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Nesreen K. Ahmed

Curriculum Vitae

Research Interests

My research lies in the field of large-scale machine learning with an emphasis on theory, algorithms, and applications of statistical machine learning, representation learning, graph theory, big data, statistical sampling and inference, anomaly detection, massive streaming data, and time-series prediction.

Education

2008–2015 **Ph.D. in Computer Science**, Purdue University, USA.
Thesis Title: Scaling Up Network Analysis and Mining: Statistical Sampling, Estimation, and Pattern Discovery – GPA 3.8/4.0
Thesis Advisor: Jennifer Neville (Prof. of Computer Science & Statistics)

2012–2014 **M.Sc. in Statistics & Computer Science**, Purdue University, USA.

2003–2006 **M.Sc. in Information Technology**, Cairo University, Egypt.
Thesis Title: A Proposed Intrusion Detection System for Encrypted Computer Networks

1997–2001 **B.Sc. in Information Technology**, Cairo University, Egypt.
Distinction with Honors - Ranked 2nd in my class
Thesis Title: Arabic Speech Recognition using Hidden Markov Models

Experience

2015–Present **Senior Staff Research Scientist - Machine Learning**, Intel Research Labs.
- Working on machine learning and deep learning algorithms/systems for massive graph data with applications in streaming data (sensor/IoT), user modeling, and analytics
- Leading large-scale ML projects in Intel/DARPA HIVE collaboration, successfully awarded funding of over $80 million
- Leading several projects at Intel AI Research on graph neural networks and relational reinforcement learning

2015 **Researcher**, Technicolor Research & Innovation Labs, CA.
- Designed methods for user cohort analysis, recommendation techniques for online movie recommendation systems, and IoT.

2008–2015 **Ph.D. Candidate/Research Assistant**, Purdue University, USA.
- Research Focus: Large-scale Graph Mining and Relational Machine Learning
- Designed fast, efficient, and parallel algorithms for mining/modeling large graphs
- Writing conference/journal papers, proposals, and mentoring junior students
- Advisor: Jennifer Neville, Network Learning and Discovery Lab

Summer 2014 **Data Science Research Intern**, Facebook Inc..
- Research Focus: Prediction and Analysis of User Activity and Time Spent in Social Networks
- Designed software pipelines for the analysis and prediction of user activity on Facebook
- Designed software pipelines for mining the Facebook traffic

Summer 2013 **Data Science Research Intern**, Intel, Data Analytics.
- Research Focus: Web Usage Classification using Machine Learning and Text Mining Techniques
- Designed machine learning methods to predict the topic of webpages with partially-observable data

Summer 2012 **Analytics Research Intern**, Adobe, Research Labs.
- Research Focus: Mining Semi-Structured Social Media
- Designed a novel system and method for mining semi-structured social media
- Designed predictive tools for the analysis of observed marketing activities
- Filed two patents with Adobe labs

2005–2008 **Research Assistant**, Data Mining & Computer Modeling Center of Excellence, Egypt.
- Research Fellowship from the United Nations Development Program
- Research Focus: Feature Extraction and Machine Learning Methods for Time-series Prediction
- Application to tourism demand prediction
- Published two journal papers
- Developed machine learning methods for time-series prediction with application to tourism demand prediction were ranked the 5th in the NN3 forecasting competition

2001–2008 **Assistant Lecturer**, Cairo University, Information Technology.
- Lecturing, grading, and mentoring undergraduate students
- Prepared homework/labs/projects for undergraduate courses
- Prepared online learning course materials for fuzzy logic and neural networks
- Teaching courses: pattern recognition, machine learning, network security, and neural networks

2006–2008 **Cisco Certified Instructor**, CCNA Networking Academy Program, Cairo University.
- Prepared summer training classes to teach students practical skills to build and manage networks

Spring 2008 **Visiting Lecturer**, German University in Cairo, College of Media Engineering & Technology.
- Invited to teach media and networks lab
- Teaching students practical skills to configure IP networks, analyze network traffic, and applications

