

Computer and Information Sciences  
University of Delaware  
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## Academic Employment

- 1/2021–now *University of Delaware*, Computer and Information Sciences  
**Associate Professor (with tenure)**
- 8/2018–2020 *Clemson University*, School of Computing  
**Associate Professor (with tenure)**
- 2/2015–2020 *Clemson University*, School of Health Research  
**Faculty Scholar Professor**
- 8/2012–2018 *Clemson University*, School of Computing  
**Assistant Professor**
- 11/2007–8/2012 *Argonne National Laboratory*  
*U.S. Department of Energy laboratory managed by UChicago*  
**Argonne Scholar**, (2010–2012)  
**Postdoctoral appointment**, (11/2007–2010)  
Mathematics and Computer Science Division  
The Laboratory for Advanced Numerical Simulations
- 2010–2012 *University of Chicago*, Computation Institute  
**Joint research staff appointment**
- 1997–2007 **Research Associate and Research Assistant positions**  
*The Weizmann Institute of Science*, Mathematics and Computer Science (2002-2007)  
*The Weizmann Institute of Science*, Department of Structural Biology (1998-1999)  
*Ben-Gurion University*, Communication Systems Engineering (1997-1998)

## Education

- 2003–2008 *The Weizmann Institute of Science, Israel*  
**Ph.D. in Applied Mathematics and Computer Science**  
Field of research: multiscale methods, graph algorithms, machine learning, combinatorial scientific computing, optimization, network science, iterative methods, large-scale computations  
Thesis: “Multilevel algorithms for combinatorial optimization problems”  
Advisers: Prof. Achi Brandt, Dr. Dorit Ron
- 2001–2003 *The Weizmann Institute of Science, Israel*  
**M.Sc. in Applied Mathematics and Computer Science**  
Thesis: “The minimum linear arrangement problem”  
Advisers: Prof. Achi Brandt, Prof. Uriel Feige
- 1995–1998 *Ben-Gurion University of Negev, Israel*  
**B.Sc. in Mathematics and Computer Science**  
Thesis: “Generalizations of the Hanoi towers problem”  
Adviser: Prof. Daniel Berend

## Research Interests

- ◇ multiscale, multilevel and multigrid algorithms
- ◇ quantum computing, hybrid quantum-classical approaches
- ◇ AI, machine learning, data mining
- ◇ network science, computational graph problems, discrete mathematics
- ◇ complex systems, multiscale methods
- ◇ natural language processing, text mining, automated hypothesis generation
- ◇ large-scale optimization
- ◇ scientific computing, computational science

## Student Advising

*Graduate Students and Postdocs (adviser and committee chair):*

- ◇ One postdoc and 12 graduate students (see full CV; this list is not constantly updated here)

*Graduate Students Committee Member:*

- ◇ More than 12 students (see full CV; this list is not constantly updated here)

*Thesis award achievements and honors programs in my lab at Clemson University:*

- ◇ Justin Sybrandt (2016-2020), **Award: Outstanding PhD student in Computer Science** (now at Google Brain)
- ◇ Angelo Carrabba (2017-2018), Biomedical knowledge discovery and text mining, **Honors Thesis** (now at Google)
- ◇ M. Grace Glenn (2017-2018), Automated query generation for text streams in social media, **Honors Thesis** (now at Foursquare)
- ◇ Sloan Nietert (2016-2017), Algebraic multigrid methods for solving graph Laplacian linear systems, **Award: Dupont Best Undergraduate Project**
- ◇ Emmanuel John (2013-2014), Automatic hypothesis generation for biomedical text analysis, **Award: Dupont Best Undergraduate Project**

*Visiting Students:*

- ◇ Christian Staudt (Fall 2015, Karlsruhe Institute of Technology, Germany)

*Students at Argonne National Laboratory:*

- ◇ Four PhD students and one postdoc (see full CV for more info)

## Teaching Experience

Examples of courses

- ◇ Principles of Scientific Computing, Selected Topics in Data Analysis, Foundations of Computer Science, Network Science, PhD Research Seminar, Linear Algebra

