

CURRICULUM VITAE

A. ERDEM SARIYÜCE

(Last updated in 03/2022)

Computer Science and Engineering Department
University at Buffalo
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Research Interests

Graph mining, graph management, graph learning, network science, social and information networks, temporal networks, hypergraphs, combinatorial scientific computing, distributed and parallel computing

Education

- **Ohio State University** Columbus, OH
Ph.D. in Computer Science and Engineering, 2015
 - Thesis title: **Fast Algorithms for Large Scale Network Analytics**
 - Advisor: Ümit V. Çatalyürek (now at Georgia Tech)
- **Middle East Technical University** Ankara, Turkey
B.S. in Computer Engineering, 2010

Experience

- **University at Buffalo, SUNY** Aug 2017 – Present
Assistant Professor (*Tenure track*)
Department of Computer Science and Engineering
- **Sandia National Laboratories, Livermore, CA** Sep 2015 – Aug 2017
John von Neumann Postdoctoral Fellow
- **Ohio State University, Columbus, OH** Sep 2010 – May 2015
Graduate Research Associate at HPC Lab under Ümit V. Çatalyürek
- **Sandia National Laboratories, Livermore, CA** May 2014 – Aug 2014
Intern
- **IBM T. J. Watson Research Center, Yorktown Heights, NY** May 2013 – Aug 2013
Intern
- **IBM T. J. Watson Research Center, Yorktown Heights, NY** Jun 2012 – Sep 2012
Intern

Awards

- CSE Early Career Researcher of the Year, 2021, University at Buffalo
- SEAS Early Career Researcher of the Year, 2020, University at Buffalo
- Distinguished Review Board Member, PVLDB 2020
- John von Neumann Postdoctoral Research Fellowship, 2015
- Best Paper Runner-up, International Conference on World Wide Web (WWW) 2015
- Student Travel Grants for ASPLOS 2013, SDM 2013, SIGMOD 2013

Grants

Agency: **NSF: CISE: OAC: Core**
Title: Collaborative Research: Fast Tools for Complex Event Detection over Bipartite Graph Streams
Start date: Sep 2021
Total Amount: \$500,000 (UB's share: \$250K)
Role: PI
Collaborators: T. Ge (PI)

Agency: **JP Morgan Chase and Company**
Title: Detecting fraudulent transactions in online marketplaces using temporal network motifs
Start date: April 2020
Total Amount: \$150,000
Role: PI
Collaborators: N. Masuda (PI)

Agency: **NSF: CISE: IIS: III: Small Core**
Title: Collaborative Research: Resilience Analysis for Core Decomposition in Real-World Networks
Start date: Oct 2019
Total Amount: \$500,000 (UB's share: \$250K)
Role: PI
Collaborators: S. Soundarajan (co-PI)

Agency: **University at Buffalo Germination Space Program Seed Grant**
Title: AI Drug Discovery to Characterise and Treat Every Disease
Start date: Aug 2018
Total Amount: \$25,000
Role: PI
Collaborators: R. Samudrala (PI) and M. Gao (PI)

Publications (*my students are denoted with **, *others' students are denoted with +*)

Refereed Journal Papers

1. P. Liu*, T. Kito, N. Masuda, **A. E. Saryüce**
[Temporal Motifs in Patent Opposition and Collaboration Networks](#)
SciRep 2022, Scientific Reports, 12, 1917
2. P. Liu*, V. Guarrasi*, **A. E. Saryüce**
[Temporal Network Motifs: Models, Limitations, Evaluation](#)
TKDE 2021, IEEE Transactions on Knowledge and Data Engineering, to appear
3. **A. E. Saryüce**, C. Seshadhri, A. Pinar, Ü. V. Çatalyürek
[Nucleus Decompositions for Identifying Hierarchy of Dense Subgraphs](#)
TWEB 2017, ACM Transactions on the Web, 11(3): 16:1-16:27
4. **A. E. Saryüce**, K. Kaya, E. Saule, Ü. V. Çatalyürek
[Graph Manipulations for Fast Centrality Computation](#)
TKDD 2017, ACM Transactions on Knowledge Discovery from Data, 11(3): 26:1-26:25
5. **A. E. Saryüce**, B. Gedik, G. Jacques-Silva, K. Wu, Ü. V. Çatalyürek
[Incremental k-core Decomposition: Algorithms and Evaluation](#)
VLDBJ 2016, Very Large Data Bases Journal, 25(3): 425-447
6. **A. E. Saryüce**, B. Gedik, G. Jacques-Silva, K. Wu, Ü. V. Çatalyürek
[SONIC: Streaming Overlapping Community Detection](#)
DAMI 2016, Data Mining and Knowledge Discovery, 30(4): 819-847