Honors & Awards

2020 Senior member, Institute of Electrical and Electronics Engineers (IEEE)

2020 Intel Labs Recognition Award for Outstanding Contributions

2020 Intel Labs Recognition Inventor Award

2019 Intel Labs Recognition Award for Outstanding Contributions

2019 Keynote at the SIGKDD Workshop on on Offline and Online Evaluation of Interactive Systems

2018 Keynote Speaker at the IEEE International Parallel and Distributed Processing Symposium (IPDPS) - GraML Workshop

2018 Nominated for ACM Practitioners Board.

2018 Invited Speaker at the Southern Data Science Conference

2018 Invited Circle Leader, Intel Corp., Pay it forward program for diversity and inclusion

2017 Finalists in the IEEE/Amazon/DARPA Graph Challenge for High-performance Graph Analytics, IEEE High Performance Extreme Computing Conference

2016 Most Liked & Viewed Paper, IEEE conference on Big Data

2016 Intel recognition for making Intel a great place to work

2015 Best Paper Candidate, IEEE conference on data mining (ICDM)

2015 Travel award to attend CRA-W women career workshop, from the Computing Research Association for Women

2014 Rising Stars Award from the University of California Berkeley — Awarded to top female Ph.D. candidates & postdocs in electrical engineering and computer science

2013 Paper on business analytics of daily deals and social media, featured by **MIT Technology Review**

2008–2015 Research Assistantship, Purdue University, Dept. of Computer Science

2005–2008 Research fellowship from the United Nations Development Program (UNDP) — Awarded to top graduate students, Egypt

2008 Egypt excellence fellowship for Ph.D

1997–2001 Cairo University fellowship, Awarded to outstanding undergraduate students

2013 Intel Ph.D. fellowship nomination by Purdue University for big data analytics

2012 Best Paper Runner-Up Award, Workshop on big data, streams and source mining (Bigmine)

2001 Ranked 2nd, Faculty of Computers & Information, Cairo University

2007 Ranked 5th (time-series prediction), The Artificial Neural Network & Computational Intelligence Forecasting Competition (NN3), organized by SAS and International Institute of Forecasters

2012 Travel award for the women in machine learning workshop, from Women in Machine Learning Organization & Purdue University

2011 Travel award for Grace Hopper celebration of women in computing, from Purdue University

2010 Travel award, SIGKDD conference on knowledge discovery and data mining

Book Chapters

B1 Ryan A. Rossi, Nesreen K. Ahmed. *Role Discovery*, **Invited Chapter**, (to appear) In Social Media Analytics: Advances and Applications, Eds. Jiliang Tang and Charu Aggarwal, CRC Press, 2018.

Journal Publications

J18 Nesreen K. Ahmed, Nick Duffield, Ryan Rossi. *Online Sampling of Temporal Networks*, (to appear) ACM Transactions on Knowledge Discovery from Data (TKDD), 2020.

J17 Nesreen K. Ahmed, Ryan Rossi, John Boaz Lee, Ted Willke, Rong Zhou, Xiangnan Kong, Hoda Eldardiry. *Role-based Graph Embeddings*, IEEE Transactions on Knowledge and Data Engineering (TKDE), 2020.

J16 Giovanni Petri, Sebastian Musslick, Kayhan Ozcimder, Biswadip Dey, David Turner, Nesreen K. Ahmed, Ted Willke, Jonathan D Cohen. *Topological limits to parallel processing capability of network architectures*, Accepted with Minor Revision, Nature Physics 2020.

J15 Guixiang Ma, Nesreen K. Ahmed, Ted Willke, Philip Yu. *Deep Graph Similarity Learning: A Survey*, Data Mining and Knowledge Discovery Journal (DAMI), 2020.

J14 John Boaz Lee, Giang Nguyen, Ryan A Rossi, Nesreen K Ahmed, Eunyee Koh, Sungchul Kim. *Dynamic Node Embeddings From Edge Streams*, IEEE Transactions on Emerging Topics in Computational Intelligence (TETCI), 2020.

J13 Ryan A. Rossi, Nesreen K. Ahmed, Aldo Carranza, David Arbour, Anup Rao, Sungchul Kim, Eunyee Koh. *Heterogeneous Graphlets*, ACM Transactions on Knowledge Discovery from Data (TKDD), 2020.

J12 Ryan A Rossi, Di Jin, Sungchul Kim, Nesreen K. Ahmed, Danai Koutra, John Boaz Lee. *On Proximity and Structural Role-based Embeddings in Networks: Misconceptions, Techniques, and Applications*, ACM Transactions on Knowledge Discovery from Data (TKDD), 2020.