## Honors and Awards

- ◇ 1998 Co-winner (with S. Benditkis) of B.Sc. final project competition; corresponding paper "Generalizations of the Hanoi Towers problem", arXiv, cs.DM/0612070, [download](#)
- ◇ 2002-2007 M.Sc, Ph.D. - The Weizmann Institute of Science Scholarships
- ◇ 2007 A. Shamir's fund conference travel award
- ◇ 2010-2012 Argonne scholar fellowship
- ◇ 2015 Courtesy appointment with the School of Health Research, Clemson University
- ◇ 2017 Audience appreciation award honorable mention (in top 5 papers) for the paper and video at ACM SIGKDD
- ◇ Travel awards 2017 for my lab: ACM SIGKDD, Supercomputing
- ◇ Travel awards 2018 for my lab: IEEE Big Data, American Physical Society (APS), Supercomputing
- ◇ Travel awards 2019 for my lab: Foundations of Computer Science (FOCS), Supercomputing, International Green and Sustainable Computing Conference (IGSC), SIAM Computational Science and Engineering
- ◇ IEEE HPEC 2019 best student paper award for the paper on quantum approximate optimization
- ◇ Travel awards 2020 for my lab: SIAM PP 2020

## Media Exposure of Our Work

- ◇ 2020, (in Russian) Решать реальные задачи на квантовых компьютерах позволит гибридный подход, <https://tinyurl.com/y28j55gp>
- ◇ 2020, *Argonne Receives Two Awards from DARPA for Quantum Information Science*, HPCwire <https://tinyurl.com/y8r2ekqv>
- ◇ 2020, *Artificial intelligence could aid in fight against COVID-19*, The Newsstand <https://tinyurl.com/y9ksfy5f>
- ◇ 2020, *Combing the best of quantum computing and classical computing*, The Newsstand <https://tinyurl.com/ufoddvw>
- ◇ 2019, *The best of both worlds: how to solve real problems on modern quantum computers*, Science Daily <http://tiny.cc/nyyrdz>, News Wise <http://tiny.cc/0zvl9y>, Innovation Toronto <http://tiny.cc/87yrdz>
- ◇ 2019, *Future of medicine: man or machine?*, Clemson World Magazine, <https://clemson.world/research/medicine/>, video at <https://www.youtube.com/watch?v=Dt2iMb4h6UA>
- ◇ 2018, *Learning continues throughout summer for ALCF student interns*, Argonne National Lab News, <http://tiny.cc/xpxl9y>
- ◇ 2016, *Charleston's next major disaster targeted in new research*, The Newsstand, <http://tiny.cc/zzwl9y>

## Professional Activities

### *Advisory Board and Scientific Consulting:*

- ◇ Swiss Innovation Valley
- ◇ The International Artificial intelligence and Quantum Technology Foundation
- ◇ SciFeat

### *Professional Societies:*

- ◇ SIAM, ACM, IEEE

### *Editorial Boards*

- ◇ Algorithms, Journal of Data Intelligence, PLOS One (academic editor in machine learning and network science areas), several special issues

### *Reviewer for Journals:*

- ◇ More than 30 journals

### *Panel Member on Grant Committees:*

- ◇ NSF, NASA, DOE, internal funding panels at several universities (2011-now)

### *Reviewer for Conferences:*

- ◇ 3-4 conferences per year. Examples include LION, PPSN, NWS, SEA, ALENEX, SIAM CSC, DaWaK, LBD, etc.

### *Organization of (Mini)symposiums/Workshops:*

- ◇ SIAM Computational Science and Engineering, “Multilevel methods for graphs and hyper-graphs”, mini-symposium, 2011
- ◇ The Institute for Computing in Science (ICIS), “Computational Methods for (Hyper)graphs”, week long workshop, 2012, with Paul Hovland and Bruce Hendrickson
- ◇ Dagstuhl Workshop at Leibniz Center for Informatics: “High-performance Graph Algorithms and Applications in Computational Science”, week long workshop, 2014, with Ulrich Meyer, Henning Meyerhenke and Ali Pinar
- ◇ International Symposium on Mathematical Programming (ISMP), “Scalable Algorithms for Networks”, session, 2015
- ◇ Dagstuhl Workshop at Leibniz Center for Informatics: “High-performance Graph Algorithms”, week long workshop, 2018, with Henning Meyerhenke, and Richard Peng
- ◇ SIAM Parallel Processing and Scientific Computing, “Recent Advances and Trends in Hybrid Quantum-Classical Algorithms”, mini-symposium, 2020, with Yuri Alexeev and Ruslan Shaydulin