7. **A. E. Saryüce**, E. Saule, K. Kaya, Ü. V. Çatalyürek
[Incremental Closeness Centrality in Distributed Memory](#)
ParCo 2015, Parallel Computing, 47: 3-18
8. **A. E. Saryüce**, E. Saule, K. Kaya, Ü. V. Çatalyürek
[Regularizing Graph Centrality Computations](#)
JPDC 2015, Journal of Parallel and Distributed Computing, 76: 106-119

Refereed Conference and Workshop Papers

9. **A. E. Saryüce**
[Motif-driven Dense Subgraph Discovery in Directed and Labeled Networks](#)
WWW 2021, The Web Conference (AR: 20.6%)
10. P. Liu*, **A. E. Saryüce**
[Characterizing and Utilizing the Interplay Between Core and Truss Decompositions](#)
BigData 2020, IEEE International Conference on Big Data (AR: 31.9%)
11. M. Monir*, **A. E. Saryüce**
[Using Large Cliques for Hierarchical Dense Subgraph Discovery \(Best Paper Runner-up\)](#)
CSoNET 2020, Int. Conf. on Computational Data & Social Networks (AR: 26.5%)
12. V. Zheng⁺, **A. E. Saryüce**, J. Zola
[Identifying Taxonomic Units in Metagenomic DNA Streams](#)
SIGKDDW 2020, Workshop on Data Mining in Bioinformatics (BIOKDD) (AR: 40%)
13. R. Laishram⁺, **A. E. Saryüce**, T. Eliassi-Rad, A. Pinar, S. Soundarajan
[Residual Core Maximization: An Efficient Algorithm for Maximizing the Size of the k-Core](#)
SDM 2020, SIAM International Conference on Data Mining (AR: 24%)
14. S. Sanei-Mehri⁺, Y. Zhang⁺, **A. E. Saryüce**, S. Tirthapura
[FLEET: Butterfly Estimation from a Bipartite Graph Stream](#)
CIKM 2019, ACM International Conf. on Information and Knowledge Management (AR: 19.4%)
15. P. Liu*, **A. E. Saryüce**
[Analysis of Core and Truss Decompositions on Real-World Networks](#)
SIGKDDW 2019, Workshop on Mining and Learning with Graphs (MLG)
ACM International Conference on Knowledge Discovery and Data Mining
16. **A. E. Saryüce**, C. Seshadhri, A. Pinar
[Local Algorithms for Hierarchical Dense Subgraph Discovery](#)
VLDB 2019, International Conference on Very Large Data Bases (AR: 18.9%)
17. M. Y. Özkaya⁺, **A. E. Saryüce**, A. Pinar, Ü. V. Çatalyürek
[Local Detection of Critical Nodes in Active Graphs](#)
ASONAM 2018, IEEE/ACM Int. Conf. on Advances in Social Networks Analysis and Mining (AR: 31%)
18. S. Sanei-Mehri⁺, **A. E. Saryüce**, S. Tirthapura
[Butterfly Counting in Bipartite Networks](#)
SIGKDD 2018, ACM International Conf. on Knowledge Discovery and Data Mining (AR: 18.4%)
19. R. Laishram⁺, **A. E. Saryüce**, T. Eliassi-Rad, A. Pinar, S. Soundarajan
[Measuring and Improving the Core Resilience of Networks](#)
WWW 2018, The Web Conference (AR: 14.8%)
20. **A. E. Saryüce**, A. Pinar
[Peeling Bipartite Networks for Dense Subgraph Discovery](#)
WSDM 2018, ACM International Conference on Web Search and Data Mining (AR: 16.1%)