J11 John Boaz Lee, Ryan A Rossi, Sungchul Kim, Nesreen K. Ahmed, Eunyee Koh. *Attention Models in Graphs: A Survey*, ACM Transactions on Knowledge Discovery from Data (TKDD), 2019.

J10 Ryan A. Rossi, Rong Zhou, Nesreen K. Ahmed. *Estimation of Graphlets in Massive Networks*, IEEE Transactions on Neural Networks and Learning Systems (TNNLS), 2019.

J9 Ryan Rossi, Rong Zhou, Nesreen K. Ahmed. *Deep Inductive Graph Representation Learning*, IEEE Transactions on Knowledge and Data Engineering (TKDE), 2018.

J8 Ryan Rossi, Nesreen K. Ahmed, Rong Zhou, Hoda Eldardiry. *Interactive Visual Graph Mining and Learning*, ACM Transactions on Intelligent Systems and Technology (TIST), 2018.

J7 Nesreen K. Ahmed, Jennifer Neville, Ryan Rossi, Nick Duffield, Ted Willke. *Graphlet Decomposition: Framework, Algorithms, and Applications*, Journal of Knowledge and Information Systems (KAIS), **Invited paper**, Special Issue on Best Papers of ICDM, 2017.

J6 Ryan Rossi, Nesreen K. Ahmed. *An Interactive Data Repository with Visual Analytics*, SIGKDD Explorations on Knowledge Discovery and Data Mining, ACM SIGKDD Explorations, Vol 17, No 2, 2015.

J5 Ryan A. Rossi, Nesreen K. Ahmed. *Role Discovery in Networks*, IEEE Transactions on Knowledge and Data Engineering (TKDE), pp.1–20, 2015.

J4 Nesreen K. Ahmed, Jennifer Neville, Ramana Kompella. *Network Sampling: From Static to Streaming Graphs*, ACM Transactions on Knowledge Discovery from Data (TKDD), Vol 8, No 2-7, pp.1–56, 2014.

J3 Ryan A. Rossi, Nesreen K. Ahmed. *Coloring Large Complex Networks*, Social Network Analysis and Mining, Vol 4, No 1-228, Springer, pp.1–37, 2014.

J2 Nesreen K. Ahmed, Amir Atiya, Neamat ElGayar, Hisham El-Shishiny. *An Empirical Comparison of Machine Learning Models for Timeseries Forecasting*, Econometric Reviews, Taylor and Francis Journals, Vol 29, No 5-6, Special Issue on "The Link between Statistical Learning Theory and Econometrics: Applications in Economics, Finance, and Marketing", pp.1–27, 2010.

J1 Nesreen K. Ahmed, Amir Atiya, Neamat ElGayar, Hisham El-Shishiny. *Tourism Demand Forecasting Using Machine Learning Methods*, International Journal on Artificial Intelligence and Machine Learning (AIML), Special Issue on Computational Methods for the Tourism Industry, pp.1–7, 2007.

Conference/Workshop Publications (Peer-reviewed)

C46 Nesreen K. Ahmed, Nick Duffield. *Adaptive Shrinkage Estimation for Streaming Graphs*, Advances in Neural Information Processing Systems, NeurIPS 2020.

C45 Aaron Zweig, Nesreen K. Ahmed, Ted Willke, Guixiang Ma. *Neural Algorithms for Graph Navigation*, NeurIPS Workshop on Learning Meets Combinatorial Algorithms, NeurIPS-LMCA 2020.

C44 Jiong Zhu, Ryan A. Rossi, Anup Rao, Tung Mai, Nedim Lipka, Nesreen K. Ahmed, Danai Koutra. *Graph Neural Network with Heterophily*, Proceedings of the Thirty-Fifth AAAI Conference on Artificial Intelligence, AAAI 2021.

C43 Nesreen K. Ahmed, Richard Alo, Catherine Amelink, Young Yun Baek, Aashish Chudhary, Kristy Collins, Albert Esterline, Edward Fox, Geoffrey Fox, Aric Hagberg, Ron Kenyon, Chris J. Kuhlman, Jure Leskovec, Dustin Machi, Madhav V. Marathe, Nataragan Meghanathan, Yasuo Miyasaki, Judy Qiu, Naren Ramakrishnan, S. S. Ravi, Ryan Rossi, Roc Sosic, Gregor von Laszewski. *net.science: A Cyberinfrastructure for Sustained Innovation in Network Science and Engineering*, Gateways Conference, 2020

C42 Ryan Rossi, Nesreen K. Ahmed, Eunyee Koh. *A structural graph representation learning framework*, In Proceedings of the 27th International Conference on Web Search and Data Mining, WSDM 2020, Texas.