### *Technical Program Committees:*

- ◇ Learning and Intelligent Optimization 2010, 2011, 2012, 2013
- ◇ IEEE International Workshop on Network Science 2013
- ◇ SIAM Workshop on Combinatorial Scientific Computing 2016
- ◇ International Conference on Big Data Analytics and Knowledge Discovery 2018, 2019 (DaWaK, former International Conference on Data Warehousing and Knowledge Discovery)

- ◇ Cloud Summit 2019 (IEEE Cloud Computing)
- ◇ 2nd International Workshop on Quantum Computing for Sustainable Computing 2019 (QCSC)
- ◇ INFORMS Optimization Society Conference 2020 (IOS)
- ◇ The First International Workshop on Literature-based discovery 2020 (LBD, co-located with PAKDD)
- ◇ International Workshop on Quantum Computing: Circuits Systems Automation and Applications 2020 (QC-CSAA, co-located with IEEE Computer Society Annual Symposium on VLSI)

*Tutorial sessions:*

- ◇ Learning and Intelligent Optimization 2010, "Multiscale methods for combinatorial optimization problems"
- ◇ Summer School on Network Science at USC 2013, "Multiscale Methods for Networks" and "When Multiscale Methods Meet Network Generation"
- ◇ Several theory and hands on tutorials on quantum algorithms for IBM Q and D-Wave at Argonne National Lab workshops and webinars (given by students in my lab), 2017-2019
- ◇ SIAM Parallel Processing and Scientific Computing 2020, "Solving combinatorial optimization problems with quantum computers", with Yuri Alexeev and Ruslan Shaydulin
- ◇ IEEE Quantum Week 2020, "Combinatorial Optimization on Quantum Computers", with Yuri Alexeev and Ruslan Shaydulin

*Service:*

- ◇ Graduate Recruiting Committee, Faculty Search Committee, Associate Dean for Research Search Committee, Awards Committee (2012-now)

## **Industrial Research Employment**

*Shopping.com, eBay Inc.*

**Research group** 2007  
Machine learning and data mining: large-scale text information clustering, product classification and prediction.

*Quark Biotech, Inc.*

**Computational scientist** 1998–2002

- ◇ Automated literature based discovery of scientific hypotheses
- ◇ Computational methods for statistical analysis of experimental data
- ◇ Analysis of gene expression data
- ◇ Development of biomedical databases
- ◇ Image analysis: spot detection and matching problems in electrophoresis

## **Industrial Development Employment**

*Gefen systems*

**Software Developer** 1998–1999  
Logic programming; Development of tools for automatic news classification.

<i>D.A. systems</i>	
<b>Software Developer</b>	1995–1996
Development of REXX (scripting language) interpreter.	
<i>I.D.F.</i>	
<b>Computer Systems Administrator</b>	1992–1995
Administration of multi-user computer systems; System programming	
<i>The Weizmann Institute of Science</i>	
<b>Algorithms Developer</b>	1992–1993
Development of algorithms for numerical analysis and digital signal processing.	

**Selected Open Source Software** (see <https://github.com/isafro>, not including industrial)

### Funded Grant Proposals (Total for PI/co-PI roles = \$4.54M)

Funding agencies: NSF, DOE, DARPA, Greenville Hospital System, BMW, internal funding.

### Patents

1. A. Gutfraind, I. Safro *System and method for synthesizing artificial networks*, filed at Clemson University, CURF Tech No. 2015-058, 2016.