21. **A. E. Sarıyüce**, A. Pınar
[Fast Hierarchy Construction for Dense Subgraphs](#)
VLDB 2017, International Conference on Very Large Data Bases (AR: 17.7%)
22. G. Jacques-Silva, F. Zheng, D. Debrunner, K. Wu, V. Dogaru, E. Johnson, M. Spicer, **A. E. Sarıyüce**
[Consistent Regions: Guaranteed Tuple Processing in IBM Streams](#)
VLDB 2016, International Conference on Very Large Data Bases, Industrial Track (AR: 33.3%)
23. **A. E. Sarıyüce**, C. Seshadhri, A. Pınar, Ü. V. Çatalyürek
[Finding the Hierarchy of Dense Subgraphs using Nucleus Decompositions](#) (Best Paper Runner-up)
WWW 2015, International World Wide Web Conference (AR: 14.1%)
24. **A. E. Sarıyüce**, E. Saule, K. Kaya, Ü. V. Çatalyürek
[Hardware/Software Vectorization for Closeness Centrality on Multi-/Many-Core Architectures](#)
IPDPSW 2014, Workshop on Multithreaded Architectures and Applications (MTAAP)
 IEEE International Parallel & Distributed Processing Symposium
25. **A. E. Sarıyüce**, K. Kaya, E. Saule, Ü. V. Çatalyürek
[Incremental Algorithms for Closeness Centrality](#)
BigData 2013, IEEE International Conference on Big Data (AR: 37.3%)
26. **A. E. Sarıyüce**, E. Saule, K. Kaya, Ü. V. Çatalyürek
[STREAMER: A Distributed Framework for Incremental Closeness Centrality Computation](#)
Cluster 2013, IEEE Cluster Conference (AR: 31.2%)
27. **A. E. Sarıyüce**, B. Gedik, G. Jacques-Silva, K. Wu, Ü. V. Çatalyürek
[Streaming Algorithms for k-core Decomposition](#)
VLDB 2013, International Conference on Very Large Data Bases (AR: 22.7%)
28. **A. E. Sarıyüce**, E. Saule, K. Kaya, Ü. V. Çatalyürek
[Shattering and Compressing Networks for Betweenness Centrality](#)
SDM 2013, SIAM International Conference on Data Mining (AR: 25.5%)
29. **A. E. Sarıyüce**, K. Kaya, E. Saule, Ü. V. Çatalyürek
[Betweenness Centrality on GPUs and Heterogeneous Architectures](#)
ASPLOSW 2013, Workshop on General Purpose Processing Using GPUs (GPGPU)
 ACM International Conference on Architectural Support for Programming Languages and Operating Systems (AR: 39.4%)
30. **A. E. Sarıyüce**, E. Saule, Ü. V. Çatalyürek
[Scalable Hybrid Implementation of Graph Coloring using MPI and OpenMP](#)
IPDPSW 2012, Workshop on Parallel Computing and Optimization (PCO)
 IEEE International Parallel & Distributed Processing Symposium
31. **A. E. Sarıyüce**, E. Saule, Ü. V. Çatalyürek
[Improving Graph Coloring on Distributed Memory Parallel Computers](#)
HiPC 2011, IEEE International Conference on High Performance Computing (AR: 19.4%)

Technical Reports and Thesis

1. **A. E. Sarıyüce**, E. Saule, Ü. V. Çatalyürek
 On Distributed Graph Coloring with Iterative Recoloring, [arXiv: 1407.6745](#)
2. **A. E. Sarıyüce**
 Fast Algorithm for Large-Scale Network Analytics, [Ph.D. Thesis](#), Ohio State University, 2015

