

CURRICULUM VITAE

A. ERDEM SARIYÜCE

(Last updated in 07/2021)

Computer Science and Engineering Department
University at Buffalo
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Research Interests

Graph mining, social network analysis, network science, temporal network analysis, combinatorial scientific computing, stream processing, 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, worked on dense subgraph discovery algorithms, resulted in [22]
- **IBM T. J. Watson Research Center, Yorktown Heights, NY** May 2013 – Aug 2013
Intern, worked on fault tolerance support for IBM Streams, resulted in [21]
- **IBM T. J. Watson Research Center, Yorktown Heights, NY** Jun 2012 – Sep 2012
Intern, worked on streaming k-core algorithms, resulted in [26]

Awards

- **SEAS Early Career Researcher of the Year, 2020, University at Buffalo**
- **Distinguished Review Board Member, PVLDB 2020**
- **John von Neumann Postdoctoral Research Fellowship, 2015**
Two year fellowship in Sandia National Laboratories, supported by the Applied Mathematics program, part of the U.S. Department of Energy’s Office of Advanced Scientific Computing Research (ASCR)

- Best Paper Runner-up, International Conference on World Wide Web (WWW) 2015
- Student Travel Grants for ASPLOS 2013, SDM 2013, SIGMOD 2013

Grants

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: Core SMALL**
Title: Collaborative Research: Resilience Analysis for Core Decomposition in Real-World Networks
Start date: Oct 2019
Total Amount: \$500,000 (UB's share: 50%)
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*, V. Guarrasi*, **A. E. Sarıyüce**
[Temporal Network Motifs: Models, Limitations, Evaluation](#)
TKDE 2021, IEEE Transactions on Knowledge and Data Engineering, to appear
2. **A. E. Sarıyüce**, 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
3. **A. E. Sarıyüce**, 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
4. **A. E. Sarıyüce**, 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
5. **A. E. Sarıyüce**, 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
6. **A. E. Sarıyüce**, E. Saule, K. Kaya, Ü. V. Çatalyürek
[Incremental Closeness Centrality in Distributed Memory](#)
ParCo 2015, Parallel Computing, 47: 3-18

7. **A. E. Sariyüce**, 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

8. **A. E. Sariyüce**
[Motif-driven Dense Subgraph Discovery in Directed and Labeled Networks](#)
WWW 2021, The Web Conference (AR: 20.6%)
9. P. Liu*, **A. E. Sariyüce**
[Characterizing and Utilizing the Interplay Between Core and Truss Decompositions](#)
BigData 2020, IEEE International Conference on Big Data (AR: 31.9%)
10. M. Monir*, **A. E. Sariyüce**
[Using Large Cliques for Hierarchical Dense Subgraph Discovery \(Best Paper Runner-up\)](#)
CSoNET 2020, Int. Conf. on Computational Data & Social Networks (AR: 26.5%)
11. V. Zheng⁺, **A. E. Sariyüce**, J. Zola
[Identifying Taxonomic Units in Metagenomic DNA Streams](#)
SIGKDDW 2020, Workshop on Data Mining in Bioinformatics (BIOKDD) (AR: 40%)
12. R. Laishram⁺, **A. E. Sariyüce**, T. Eliassi-Rad, A. Pinar, S. Sundarajan
[Residual Core Maximization: An Efficient Algorithm for Maximizing the Size of the k-Core](#)
SDM 2020, SIAM International Conference on Data Mining (AR: 24%)
13. S. Sanei-Mehri⁺, Y. Zhang⁺, **A. E. Sariyüce**, S. Tirthapura
[FLEET: Butterfly Estimation from a Bipartite Graph Stream](#)
CIKM 2019, ACM International Conf. on Information and Knowledge Management (AR: 19.4%)
14. P. Liu*, **A. E. Sariyüce**
[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
15. **A. E. Sariyüce**, C. Seshadhri, A. Pinar
[Local Algorithms for Hierarchical Dense Subgraph Discovery](#)
VLDB 2019, International Conference on Very Large Data Bases (AR: 18.9%)
16. M. Y. Özkaya⁺, **A. E. Sariyüce**, 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%)
17. S. Sanei-Mehri⁺, **A. E. Sariyüce**, S. Tirthapura
[Butterfly Counting in Bipartite Networks](#)
SIGKDD 2018, ACM International Conf. on Knowledge Discovery and Data Mining (AR: 18.4%)
18. R. Laishram⁺, **A. E. Sariyüce**, T. Eliassi-Rad, A. Pinar, S. Sundarajan
[Measuring and Improving the Core Resilience of Networks](#)
WWW 2018, The Web Conference (AR: 14.8%)
19. **A. E. Sariyüce**, A. Pinar
[Peeling Bipartite Networks for Dense Subgraph Discovery](#)
WSDM 2018, ACM International Conference on Web Search and Data Mining (AR: 16.1%)
20. **A. E. Sariyüce**, A. Pinar
[Fast Hierarchy Construction for Dense Subgraphs](#)
VLDB 2017, International Conference on Very Large Data Bases (AR: 17.7%)

