence guarantees*", preprint - work in progress, 2023.
- Chen Dun, Mirian Hipolito Garcia, Robert Sim, Guoqing Zheng, Dimitris Dimitriadis, Anastasios Kyrillidis, "*Efficient Zero-shot Personalization with Federated Mixture of Experts*", preprint - work in progress, 2023.
- Lyle Kim, Taha Toghani, Cesar uribe, Anastasios Kyrillidis, "*Adaptive Federated Learning with Auto-Tuned Clients*", preprint - work in progress, 2023.
- Cameron R Wolfe, Anastasios Kyrillidis, "*Cold Start Streaming Learning for Deep Networks*", preprint - work in progress, 2023.
- Junhyung Lyle Kim, Gauthier Gidel, Anastasios Kyrillidis, Fabian Pedregosa, "*Extragradient with Positive Momentum is Optimal for Games with Cross-Shaped Jacobian Spectrum*", preprint - work in progress, 2023.
- Anastasios Kyrillidis, Moshe Y. Vardi, Zhiwei Zhang, "*DPMS: An ADD-Based Symbolic Approach for Generalized MaxSAT Solving*", preprint - work in progress, 2021.
- Zhenwei Dai, Chen Dun, Yuxin Tang, Anastasios Kyrillidis, Anshumali Shrivastava, "*Federated Multiple Label Hashing (FedMLH): Communication Efficient Federated Learning on Extreme Classification Tasks*", preprint - work in progress, 2021.
- Cameron R Wolfe, Qihan Wang, Junhyung Lyle Kim, Anastasios Kyrillidis, "*How much pre-training is enough to discover a good subnetwork?*", preprint - work in progress, 2021.
- Junhyung Lyle Kim, Jose Antonio Lara Benitez, Mohammad Taha Toghani, Cameron Wolfe, Zhiwei Zhang, Anastasios Kyrillidis, "*Momentum-inspired Low-Rank Coordinate Descent for Diagonally Constrained SDPs*", preprint - work in progress, 2021.
- Cameron R Wolfe, Jingkang Yang, Arindam Chowdhury, Chen Dun, Artun Bayer, Santiago Segarra, Anastasios Kyrillidis, "*GIST: Distributed Training for Large-Scale Graph Convolutional Networks*", preprint - work in progress, 2021.

Invited Talks/Workshops

- *Introduction to machine learning for biosciences*
  - CMB Workshop, Houston, December, 2022.
- *A Tale of Sparsity in Deep Learning: Lottery Tickets, Subset Selection, and Efficiency in Distributed Learning*
  - Technical University of Crete, Greece, July, 2022.
- *Distributed learning of deep neural networks using independent subnet training*
  - Naval Research Laboratory, USA, January, 2023.
  - Google (Federated Learning Workshop), USA, October, 2022.
  - Yahoo, USA, October, 2022.
  - Samsung, UK, September, 2022.
  - National Technical University of Athens and Demokritos Research Institute, Athens, Greece, 2022.
  - University of Patras, Patra, Greece, 2022.
  - EPFL and ETH, (Lausanne, Zurich), Switzerland, 2022.
  - University of Western Macedonia, Kozani, Greece, 2022.
  - Microsoft (MSR Redmond), 2021.

- EurOPT, France, July, 2021.
- SIAM Conference on Computational Science and Engineering, USA, March, 2021.
- MILA, Canada, February, 2021.
- Google, USA, June, 2020.
- Technical University of Crete, Greece, August, 2020.
- Intel, USA, September, 2020.
- INFORMS (virtual), November, 2020.

- *Finding low-rank solutions, efficiently and provably*
  - Department of Mathematics Seminar Series, University of Houston, Houston, USA, November, 2019.

- *Low-rank regularization and solution uniqueness in over-parameterized matrix sensing*
  - Data Science Symposium, Texas A&M, College Station, USA, September, 2019.
  - INFORMS, Seattle, USA, October 2019.

- *A new approximation technique for quadratic form maximization over discrete sets on the unit sphere*
  - CAAM Seminar Series, Rice University, Houston, USA, April, 2019.

- *Three concepts in ML that require rethinking: Implicit regularization, over-parameterization, and momentum acceleration*
  - INFORMS, Arizona, USA, October 2018.
  - Data Science Conference, Houston, USA, September 2018.

- *Rethinking algorithms in Data Science: Scaling up optimization using non-convexity, provably*
  - IBM T.J. Watson Research Center, New York, USA, January, 2018.
  - Rutgers University, New Jersey, USA, March, 2017.
  - University of Massachusetts, Amherst, USA, March, 2017.
  - University of Alberta, Edmonton, Canada, March, 2017.
  - Carnegie Mellon University, Pittsburgh, USA, February, 2017.
  - Rice University, Houston, USA, February, 2017.
  - Ohio State University, Columbus, USA, February, 2017.
  - Maryland University, Washington DC, USA, February, 2017.
  - Aalto University, Helsinki, Finland, February, 2017.
  - Max-Planck Symposium, Berlin, Germany, January, 2017.
  - Purdue University, West Lafayette, USA, January, 2017.
  - Northwestern University, Chicago, USA, January, 2017.
  - Waterloo University, Waterloo, Canada, January, 2017.
  - Temple University, Philadelphia, USA, December, 2016.

- *Finding low-rank solutions via the Burer-Monteiro approach, efficiently and provably*
  - Seminaire d'analyse numerique, Section de mathematiques, University of Geneva, Switzerland, December, 2016.
  - Systems, Information, Learning and Optimization (SILO) Seminar, Wisconsin Institute for Discovery, USA, November, 2016.
  - Departments of Mathematics and Computer Science, University of Maryland, USA, November, 2016.
  - Colorado School of Mines, USA, October, 2016.
  - University of Colorado Boulder, USA, October, 2016.
  - Digital Technology Center (DTC) Seminar, Minneapolis, USA, October, 2016.
  - Allerton Conference, Urbana Champaign, USA, September, 2016.

- *Composite self-concordant minimization and extensions to path-following schemes*
  - UT Simons Seminar, Austin, USA, September, 2015.
  - International Symposium on Mathematical Programming (ISMP), Pittsburgh, USA, July, 2015.
  - ENS, Paris, France, Mar. 2014.

- *Scalable solutions to some "hard" problems via self-concordance,* EcoCloud Annual Event, Lausanne, Switzerland, June 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.
  - 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.

Professional Activities / Service

Area Chair for:

International Conference on Machine Learning (ICML) - 2019, 2020, 2021, 2022, 2023

Neuronal Information Processing Systems (NeurIPS) - 2019, 2020, 2021, 2022, 2023

International Conference on Learning Representations (ICLR) - 2021, 2022, 2023

Conference on Artificial Intelligence and Statistics (AISTATS) - 2023

Uncertainty in Artificial Intelligence (UAI) - 2023

Reviewer/PC member for:

International Conference on Machine Learning (ICML), Neuronal Inference and Processing Systems (NeuIPS), Artificial Intelligence and Statistics (AISTATS), American Association on Artificial Interlligence (AAAI), IEEE International Conference on Communications (ICC), IEEE Transactions on Signal Processing (TSP), IEEE Transactions on Information Theory (TIT), Mathematics of Operation Research (Math OR), Mathematical Programming Journal, SIAM Journal on Matrix Analysis and Applications, IMA Information and Inference.