

List of papers: Ilya M. Safro

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Book Chapters

1. 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. 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

Journal Publications

1. (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](#)
2. 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](#)
3. (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](#)
4. 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](#)
5. 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](#)
6. 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](#)
7. 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](#)
8. 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](#)
9. J. Chen, I. Safro, “*Algebraic Distance on Graphs*”, **SIAM Journal on Scientific Computing**, Vol. 33, No. 6, pp. 3468-3490, 2011, [download](#)
10. I. Safro, B. Temkin, “*Multiscale approach for network compression-friendly ordering*”, **Journal of Discrete Algorithms**, Vol. 9, pp. 190-202, 2011, [download](#).
11. A. Lyons, I. Safro, J. Utke, “*Randomized algorithms for Exploiting Jacobian Scarcity*”, **Optimization Methods and Software** 27(2), pp. 311-322, 2012, [download](#).
12. S. Leyffer, I. Safro “*Fast Response to Infection Spread and Cyber Attacks on Large-Scale Networks*”, accepted in **Journal of Complex Networks**, vol 1(2), pp. 183–199, 2013, [download](#)
13. N. Goldberg, S. Leyffer, I. Safro “*Optimal Response to Cyber Attacks and Epidemics in Networks*”, **Networks**, Volume 66 (2), pp. 145–158, 2015, [download](#)
14. I. Safro, P. Sanders, C. Schultz “*Advanced Coarsening Schemes for Graph Partitioning*”, **ACM Journal of Experimental Algorithmics**, vol. 19, pp. 2.2:1–2.2:24, 2015

15. 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](#).
16. 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](#).
17. 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](#)
18. Christian L. Staudt, Michael Hamann, Alexander Gutfraind, Ilya Safro, Henning Meyerhenke “*Generating realistic scaled complex networks*”, **Applied Network Science**, vol. 2(1), 36p, 2017, [download](#)
19. 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, [download](#)
20. R. Shaydulín, J. Chen, I. Safro “*Relaxation-Based Coarsening for Multilevel Hypergraph Partitioning*”, under revision in **SIAM Multiscale Modeling and Simulation**, preprint at arXiv:1710.06552, 2017, [download](#)
21. T. Razzaghi, I. Safro, J. Ewing, E. Sadrfaridpour, J. Scott “*Predictive Models for Bariatric Surgery Risks with Imbalanced Medical Datasets*”, under minor revision in **Annals of Operations Research**, 2018, preprint at https://tigerprints.clemson.edu/computing_pubs/32/.

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1. C. Chevalier, I. Safro, “*Comparison of coarsening schemes for multilevel graph partitioning*”, **Learning and Intelligent Optimization (LION)**, LNCS 5851, pp. 191–205. Springer, 2009, [download](#)
2. 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](#)
3. O. Roderick, I. Safro, “*Learning Highly Filtered Data by Nonlinear Spectral Methods*”, **Learning and Intelligent Optimization (LION)**, LNCS 6073, pp. 154–168. Springer, 2010, [download](#)
4. 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
5. 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](#)
6. W. Hager, J. Hungerford, I. Safro, “*A Continuous Refinement Strategy for the Multilevel Computation of Vertex Separators*”, **Learning and Intelligent Optimization (LION)**, LNCS vol. 8426, pp. 77-81, 2014, [download](#)
7. 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](#)
8. 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](#)
9. 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](#)
10. 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](#)

11. E. Sadrfaridpour, 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
12. 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** (oral presentation, in top 8%; honorable mention for Audience Appreciation Award, in top 5 papers), pp. 1633-1642, [download](#), 2017
13. 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 Big Data** 2017, (acceptance rate 18%), long version at arXiv:1610.06431, [download](#), 2017
14. 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](#)
15. R. Shaydulin, I. 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](#)
16. R. Shaydulin, H. Ushijima-Mwesigwa, I. Safro, S. Mniszewski, Y. 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.
17. J. Sybrandt, M. Shtutman, I. Safro “*Large-Scale Validation of Hypothesis Generation Systems via Candidate Ranking*”, accepted at **IEEE International Conference on Big Data 2018**, preprint at arXiv:1802.03793, [download](#), 2018
18. J. Sybrandt, A. Carrabba, A. Herzog, I. Safro “*Are Abstracts Enough for Hypothesis Generation?*”, accepted at **IEEE International Conference on Big Data 2018**, preprint at arXiv:1804.05942, [download](#), 2018
19. Saroj K. Dash, I. Safro, Ravisutha S. Srinivasamurthy “Spatio-temporal prediction of crimes using network analytic approach”, accepted at **IEEE International Conference on Big Data 2018**, preprint at arXiv:1808.06241, [download](#), 2018