### Notation for Publications

ML<sup>1</sup> – Machine Learning/Data Mining, GA – Graph Algorithms/Network Science, NLP – Natural Language Processing/Text Mining, MS – Multiscale Methods, QC – Quantum Computing, CSC – Combinatorial Scientific Computing, AGT – Agent-based Modeling, BIO – Applications in Biology/Medicine/Healthcare, ENG – Applications in Computational Engineering, VIS – Visualization, COMB – Other Combinatorics

### Book Chapters

1. (CSC, GA) I. Safro, D. Ron, A. Brandt, “*Fast Multilevel Algorithms for Linear Ordering Problems*”, in “*Computational Optimization: New Research Developments*”, Nova Science Publishers, ISBN: 978-1-60692-671-0, 2010
2. (ML) P. Bhavsar, I. Safro, N. Bouayanaya, R. Polikar, D. Dera “*Chapter 12: Machine Learning in Transportation Data Analytics*”, a book chapter in “*Data analytics for intelligent transportation systems*”, A. Apon, R. Chowdhury, K. Dey eds., 2017
3. (GA) Manuel Penschuck, Ulrik Brandes, Michael Hamann, Sebastian Lamm, Ulrich Meyer, Ilya Safro, Peter Sanders, Christian Schulz “*Recent Advances in Scalable Network Generation*”, will appear as a chapter in “*Massive Graph Analytics*”, David Bader ed., preprint at <https://arxiv.org/abs/2003.00736>, 2020

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<sup>1</sup>Due to heavy abuse and inconsistency in understanding of the term “AI” by the media and some scientists, I prefer to clarify the specific sub-areas of AI using ML, NLP, BIO, ENG, and partially GA. In fact, most of my works marked by ML, NLP, BIO, ENG, and some of GA are tasks of AI. Depending on the task, deep learning, neural nets and representation learning belong to some of these classes.

## Journal Publications

4. (AGT,BIO) (invited paper) I. Safro, L. Segel, "Collective stochastic versions of playable games as metaphors for complex biosystems: Team Collect Four", **Complexity** 8 (2003), 46-55, [download](#)
5. (GA,CSC,MS) I. Safro, D. Ron, A. Brandt, "A Multilevel Algorithm for the Minimum 2-sum Problem", **Journal of Graph Algorithms and Applications**, Vol. 10/2, 2006, [download](#)
6. (GA,CSC,MS) (in ScienceDirect Top-25 Hottest Articles, 2006) I. Safro, D. Ron, A. Brandt, "Graph Minimum Linear Arrangement by Multilevel Weighted Edge Contractions", **Journal of Algorithms**, Vol. 60/1, pp. 24-41, 2006, [download](#)
7. (BIO) L. Klipcan, I. Safro, B. Temkin, M. Safro, "Optimal growth temperature of prokaryotes correlates with class II amino acid composition", **FEBS Letters**, Vol. 580/6, pp. 1672-1676, 2006, [download](#)
8. (GA,CSC,MS) I. Safro, D. Ron, A. Brandt, "Multilevel Algorithms for Linear Ordering Problems", **ACM Journal of Experimental Algorithmics**, Vol. 13, pp. 1.4-1.20, 2008, [download](#)
9. (GA,CSC) E. Boman, U. Catalyurek, C. Chevalier, K. Devine, I. Safro, M. Wolf, "Advances in Parallel Partitioning, Load Balancing, and Matrix Ordering", **Journal of Physics**, Vol. 180, 2009, [download](#)
10. (CSC,MS,VIS) D. Ron, I. Safro, A. Brandt, "A fast multigrid algorithm for energy minimization under planar density constraints", **SIAM Multiscale Modeling and Simulation**, Vol. 8, No. 5, pp. 1599-1620, 2010, [download](#)
11. (GA,MS,CSC) D. Ron, I. Safro, A. Brandt, "Relaxation-based coarsening and multiscale organization of graphs", **SIAM Multiscale Modeling and Simulation**, Vol. 9, No. 1, pp. 407-423, 2011, [download](#)
12. (GA,CSC) J. Chen, I. Safro, "Algebraic Distance on Graphs", **SIAM Journal on Scientific Computing**, Vol. 33, No. 6, pp. 3468-3490, 2011, [download](#)
13. (GA,MS,CSC) I. Safro, B. Temkin, "Multiscale approach for network compression-friendly ordering", **Journal of Discrete Algorithms**, Vol. 9, pp. 190-202, 2011, [download](#).
14. (CSC) A. Lyons, I. Safro, J. Utke, "Randomized algorithms for Exploiting Jacobian Scarcity", **Optimization Methods and Software** 27(2), pp. 311-322, 2012, [download](#).
15. (GA,MS) S. Leyffer, I. Safro "Fast Response to Infection Spread and Cyber Attacks on Large-Scale Networks", **Journal of Complex Networks**, vol 1(2), pp. 183-199, 2013, [download](#)
16. (GA) N. Goldberg, S. Leyffer, I. Safro "Optimal Response to Cyber Attacks and Epidemics in Networks", **Networks**, Volume 66 (2), pp. 145-158, 2015, [download](#)
17. (GA,MS,CSC) I. Safro, P. Sanders, C. Schultz "Advanced Coarsening Schemes for Graph Partitioning", **ACM Journal of Experimental Algorithms**, vol. 19, pp. 2.2:1-2.2:24, 2015
18. (ML,MS,BIO) T. Razzaghi, O. Roderick, I. Safro, N. Marko "Multiscale weighted support vector machines for classification of healthcare data with missing values", **PLOS ONE**, Volume 11(5), 2016, [download](#).
19. (GA) A. Buluc, H. Meyerhenke, I. Safro, P. Sanders, C. Schulz "Recent Advances in Graph Partitioning", LNCS 9220 volume on **Algorithms Engineering: Selected Results and Surveys**, 2016, Preprint at Arxiv [download](#).
20. (GA,MS) E. John, I. Safro "Single- and Multi-level Network Sparsification by Algebraic Distance", **Journal of Complex Networks**, Volume 3 (5), pp. 352-388, 2016, [download](#)