21. G. Jacques-Silva, F. Zheng, D. Debrunner, K. Wu, V. Dogaru, E. Johnson, M. Spicer, **A. E. Saryüce**
[Consistent Regions: Guaranteed Tuple Processing in IBM Streams](#)
VLDB 2016, International Conference on Very Large Data Bases, Industrial Track (AR: 33.3%)
22. **A. E. Saryüce**, C. Seshadhri, A. Pinar, 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%)
23. **A. E. Saryüce**, 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
24. **A. E. Saryüce**, K. Kaya, E. Saule, Ü. V. Çatalyürek
[Incremental Algorithms for Closeness Centrality](#)
BigData 2013, IEEE International Conference on Big Data (AR: 37.3%)
25. **A. E. Saryüce**, E. Saule, K. Kaya, Ü. V. Çatalyürek
[STREAMER: A Distributed Framework for Incremental Closeness Centrality Computation](#)
Cluster 2013, IEEE Cluster Conference (AR: 31.2%)
26. **A. E. Saryüce**, 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%)
27. **A. E. Saryüce**, 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%)
28. **A. E. Saryüce**, K. Kaya, E. Saule, Ü. V. Çatalyürek
[Betweenness Centrality on GPUs and Heterogeneous Architectures](#)
ASPLOS 2013, Workshop on General Purpose Processing Using GPUs (GPGPU)
 ACM International Conference on Architectural Support for Programming Languages and Operating Systems (AR: 39.4%)
29. **A. E. Saryüce**, 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
30. **A. E. Saryüce**, 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%)

Under Submission

1. V. Zheng⁺, **A. E. Saryüce**, J. Zola
 Identifying Taxonomic Units in Metagenomic DNA Streams on Mobile Devices
 Submitted to TCBB