Submitted to Journals/Conferences

1. H. Ushijima-Mwesigwa, MD Z. Khan, M. A. Chowdhury, I. Safro “Optimal Installation for Electric Vehicle Wireless Charging Lanes”, submitted, 2018, [download](#)
2. H. Ushijima-Mwesigwa, Z. Khan, M. Chowdhury, I. Safro “*Centralities for Networks with Consumable Resources*”, submitted (double blind review, not uploaded to arXiv), 2018
3. V. Chauhan, A. Gutfraind, I. Safro “*Multiscale Planar Graph Generator*”, submitted, 2018, preprint at arXiv:1802.09617, [download](#)
4. C. Gropp, A. Herzog, I. Safro, P. Wilson, A. Apon “*Scalable Dynamic Topic Modeling with Clustered Latent Dirichlet Allocation (CLDA)*”, submitted, [download](#), 2017
5. E. Sadrfaridpour, T. Razzaghi, I. Safro “*Engineering fast multilevel support vector machines*”, submitted, [download](#), 2017

ArXiv/White Papers/Technical Reports

1. I. Safro, “*Discovery of new hypotheses about the relations between biological objects using MEDLINE information*”, 2000.
2. I. Safro, “*The minimum linear arrangement problem on proper interval graphs*”, arXiv, cs.DM/0608008, 2002, [download](#)

3. S. Benditkis, I. Safro, "*Generalizations of the Hanoi Towers problem*", arXiv, cs.DM/0612070, 1998, [download](#)
4. O. Roderick, I. Safro, "*Polynomial Interpolation for Predicting Decisions and Recovering Missing Data*", Technical report ANL/MCS-P1586-0209, Argonne National Laboratory, [download](#).
5. A. Gutfraind, I. Safro "Modeling and Generation of Complex Networks with Applications to Security", 2011.
6. I. Safro "Multilevel methods for modeling large-scale networks", Argonne National Laboratory Technical Report ANL/MCS-2012-0112, 2011
7. A. Gutfraind, L. A. Meyers, I. Safro "*Multiscale Network Generation*", Technical Report ANL/MCS-P3009-0712, 2012.
8. U. Meyer, H. Meyerhenke, A. Pinar, I. Safro "*High-performance Graph Algorithms and Applications in Computational Science*", Dagstuhl Reports, Vol. 4, Issue 11, pp. 4058, 2014, [download](#)
9. T. Razzaghi, I. Safro "*Fast Multilevel Support Vector Machines*", arXiv:1410.3348, 2015, [download](#)
10. Y. Bolotova, J. Lou, I. Safro "*Detecting and monitoring foodborne illness outbreaks: Twitter communications and the 2015 U.S. Salmonella outbreak linked to imported cucumbers*", Technical report, 2017, TigerPrints Publications. 1, http://tigerprints.clemson.edu/ag_envsci_pub/1, 2017, [download](#)

Selected Refereed Extended Abstracts

1. L. Brodsky, M. Kositsky, A. Leontovich, Y. Kalaidzidis, I. Safro, M. Shtutman, E. Feinstein, "*Gene Expression Analysis Tools*", Annual Israeli Bioinformatics Symposium, 2002.
2. I. Safro, D. Ron, A. Brandt, "*Multilevel Algorithms for Linear Ordering Problems*", SIAM Workshop on Combinatorial Scientific Computing, 2005, [download](#)
3. A. Lyons, I. Safro, "*Randomized Heuristics for Exploiting Jacobian Scarcity*", Dagstuhl Seminar on Combinatorial Scientific Computing, 2009, [download](#)
4. D. Ron, I. Safro, A. Brandt, "*Fast Multilevel Solver for Quadratic Optimization under Planar Density Constraints*", European Conference on Operational Research, 2009.
5. I. Safro, "*Algebraic Distance and Its Applications to Combinatorial Scientific Computing Problems*", SIAM Workshop on Combinatorial Scientific Computing, 2009.
6. C. Chevalier, I. Safro "*Weighted aggregation for multi-level graph partitioning*", Dagstuhl Seminar Proceedings, 2009.
7. I. Safro, B. Temkin, "*Multiscale approach for network compression-friendly ordering*", SIAM Workshop on Combinatorial Scientific Computing, 2011.
8. I. Safro, "*Multiscale Algorithms for Analysis and Optimization Problems on Large Networks*", Complex Networks, 2012.
9. S. Leyffer, T. Munson, I. Safro, "*Multilevel Optimization Models and Algorithms for the Detection and Response to Cyber Attacks*", ASCR Cybersecurity Workshop, 2014.
10. Y. Bolotova, I. Safro, "*Social Media Communications and Market Effects: An Analysis of the Recent Foodborne Illness Outbreaks in the United States*", 2015.
11. J. Hungerford, W. Hager, I. Safro "*A Multilevel Vertex Separator Algorithm Based on the Solution of Bilinear Programs*", SIAM Combinatorial Scientific Computing 2016

Dissertations

1. I. Safro, "*The minimum linear arrangement problem*", M.Sc. Thesis, Weizmann Institute of Science, 2002.
2. I. Safro, "*Multilevel Algorithms for Combinatorial Optimization Problems*", Ph.D. Thesis, The Weizmann Institute of Science, 2007, [download](#)