Invited Talks

1. **Rensselaer Polytechnic Institute (RPI)** November 2020
Temporal Network Motifs: Models, Limitations, Evaluation Online
2. **JP Morgan Chase and Company** September 2020
Detecting Fraudulent Activities in Financial Transaction Networks by Network Measures Online
3. **Cornell University** October 2019
Local Algorithms for Hierarchical Dense Subgraph Discovery Ithaca, NY
4. **National Security Agency (NSA)** April 2019
Hierarchical Dense Subgraph Discovery: Models, Algorithms, Applications Hanover, MD
5. **Northeastern University** Mar 2019
Hierarchical Dense Subgraph Discovery: Models, Algorithms, Applications Boston, MA
6. **Middle East Technical University** Dec 2018
Hierarchical Dense Subgraph Discovery: Models, Algorithms, Applications Ankara, Turkey
7. **Bilkent University** Dec 2018
Hierarchical Dense Subgraph Discovery: Models, Algorithms, Applications Ankara, Turkey
8. **University of Waterloo** Nov 2018
Hierarchical Dense Subgraph Discovery: Models, Algorithms, Applications Waterloo, ON
9. **University at Buffalo CDSE days** April 2018
Dense Subgraphs with Hierarchical Relations: Models, Algorithms, Applications Buffalo, NY
10. **INFORMS Annual Meeting** Oct 2017
Finding the Hierarchy of Dense Subgraphs Houston, TX
11. **Complex Networks Seminar, University at Buffalo** Oct 2017
Finding the Hierarchy of Dense Subgraphs using Nucleus Decompositions Buffalo, NY
12. **University at Buffalo** May 2017
Parallel Local Algorithms for Core, Truss, and Nucleus Decompositions Buffalo, NY
13. **University at Buffalo** Feb 2017
Fast Algorithms for Mining and Processing Real-world Graphs Buffalo, NY
14. **Sandia National Laboratories** Jan 2015
Fast and High Quality Dense Subgraph Discovery Algorithms Albuquerque, NM
15. **Bilkent University** Nov 2012
Streaming Algorithms for k-core Decomposition Ankara, Turkey

Teaching

- CSE 331: Algorithms and Complexity (271 enrolled) Spring 2021
- CSE 701: Deep Learning on Graphs (16 enrolled) Fall 2020
- CSE 640: Graph Mining and Management (7 enrolled) Fall 2020
- CSE 331: Algorithms and Complexity (154 enrolled) Spring 2020
- CSE 610: Special Topics in Social & Information Network Analysis (8 enrolled) Fall 2019
- CSE 701: Fast Algorithms for Graph Analytics (16 enrolled) Fall 2019

- CSE 701: Large-Scale Graph Mining (5 enrolled) Fall 2018
- CSE 610: Special Topics in Network Science (6 enrolled) Spring 2018
- CSE 701: Large-Scale Graph Mining (8 enrolled) Fall 2017

Advising (*current advisees are denoted with **)

Postdocs

- Rupam Acharyya (co-advised with N. Masuda)

Ph.D. students

- Md. Jakir Hossain* (S21-Present)
- Jason Niu* (F20-Present)
- Penghang Liu* (S19-Present)

M.S. students

- Md Moniruzzaman Monir (now Software Engineer @Amazon Alexa)
- Lingbo Hu
- Valerio Guarrasi (Visitor from U. Sapienza)
- Aditya Sahay
- Chaitanya Pawa
- Yifan Yin (now Software Engineer @Amazon)

Undergraduate Students

- Aman Timalisina*
- Qinran Wang*
- Jingjing Chi*
- Yifan Wang*
- Tanvie Kirane*
- Connor Wilson*
- David Campbell
- Elijah Einstein
- Jessica Grogan (now Ph.D. student @University at Buffalo)
- Jonathan Hercules
- Redwan Khan (now Ph.D. student @VirginiaTech)

Professional and University Service

Organizing Committee

- Track Co-Chair for PhD forum and posters, The IEEE/ACM International Conference on Social Network Analysis and Mining (ASONAM), 2019

Session Chairing

- Research Session 1B: Collective Behavior, Subgraphs and Communities, Northeast Regional Conference on Complex Systems (NERCCS), April 2, 2020.
- Research Session 6: Subgraphs and Communities, International Conference on Very Large Data Bases (VLDB), Aug 27, 2019.