C41 John Boaz Lee, Xiangnan Kong, Constance Moore, Nesreen K. Ahmed. *Deep Parametric Model for Discovering Group-cohesive Functional Brain Regions*, Proceedings of the SIAM International Conference on Data Mining, SDM 2020, Ohio.

C40 Ryan Rossi, Somdeb Sarkhel, David Arbor, Nesreen K. Ahmed. *Inferring Individual Level Causal Models from Graph-based Relational Time Series*, In Statistical Relational AI (StarAI), AAAI 2020, New York.

C39 Ameer Haj-Ali, Nesreen K. Ahmed, Ted Willke, Sophia Shao, Krste Asanovic, Ion Stoica. *NeuroVectorizer: End-to-End Vectorization with Deep Reinforcement Learning*, In Proceedings of the International Symposium on Code Generation and Optimization (CGO), San Diego, California 2020.

C38 Ryan A. Rossi, Nesreen K. Ahmed, Eunyee Koh, Sungchul Kim, *Fast Hierarchical Graph Clustering in Linear-Time*, In Proceedings of The Web Conference, WWW 2020.

C37 Ryan A. Rossi, Anup Rao, Sungchul Kim, Eunyee Koh, Nesreen K. Ahmed, *From Closing Triangles to Closing Higher-Order Motifs*, In Proceedings of The Web Conference, WWW 2020.

C36 Ryan A. Rossi, Anup Rao, Tung Mai, Nesreen K. Ahmed, *Fast and Accurate Estimation of Typed Graphlets*, In Proceedings of The Web Conference, WWW 2020.

C35 Ameer Haj-Ali, Nesreen K. Ahmed, Ted Willke, Sophia Shao, Krste Asanovic, Ion Stoica. *End-to-End Vectorization with Deep Reinforcement Learning*, In Proceedings of the Compiler, Architecture, and Tools Conference (CATC), Israel 2019.

C34 Ameer Haj-Ali, Nesreen K. Ahmed, Ted Willke, Sophia Shao, Krste Asanovic, Ion Stoica. *Learning to Vectorize Using Deep Reinforcement Learning*, In NeurIPS Workshop on ML for Systems, Vancouver 2019.

C33 Guixiang Ma, Nesreen K. Ahmed, Ted Willke, Dipanjan Sengupta, Michael Cole, Nicholas Turk-Browne, Philip S. Yu. *Deep Graph Similarity Learning for Brain Data Analysis*, In Proceedings of the 26th ACM International Conference on Information and Knowledge Management (CIKM), Beijing 2019.

C32 Nesreen K. Ahmed, Ryan Rossi, John Boaz Lee, Ted Willke, Rong Zhou, Xiangnan Kong, Hoda Eldardiry. *role2vec: Role-based Network Embeddings*, SIGKDD Workshop on Deep Learning on Graphs, (DLG), 2019.

C31 Ryan A. Rossi, Nesreen K. Ahmed, Aldo Carranza, David Arbour, Anup Rao, Sungchul Kim, Eunyee Koh. *Heterogeneous Graphlets*, In Proceedings of the 15th Workshop on Mining and Learning with Graphs, MLG, held with KDD, 2019.

C30 Nesreen K. Ahmed, Nick Duffield, Liangzhen Xia. *Sampling for Approximate Bipartite Network Projection*, In Proceedings of the 27th International Joint Conference on Artificial Intelligence, IJCAI 2018.

C29 Ryan Rossi, Nesreen K. Ahmed, Eunyee Koh. *Interactive Higher-order Network Mining*, (Demo Paper) In Proceedings of the IEEE Conference on Data Mining, ICDM 2018.

C28 Ryan Rossi, Nesreen K. Ahmed, Rong Zhou, and Hoda Eldardiry. *Relational Similarity Machines (RSM): A Similarity-based Learning Framework for Graphs*, In Proceedings of the 2018 IEEE Big Data Conference, 2018, Seattle.