Technical Reports and Thesis

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

Talks

1. **Invited Talk, Rensselaer Polytechnic Institute (RPI)** November 2020
Temporal Network Motifs: Models, Limitations, Evaluation Online
2. **Invited Talk, JP Morgan Chase and Company** September 2020
Detecting Fraudulent Activities in Financial Transaction Networks by Network Measures Online
3. **Invited Talk, Cornell University** October 2019
Local Algorithms for Hierarchical Dense Subgraph Discovery Ithaca, NY
4. **Invited Talk, UB Applied Math Seminar** October 2019
Hierarchical Dense Subgraph Discovery: Models, Algorithms, Applications Buffalo, NY
5. **Very Large Data Bases Conference (VLDB)** August 2019
Local Algorithms for Hierarchical Dense Subgraph Discovery Los Angeles, CA
6. **Invited Talk, National Security Agency (NSA)** April 2019
Hierarchical Dense Subgraph Discovery: Models, Algorithms, Applications Hanover, MD
7. **Invited Talk, Northeastern University** Mar 2019
Hierarchical Dense Subgraph Discovery: Models, Algorithms, Applications Boston, MA
8. **SIAM Conference on Computational Science and Engineering (SIAM CSE)** Feb 2019
Local Algorithms for Hierarchical Dense Subgraph Discovery Spokane, WA
9. **Invited Talk, Middle East Technical University** Dec 2018
Hierarchical Dense Subgraph Discovery: Models, Algorithms, Applications Ankara, Turkey
10. **Invited Talk, Bilkent University** Dec 2018
Hierarchical Dense Subgraph Discovery: Models, Algorithms, Applications Ankara, Turkey
11. **Invited Talk, University of Waterloo** Nov 2018
Hierarchical Dense Subgraph Discovery: Models, Algorithms, Applications Waterloo, ON
12. **ACM SIGKDD Conference On Knowledge Discovery And Data Mining** Aug 2018
Butterfly Counting in Bipartite Networks London, UK
13. **ACM SIGMOD International Conference on Management of Data** June 2018
Fast Hierarchy Computation for Dense Subgraphs Houston, TX
14. **Invited Talk, University at Buffalo CDSE days** April 2018
Dense Subgraphs with Hierarchical Relations: Models, Algorithms, Applications Buffalo, NY
15. **Web Search and Data Mining Conference (WSDM)** Feb 2018
Peeling Bipartite Networks for Dense Subgraph Discovery Los Angeles, CA
16. **Invited Talk, INFORMS Annual Meeting** Oct 2017
Finding the Hierarchy of Dense Subgraphs Houston, TX
17. **Invited Talk, Complex Networks Seminar, University at Buffalo** Oct 2017
Finding the Hierarchy of Dense Subgraphs using Nucleus Decompositions Buffalo, NY
18. **Graph Exploitation Symposium (GraphEx), organized by MIT Lincoln Lab** May 2017
Parallel Local Algorithms for Core, Truss, and Nucleus Decompositions Lexington, MA
19. **Invited Talk, University at Buffalo** May 2017
Parallel Local Algorithms for Core, Truss, and Nucleus Decompositions Buffalo, NY
20. **SIAM Conference on Computational Science and Engineering (SIAM CSE)** Mar 2017
Finding Dense Subgraphs with Hierarchical Relations in Real-world Networks Atlanta, GA

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| 21. Invited Talk, University at Buffalo
Fast Algorithms for Mining and Processing Real-world Graphs | Feb 2017
Buffalo, NY |
| 22. SIAM Conference on Combinatorial Scientific Computing (SIAM CSC)
Fast Hierarchy Construction for Dense Subgraphs | Oct 2016
Albuquerque, NM |
| 23. Dean Seminar, Sandia National Laboratories
Finding Dense Subgraphs and Hierarchy Construction: Models and Algorithms | Aug 2016
Livermore, CA |
| 24. Workshop on Algorithms for Modern Massive Data Sets (MMDS)
Fast Hierarchy Construction for Dense Subgraphs | Jun 2016
Berkeley, CA |
| 25. Graph Exploitation Symposium (GraphEx), organized by MIT Lincoln Lab
Fast Algorithms for Finding Dense Subgraphs with Hierarchy | May 2016
Lexington, MA |
| 26. Invited talk, Sandia National Laboratories
Fast and High Quality Dense Subgraph Discovery Algorithms | Jan 2015
Albuquerque, NM |
| 27. Internship talk, Sandia National Laboratories
Finding the Hierarchy of Dense Subgraphs using Nucleus Decompositions | Aug 2014
Livermore, CA |
| 28. IEEE Cluster Conference
STREAMER: A Distributed Framework for Incremental Closeness Cent. Comp. | Sep 2013
Indianapolis, IN |
| 29. SIAM Data Mining Conference (SDM)
Shattering and Compressing Networks for Betweenness Centrality | May 2013
Austin, TX |
| 30. Workshop on General Purpose Processing Using GPUs (GPGPU)
Betweenness Centrality on GPUs and Heterogeneous Architectures | Mar 2013
Houston, TX |
| 31. Invited talk, Bilkent University Computer Engineering Department
Streaming Algorithms for k-core Decomposition | Nov 2012
Ankara, Turkey |
| 32. Internship talk, IBM T.J. Watson Researcher Center
Streaming Algorithms for k-core Decomposition | Sep 2012
Hawthorne, NY |
| 33. SIAM Conference on Parallel Processing for Scientific Computing (SIAM PP)
Considerations on Parallel Graph Coloring Algorithms | Feb 2012
Savannah, GA |

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

- Qinran Wang*
- Jing Jing 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

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

Reviewer

- 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 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
 - Vicky Zheng (advised by Jaroslaw Zola), 7/9/21
- Graduate Admissions Committee, 2017 - Present
- Graduate Studies Committee, 2017 - Present
- Colloquium Committee, 2017 - Present