21. (GA) Christian L. Staudt, Michael Hamann, Alexander Gutfraind, Ilya Safro, Henning Meyerhenke “*Generating realistic scaled complex networks*”, **Applied Network Science**, vol. 2(1), 36p, 2017, <https://doi.org/10.1007/s41109-017-0054-z>, Springer
22. (GA,CSC,MS) J. Hungerford, W. Hager, I. Safro “*A Multilevel Bilinear Programming Algorithm for the Vertex Separator Problem*”, **Computational Optimization and Applications**, vol. 69, issue 1, pp. 189-223, 2018, <https://doi.org/10.1007/s10589-017-9945-2>, preprint at <http://www.cs.clemson.edu/~isafro/papers/vspbilinear.pdf>
23. (ML,BIO) T. Razzaghi, I. Safro, J. Ewing, E. Sadrfaridpour, J. Scott “*Predictive Models for Bariatric Surgery Risks with Imbalanced Medical Datasets*”, **Annals of Operations Research**, Vol. 280(1-2), pp. 1–18, 2019, <https://doi.org/10.1007/s10479-019-03156-8>, preprint at <http://www.cs.clemson.edu/~isafro/papers/bariatric-surgery.pdf>
24. (GA) H. Ushijima-Mwesigwa, MD Z. Khan, M. Chowdhury, I. Safro “*Centralities for Networks with Consumable Resources*”, **Network Science**, Vol. 7(3), pp. 376–401, 2019, <https://doi.org/10.1017/nws.2019.7>, preprint at <https://arxiv.org/abs/1903.00642>
25. (ML,ENG) MD Zaid Khan, Mashrur Chowdhury, Sakib Mahmud Khan, Ilya Safro, Hayato Ushijima-Mwesigwa, “*Wireless Charging Utility Maximization and Intersection Control Delay Minimization Framework for Electric Vehicles*”, **Computer-Aided Civil and Infrastructure Engineering**, Vol. 34(7), <https://doi.org/10.1111/mice.12439>, preprint at <http://www.cs.clemson.edu/~isafro/papers/wireless-inters.pdf>, 2019
26. (QC,GA) (invited paper) Ruslan Shaydulin, Hayato Ushijima-Mwesigwa, Christian F.A. Negre, Ilya Safro, Susan M. Mniszewski, Yuri Alexeev “*A Hybrid Approach for Solving Optimization Problems on Small Quantum Computers*”, **IEEE Computer**, Vol. 52(6), pp. 18–26, 2019, <https://doi.org/10.1109/MC.2019.2908942>
27. (GA,MS) V. Chauhan, A. Gutfraind, I. Safro “*Multiscale Planar Graph Generator*”, **Applied Network Science**, Vol. 4(46), 2019, <https://doi.org/10.1007/s41109-019-0142-3>, preprint at <https://arxiv.org/abs/1802.09617>
28. (NLP,ML,BIO) Marina Aksenova, Justin Sybrandt, Biyun Cui, Vitali Sikirzhyski, Hao Ji, Diana Odhiambo, Mathew Lucius, Jill R. Turner, Eugenia Broude, Edsel Peña, Sofia Lizzaraga, Jun Zhu, Ilya Safro, Michael D Wyatt, Michael Shtutman “*Inhibition of the DDX3 prevents HIV-1 Tat and cocaine-induced neurotoxicity by targeting microglia activation*”, accepted in **Journal of Neuroimmune Pharmacology**, preprint at <https://doi.org/10.1101/591438>, 2019
29. (GA,ENG) Hayato Ushijima-Mwesigwa, MD Zaid Khan, Mashrur Chowdhury, Ilya Safro “*Optimal Placement of Wireless Charging Lanes in Road Networks*”, accepted in **Journal of Industrial and Management Optimization** 2019, preprint at <https://people.cs.clemson.edu/~isafro/papers/optimal-wcl.pdf>
30. (ML,ENG) William Locke, Justin Sybrandt, Ilya Safro, Sez Atamturktur “*Using Drive-by Health Monitoring to Detect Bridge Damage Considering Environmental and Operational Effects*”, accepted in **Journal of Sound and Vibration**, preprint at <https://doi.org/10.31224/osf.io/ntfdp>, 2019
31. (QC,GA,ML) R. Shaydulin, H. Ushijima-Mwesigwa, I. Safro, S. Mniszewski, Y. Alexeev “*Network Community Detection On Small Quantum Computers*”, **Advanced Quantum Technologies**, Vol. 2(9), <https://doi.org/10.1002/qute.201900029>, preprint at <https://arxiv.org/abs/1810.12484>, 2019