C27 Giang Nguyen, John Lee, Ryan Rossi, Nesreen K. Ahmed, Eunyee Koh, Sungchul Kim. *Dynamic Network Embeddings: From Random Walks to Temporal Random Walks*, In Proceedings of the 2018 IEEE Big Data Conference, 2018, Seattle.

C26 Nesreen K. Ahmed, Ryan Rossi, John Boaz Lee, Ted Willke, Rong Zhou, Xiangnan Kong, Hoda Eldardiry. *Learning Role-based Graph Embeddings*, In Proceedings of the 8th International ICML Workshop on Statistical Relational AI, StarAI 2018.

C25 Ryan Rossi, Nesreen K. Ahmed, Eunyee Koh. *HONE: Higher-Order Network Embeddings*, In Proceedings of the 27th International Conference on World Wide Web Companion, WWW 2018, France.

C24 Ryan Rossi, Nesreen K. Ahmed, Hoda Eldardiry, Rong Zhou. *Similarity-based Multi-label Learning*, In Proceedings of the International Joint Conference on Neural Networks, IJCNN 2018, Brazil.

C23 Ryan Rossi, Rong Zhou, Nesreen K. Ahmed. *Deep Inductive Network Representation Learning*, In Proceedings of the 3rd International Workshop on Learning Representations for Big Networks, WWW-BigNet 2018, France.

C22 Giang Nguyen, John Lee, Ryan Rossi, Nesreen K. Ahmed, Eunyee Koh, Sungchul Kim. *Continuous-Time Dynamic Network Embeddings*, In Proceedings of the 3rd International Workshop on Learning Representations for Big Networks, WWW-BigNet 2018, France.

C21 Nesreen K. Ahmed, Nick Duffield, Ted Willke, Ryan Rossi. *On Sampling from Massive Graph Streams*, In Proceeding of the 43rd International Conference on Very Large Databases, VLDB 2017, Germany.

C20 Vachik Dave, Nesreen K. Ahmed, Mohammad Al Hasan. *E-CLoG: Counting Edge-Centric Local Graphlets*, In Proceedings of the IEEE International Conference on Big Data, Boston, MA, 2017.

C19 Nesreen K. Ahmed, Ryan Rossi, Ted Willke, Rong Zhou. *Edge Role Discovery via Higher-order Structures*, In Proceedings of the Pacific-Asia Conference on Knowledge Discovery and Data Mining, PAKDD, Jeju, South Korea, 2017.

C18 Nesreen K. Ahmed, Ryan Rossi, Ted Willke, Rong Zhou. *A Higher-order Latent Space Network Model*, In Proceedings of AAAI Conference on Artificial Intelligence, AAAI-PAIR Workshop, San Francisco, 2017.

C17 Ancy Tom, Narayanan Sundaram, Nesreen K. Ahmed, Shaden Smith, Stijn Eyerman, Midhunchandra Kodiyath, Ibrahim Hur, Fabrizio Petrini, George Karypis. *Exploring Optimizations on Shared-memory Platforms for Parallel Triangle Counting Algorithms*, In Proceedings of IEEE HPEC, 2017.**Finalist in IEEE/DARPA/Amazon Graph Challenge**

C16 Shaden Smith, Xing Liu, Nesreen K. Ahmed, Ancy Tom, Fabrizio Petrini, George Karypis. *Truss Decomposition on Shared-Memory Parallel Systems*, In Proceedings of IEEE HPEC, 2017.**Finalist in IEEE/DARPA/Amazon Graph Challenge**

C15 Nick Duffield, Yunhong Xu, Linagzhen Xia, Nesreen K. Ahmed, Minlan Yu. *Stream Aggregation Through Order Sampling*, In Proceedings of the 26th ACM International Conference on Information and Knowledge Management (CIKM), 2017.

C14 Kayhan Ozcimder, Biswadip Dey, Sebastian Musslick, Giovanni Petri, Nesreen K. Ahmed, Theodore L Willke, Jonathan D Cohen. *A Formal Approach to Modeling the Cost of Cognitive Control*, In Proceedings of the 39th Annual Meeting of the Cognitive Science Society, CogSci, 2017.