Program Committee

- SIGKDD 2022-2020, 2018 (ACM International Conf. on Knowledge Discovery and Data Mining)
- WWW 2022-2019 (The Web Conference)
- IJCAI 2022-2021 (International Joint Conference on Artificial Intelligence)
- SDM 2021-2018 (SIAM Data Mining Conference)
- VLDB 2020-2019 (International Conference on Very Large Data Bases)
- Cluster 2022, 2018 (IEEE Cluster Conference)
- HiPC 2019 (IEEE International Conference On High Performance Computing, Data, and Analytics)
- ASONAM 2019 (The IEEE/ACM International Conference on Social Network Analysis and Mining)
- ICPP 2019 (International Conference on Parallel Processing)
- IPDPS 2018 (IEEE International Parallel and Distributed Processing Symposium)
- GrAPL 2022, 2019 (Workshop on Graphs, Architectures, Programming, and Learning in conj. with IPDPS)
- NERCCS 2021-2020 (Northeast Regional Conference on Complex Systems)
- GRADES-NDA 2021-2020 (Workshop on Graph Data Management Experiences & Systems and Network Data Analytics in conj. with SIGMOD)
- SIAMNS 2020 (Workshop on Network Science)
- PMAW 2018 (The Programming Models and Algorithms Workshop in conj. with IPDPS)
- BigGraphs 2017 Big Graphs Workshop in conj. with IEEE BigData)
- HPC4BD 2017-2016 (Workshop on High Performance Computing for Big Data in conj. with ICPP)

Reviewer

- Science
- The Canadian Journal of Statistics
- ACM Transactions on Database Systems (TODS)
- Network Science
- PLOS ONE
- ACM Transactions on Knowledge Discovery from Data (TKDD)
- SIAM Journal on Discrete Mathematics (SIDMA)
- Information Systems
- Very Large Data Bases Journal (VLDBJ)
- European Journal of Operational Research (EJOR)
- SIAM Journal on Mathematics of Data Science (SIMODS)
- PeerJ Computer Science
- IEEE Transactions on Parallel and Distributed Systems (TPDS)
- Data Mining and Knowledge Discovery (DAMI)
- Journal of Parallel and Distributed Computing (JPDC)
- Parallel Computing (ParCo)
- Journal of Machine Learning (JMLR)
- IEEE Transactions on Knowledge and Data Engineering (TKDE)
- Journal of Complex Networks (COMNET)
- World Wide Web journal
- IEEE International Parallel and Distributed Processing Symposium (IPDPS)
- IEEE Cluster Conference
- IEEE International Conference On High Performance Computing (HiPC)
- International Conference on Parallel Processing (ICPP)
- Supercomputing Conference (SC)
- ACM International Conference on Management of Data (SIGMOD)
- International World Wide Web Conference (WWW)
- ACM Conference on Knowledge Discovery and Data Mining (SIGKDD)

Panelist

- NSF Proposal Review Panelist, 2022
- NSF Ad-hoc Reviewer, 2020
- NSF Proposal Review Panelist, 2020
- NSF Proposal Review Panelist, 2018

Department Service

- MS Thesis committee member
 - Arjunil Pathak (advised by Kenny Joseph), 1/3/20
- Oral Qualification Exam (OEQ) committee member
 - Vicky Zheng (advised by Jaroslaw Zola), 10/31/19
 - Fei Xu (advised by Venu Govindaraju), 8/15/19
 - Syed Mohammed Arshad Zaidi (advised by Varun Chandola), 1/22/18
 - Fan Yang (advised by Wen Dong), 1/17/18
- Dissertation Proposal committee member
 - Syed Mohammed Arshad Zaidi (advised by Varun Chandola), 6/23/21
 - Vicky Zheng (advised by Jaroslaw Zola), 12/17/20
- Dissertation Defense committee member
 - Syed Mohammed Arshad Zaidi (advised by Varun Chandola), 1/10/22
 - Vicky Zheng (advised by Jaroslaw Zola), 7/9/21
- Graduate Admissions Committee, 2017 - Present
- Graduate Studies Committee, 2017 - Present
- Colloquium Committee, 2017 - Present

External Thesis Committees

- External Examiner: Fatemeh Esfahani @ University of Victoria (advised by Alex Thomo, Venkatesh Srinivasan), 12/1/21