32. (ML,MS) E. Sadrifaridpour, T. Razzaghi, I. Safro “*Engineering fast multilevel support vector machines*”, **Machine Learning**, Volume 108(11), pp. 1879—1917, Springer, 2019, <https://doi.org/10.1007/s10994-019-05800-7>, preprint at <https://arxiv.org/abs/1707.07657>
33. (GA,CSC,MS) R. Shaydulin, J. Chen, I. Safro “*Relaxation-Based Coarsening for Multilevel Hypergraph Partitioning*”, **SIAM Multiscale Modeling and Simulation**, vol. 17, issue 1, pp. 482—506, 2019, preprint at <https://arxiv.org/abs/1710.06552>
34. (ML,GA) Justin Sybrandt, Ruslan Shaydulin, Ilya Safro “Hypergraph Partitioning with Embeddings”, accepted in **IEEE Transaction on Knowledge and Data Engineering (TKDE)**, 2020, DOI [10.1109/TKDE.2020.3017120](https://doi.org/10.1109/TKDE.2020.3017120), preprint at <https://arxiv.org/abs/1909.04016>
35. (QC,MS) Hayato Ushijima-Mwesigwa, Ruslan Shaydulin, Christian Negre, Susan Mniszewski, Yuri Alexeev, Ilya Safro “*Multilevel Combinatorial Optimization Across Quantum Architectures*”, accepted in **ACM Transactions on Quantum Computing**, 2020, preprint at <https://arxiv.org/abs/1910.09985>