C13 Nesreen K. Ahmed, Ted Willke, Ryan Rossi. *Estimation of Local Subgraph Counts*, In Proceedings of the IEEE International Conference on Big Data, Washington D.C., 2016. **Most Liked/Viewed Paper**

C12 Nesreen K. Ahmed, Ted Willke, Ryan Rossi. *Exact and Estimation of Local Edge-centric Graphlet Counts*, In Proceedings of the 5th International Workshop on Big Data, Streams and Heterogeneous Source Mining, Bigmine, held with KDD, San Francisco, CA, 2016.

C11 Ryan A. Rossi, Rong Zhou, Nesreen K. Ahmed. *Relational Similarity Machines* , In Proceedings of the 12th Workshop on Mining and Learning with Graphs, MLG, held with KDD, San Francisco, CA, 2016.

C10 Nesreen K. Ahmed, Jennifer Neville, Ryan Rossi, Nick Duffield. *Efficient Graphlet Counting for Large Networks*, In Proceedings of the IEEE International Conference on Data Mining, ICDM, New Jersey, 2015 **Best Paper Candidate**

C9 Nesreen K. Ahmed, Ryan A. Rossi. *Interactive Visual Graph Analytics on the Web*, In Proceedings of the 9th International AAAI Conference on Web and Social Media, ICWSM, UK, 2015.

C8 Ryan A. Rossi, Nesreen K. Ahmed. *The Network Data Repository with Interactive Graph Analytics and Visualization*, In Proceedings of the 29th AAAI Conference on Artificial Intelligence, Demo paper, AAAI, Texas, 2015. **Featured by Kdnuggets.com**

C7 Nesreen K. Ahmed, Nick Duffield, Jennifer Neville, Ramana Kompella. *Graph Sample and Hold: A Framework for Big-Graph Analytics*, In Proceedings of the 20th SIGKDD Conference on Knowledge Discovery and Data Mining, KDD, New York, 2014.

C6 Nesreen K. Ahmed, Jennifer Neville, Ramana Kompella. *Network Sampling Designs for Relational Classification*, In Proceedings of the 6th International AAAI Conference on Weblogs and Social Media, ICWSM, Ireland, 2012.

C5 Ayman Farahat, Nesreen K. Ahmed, Utpal Dholakia. *Does a Daily Deal Signal a Distressed Business? An Empirical Investigation of Small Business Survival*, In Proceedings of the Workshop on the Economics of Web Search and Social Networks, WSDM, Italy, 2013. **Featured by MIT Technology Review**

C4 Nesreen K. Ahmed, Jennifer Neville, Ramana Kompella. *Space-Efficient Sampling From Social Activity Streams*, In Proceedings of the 1st International Workshop on Big Data, Streams and Heterogeneous Source Mining, Bigmine, held with KDD, China, 2012. **Best Paper Runner-Up**

C3 Nesreen K. Ahmed, Jennifer Neville, Ramana Kompella. *Reconsidering the Foundations of Network Sampling*, In Proceedings of the 2nd Workshop on Information in Networks, WIN, NewYork, 2010.

C2 Nesreen K. Ahmed, Jennifer Neville, Ramana Kompella. *Time-Based Sampling of Social Network Activity Graphs*, In Proceedings of the 8th Workshop on Mining and Learning with Graphs, MLG, held with KDD, Washington D.C., 2010.

C1 Nesreen K. Ahmed, Nabil Hamdy, Sanaa El-Ola Ahmed. *A Proposed Intrusion Detection System for Encrypted Computer Networks*, In Proceeding of the 3rd International Conference on Informatics and Systems, INFOS, Cairo, 2005.

Preprints (manuscripts in preparation, under review)

P10 Aaron Zweig, Nesreen K. Ahmed, Ted Willke, Guixiang Ma. *Memory-Augmented Reinforcement Learning for Efficient Graph Navigation*, Submitted, 2020.

P9 Sriram Aananthakrishnan, Nesreen K. Ahmed, Vincent Cave, Marcelo Cintra, Yigit Demir, Kristof Du Bois, Stijn Eyerman, Joshua B. Fryman, Ivan Ganev, Wim Heirman, Hans-Christian Hoppe, Jason Howard, Ibrahim Hur, Midhun Chandra Kodiyath, Samkit Jain, Daniel S. Klowden, Marek Landowski, Laurent Montigny, Ankit More, Przemyslaw Ossowski, Robert Pawlowski, Nick Pepperling, Fabrizio Petrini, Mariusz Sikora, Balasubramanian Seshasayee, Shaden Smith, Sanjaya Tayal, Jesmin Jahan Tithi, Yves Vandriessche, Izajasz P. Wrosz. *PIUMA: Programmable Unified Memory Architecture*, Submitted, 2020.

P8 Ameer Haj-Ali, Nesreen K Ahmed, Ted Willke, Joseph E Gonzalez, Krste Asanovic, Ion Stoica. *A View on Deep Reinforcement Learning in System Optimization*, Preprint, arXiv:1908.01275

P7 Nesreen K. Ahmed, Nick Duffield, Ryan Rossi. *Temporal Network Sampling*, Preprint, arXiv:1910.08657, 2019.

P6 Nesreen K. Ahmed, Nick Duffield. *Network Shrinkage Estimation*, Preprint, arXiv:1908.01087, 2019.

P5 Giovanni Petri, Sebastian Musslick, Kayhan Ozcimder, Biswadip Dey, Nesreen K. Ahmed, Ted Willke, Jonathan D Cohen. *Topological Limits to Parallel Computation Capability of Neural Systems*, Submitted, 2019.

P4 Nesreen K. Ahmed, Ryan A. Rossi, Ted Willke, Rong Zhou. *Revisiting Role Discovery in Networks: From Node to Edge Roles*, Preprint, arxiv.org/abs/1610.00844, 2016.

P3 Ryan A. Rossi, Nesreen K. Ahmed. *NetworkRepository: A Graph Data Repository with Visual Interactive Analytics*, arXiv:1410.3560, 2014.

P2 Nesreen K. Ahmed, Ryan A. Rossi. *A Web-based Interactive Visual Graph Analytics Platform*, arXiv:1410.3560, 2014.

P1 Nesreen K. Ahmed, Chris Cole, Jennifer Neville. *Learning the Latent State Space of Time-Varying Graphs*, arXiv:1403.3707, 2014.

Technical Reports

T2 Nesreen K. Ahmed, Jennifer Neville, Ramana Kompella. *Network Sampling via Edge-based Node Selection with Graph Induction*, Technical Report TR-11-016, Dept of Computer Science, Purdue University, 2011.

T1 Nesreen K. Ahmed, Amir Atiya, Neamat ElGayar, Hisham El-Shishiny. *A Combined Neural Network/Gaussian Process Regression Timeseries Forecasting System for the NN3 Competition*, The Artificial Neural Network and Computational Intelligence Competition, NN3, 2007.

Peer-Reviewed Extended Abstracts

A8 Nesreen K. Ahmed. *Representation Learning in Large Attributed and Dynamic Graphs*, SIAM Conference on Computational Science and Engineering, (CSE 2019).

A7 Guixiang Ma, Nesreen K. Ahmed, Ted Willke, Dipanjan Sengupta, Michael Cole, Nicholas Turk-Browne, Philip Yu. *Metric Learning for Brain Connectivity Networks*, at the Women in Machine Learning Workshop at NIPS, (WiML 2018).

A6 Nesreen K. Ahmed, Ryan A. Rossi, Rong Zhou, John Boaz Lee, Xiangnan Kong, Theodore L. Willke, Hoda Eldardiry. *Representation Learning in Large Attributed Graphs*, at the Women in Machine Learning Workshop at NIPS, (WiML 2017).

A5 James P. Canning, Emma E. Ingram, Sammantha Nowak-Wolff, Adriana M. Ortiz, Nesreen K. Ahmed, Ryan A. Rossi, Karl R. B. Schmitt, and Sucheta Soundarajan. *Network Classification and Categorization*, at the International Conference on Complex Network, (CompleNet 2018).

A4 Giovanni Petri, Sebastian Musslick, Kayhan Ozcimder, Biswadip Dey, Nesreen K. Ahmed, Jonathan D Cohen. *Diminishing returns with size for parallel computation capacity of neural architectures*, at the International School and Conference on Network Science, Netsci, 2017.

A3 Giovanni Petri, Sebastian Musslick, Kayhan Ozcimder, Biswadip Dey, Nesreen K. Ahmed, Jonathan D Cohen. *Universal limits to parallel processing capability of neural systems*, at the Conference on Complex Systems 2017, CCS, 2017.