### Refereed Conferences (full length papers)

36. (GA,CSC,MS) C. Chevalier, I. Safro, “*Comparison of coarsening schemes for multilevel graph partitioning*”, **Learning and Intelligent Optimization (LION)** (acceptance rate 18%), LNCS 5851, pp. 191–205. Springer, 2009, [download](#)
37. (GA,CSC,MS) I. Safro, P. Hovland, J. Shin, M. Strout, “*Improving random walk performance*”, In Proceedings of the 2009 **International Conference on Scientific Computing (CSC)**, pp. 108–112, CSREA Press, 2009, [download](#)
38. (ML) O. Roderick, I. Safro, “*Learning Highly Filtered Data by Nonlinear Spectral Methods*”, **Learning and Intelligent Optimization (LION)** (acceptance rate 21%), LNCS 6073, pp. 154–168. Springer, 2010, [download](#)
39. (GA,CSC) J. Chen, I. Safro, “*A Measure of the Connection Strengths between Graph Vertices*”, **International Conference on Computational Science (ICCS)**, vol. 4, pp. 196–205, 2011
40. (GA,CSC,MS) I. Safro, P. Sanders, C. Schultz “*Advanced Coarsening Schemes for Graph Partitioning*”, **Symposium on Experimental Algorithms (SEA)**, LNCS vol. 776, pp. 369–380, 2012, [download](#)
41. (GA,CSC,MS) W. Hager, J. Hungerford, I. Safro, “*A Continuous Refinement Strategy for the Multi-level Computation of Vertex Separators*”, **Learning and Intelligent Optimization (LION)**, LNCS vol. 8426, pp. 77–81, 2014, [download](#)
42. (ML,MS) T. Razzaghi, I. Safro “*Scalable Multilevel Support Vector Machines*”, **International Conference on Computational Science (ICCS)**, Procedia Computer Science, Vol. 51, pp. 2683–2687, 2015, [download](#)
43. (ML,MS,BIO) T. Razzaghi, O. Roderick, I. Safro, N. Marko “*Fast Imbalanced Classification of Healthcare Data with Missing Values*”, In Proceedings of **IEEE International Conference on Information Fusion (FUSION)**, pp. 774–781, 2015, [download](#)
44. (GA,MS) A. Gutfraind, L. A. Meyers, I. Safro “*Multiscale Network Generation*”, In Proceedings of **IEEE International Conference on Information Fusion (FUSION)**, pp. 158–165, 2015, [download](#)

45. (GA) C. Staudt, M. Hamann, I. Safro, A. Gutfraind, and H. Meyerhenke *Generating Scaled Replicas of Real-World Networks*, **Complex Networks & Their Applications V (COMPLENET)**, 2016, Studies in Computational Intelligence, vol 693. Springer, [download](#)
46. (ML,MS) E. Sadrifaridpour, T. Razzaghi, A. Luckow, K. Kennedy, S. Jeeredy, I. Safro “*Algebraic multigrid-inspired support vector machines*”, **European Symposium on Artificial Neural Networks (ESANN17)**, [download](#), 2017
47. (NLP) (oral presentation, in top 8%; honorable mention for Audience Appreciation Award, in top 5 papers) J. Sybrandt, M. Shtutman, I. Safro “MOLIERE: Automatic Biomedical Hypothesis Generation System”, In Proceedings of the 23rd **ACM SIGKDD International Conference on Knowledge Discovery and Data Mining**, pp. 1633-1642, [download](#), 2017
48. (NLP) N.Avudaiappan, A. Herzog, S. Kadam, Y. Du, J. Thatcher, I. Safro “*Detecting and Summarizing Emergent Events in Microblogs and Social Media Streams by Dynamic Centralities*”, accepted in **IEEE International Conference on Big Data 2017 (BIGDATA)**, (acceptance rate 18%), long version at arXiv:1610.06431, [download](#), 2017
49. (ML,ENG) MD Z. Khan, M. A. Chowdhury, S. M. Khan, I. Safro, H. Ushijima-Mwesigwa “Utility Maximization Framework for Opportunistic Wireless Charging at Signalized Intersections: A Simulation-based Approach”, accepted in **Transportation Research Board**, 2017, [download](#)
50. (GA,CSC,MS) Ruslan Shaydulin, Ilya Safro “*Aggregative Coarsening for Multilevel Hypergraph Partitioning*”, in proceedings of the **17th International Symposium on Experimental Algorithms (SEA)**, Vol. 103, pp. 2:1-2:15, 10.4230/LIPIcs.SEA.2018.2, 2018, [download](#)
51. (QC,GA) Ruslan Shaydulin, Hayato Ushijima-Mwesigwa, Ilya Safro, Susan Mniszewski, Yuri Alexeev “Community Detection Across Emerging Quantum Architectures”, in proceedings of the **3rd International Workshop on Post Moore’s Era Supercomputing (PMES 2018)**, Supercomputing, preprint at arXiv:1810.07765, [download](#), 2018.
52. (NLP) Justin Sybrandt, Michael Shtutman, Ilya Safro “*Large-Scale Validation of Hypothesis Generation Systems via Candidate Ranking*”, In 2018 **IEEE International Conference on Big Data (Big Data)** (acceptance rate 18%), pp. 1494-1503, 2018, preprint at <https://arxiv.org/abs/1802.03793>
53. (NLP) Justin Sybrandt, Angelo Carrabba, Alexander Herzog, Ilya Safro “*Are Abstracts Enough for Hypothesis Generation?*”, In 2018 **IEEE International Conference on Big Data (Big Data)** (acceptance rate 18%), pp. 1504-1513, 2018, preprint at <https://arxiv.org/abs/1804.05942>
54. (ML) Saroj K. Dash, Ilya Safro, and Ravisutha Sakrepatna Srinivasamurthy “*Spatio-temporal prediction of crimes using network analytic approach*”, In 2018 **IEEE International Conference on Big Data (Big Data)** (acceptance rate 18%), pp. 1912-1917, 2018, [download](#)
55. (QC,GA) (best student paper award) Ruslan Shaydulin, Ilya Safro, Jeffrey Larsen “Multistart Methods for Quantum Approximate Optimization”, accepted in **IEEE High-Performance Extreme Computing (HPEC)**, preprint at <https://arxiv.org/abs/1905.08768>, 2019
56. (NLP) C. Gropp, A. Herzog, I. Safro, P. Wilson, A. Apon “*Clustered Latent Dirichlet Allocation for Scientific Discovery*”, accepted at **International Workshop on Big Data Tools, Methods, and Use Cases for Innovative Scientific Discovery (BTSD)**, 2019, preprint at <https://arxiv.org/abs/1610.07703>
57. (ML,GA) Justin Sybrandt, Ilya Safro “*FOBE and HOBE: First- and High-order Bipartite Embeddings*”, **16th International Workshop on Mining and Learning with Graphs, ACM SIGKDD**

**International Conference on Knowledge Discovery and Data Mining 2020**, preprint at <https://arxiv.org/abs/1905.10953>

58. (ML,GA) Fei Ding, Xiaohong Zhang, Justin Sybrandt, Ilya Safro “*Unsupervised Hierarchical Graph Representation Learning by Mutual Information Maximization*”, **16th International Workshop on Mining and Learning with Graphs, ACM SIGKDD International Conference on Knowledge Discovery and Data Mining 2020**, preprint at <https://arxiv.org/abs/2003.08420>
59. (NLP) Justin Sybrandt, Ilya Tyagin, Michael Shtutman, Ilya Safro “*AGATHA: Automatic Graph-mining And Transformer based Hypothesis generation Approach*”, accepted at **29TH ACM International Conference on Information and Knowledge Management (CIKM)**, preprint at <https://arxiv.org/abs/2002.05635>, 2020
60. (ML, MS) Ehsan Sadrfaridpour, Korey Palmer, Ilya Safro “*AML-SVM: Adaptive Multilevel Learning with Support Vector Machines*”, In **2020 IEEE International Conference on Big Data (Big Data)** (acceptance rate 15%), 2020

## Other reports

Papers at arxiv, technical reports, papers translated into other languages, dissertations, white papers, submitted works, and papers under revision are available in full CV

## Presentations

1. More than 90 talks
2. More than 30 invited talks

## Personal Information

Languages: English (fluent), Hebrew (fluent), Russian (fluent), German (beginner)