A2 Nesreen K. Ahmed, Jennifer Neville, Ramana Kompella. *Network Sampling Designs for Relational Classification*, at the Women in Machine Learning Workshop, WiML 2012.

A1 Nesreen K. Ahmed, Jennifer Neville, Ramana Kompella. *A Novel Approach for Network Sampling*, at the Grace Hopper Celebration of Women in Computing, GHC 2011.

Patents

1. Nesreen K. Ahmed, Dipanjan Sengupta, Todd Anderson, Ted Willke. *Similarity Search using Guided Reinforcement Learning*, Intel Corporation, Filed 2020.
2. Guixiang Ma, Nicole Beckage, Nesreen K. Ahmed, Ignacio Alvarez. *Technology to Apply Driving Norms for Automated Vehicle Behavior Prediction*, Intel Corporation, Filed 2020.
3. Mariano Tepper, Bryn Keller, Mihai Capota, Vy Vo, Nesreen K. Ahmed, Ted Willke. *System for Analyzing and Enhancing Software based on Graph Attention Networks*, Intel Corporation, Filed 2020.
4. Ayman Farahat, Nesreen K. Ahmed. *Mining Semi-Structured Social Media*, Adobe Systems, US Patent No. US9002852 B2, Granted 2015.
5. Ayman Farahat, Nesreen K. Ahmed. *Predictive Tool Utilizing Correlations With Unmeasured Factors Influencing Observed Marketing Activities*, Adobe Systems, US Patent App. 13/678,149, Published 2014.

Tutorials

1. Mohamed Al Hasan, Nesreen K. Ahmed, and Jennifer Neville. *Methods and Applications of Network Sampling*, SIAM International Conference on Data Mining (SDM), 2015.

2. Mohamed Al Hasan, Nesreen K. Ahmed, and Jennifer Neville. *Network Sampling:Methods and Applications*, ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD), 2013.
3. Mohamed Al Hasan, Nesreen K. Ahmed, and Jennifer Neville. *Methods and Applications of Network Sampling*, IEEE International Conference on Data Mining (ICDM), 2013.

Invited Talks

2019 Keynote at the SIGKDD Workshop on on Offline and Online Evaluation of Interactive Systems, Anchorage, Alaska

2019 Distinguished Speaker at Pacific Northwest National Laboratory, Washington

2019 SIAM Conference on Computational Science and Engineering *Representation Learning in Large Attributed and Dynamic Graphs*, Spokane, Washington

2019 Invited Judge/Mentor, the first Open Network Science Hackathon, Burlington VT.

2018 Dagstuhl Schloss, Dagstuhl Seminar on *High-Performance Graph Algorithms*, Wadern, Germany

2018 GraML 2018: Workshop on the Intersection of Graph Algorithms and Machine Learning, at the IEEE International Parallel and Distributed Processing Symposium (IPDPS), Vancouver, Canada

2018 The Southern Data Science Conference, Atlanta, GA

2017 Women in Machine Learning Workshop at NIPS 2017, *Representation Learning in Large Attributed Graphs*, Long Beach, CA

2016 UC Berkeley, Dept. of Statistics, *Fast Graphlet Decomposition: Theory, Algorithms, and Applications*, Workshop on Algorithms for Modern Massive Data Sets (MMDS), CA

2016 Princeton University, Neuroscience Institute, *Mining and Learning with Graphs*, NJ

2016 Intel Analytics Summit, *Statistical Sampling Methods for Big Graph Analytics*, CA

2015 IEEE conference on Data Mining (ICDM), *Efficient Graphlet Counting from Large Networks*, Atlantic City, NJ

2015 Intel Labs, *Large-scale Network Analysis and Graph Mining*, Santa Clara, CA

2015 Stanford University, *Large-scale Network Analysis*, Stanford, CA

2015 Vanderbilt University, EECS Colloquium, *Large-scale Network Analysis and Graph Mining*, Nashville, TN

2015 College of William & Mary, CS Colloquium, *Large-scale Network Analysis and Graph Mining*, Williamsburg, VA

2015 University of Miami, CS Colloquium, *Large-scale Network Analysis and Graph Mining*, FL

2015 NEC Labs, *Large-scale Network Analysis and Graph Mining*, Princeton, NJ

2015 Technicolor R&I Labs, *Large-scale Network Analysis and Graph Mining*, Los Altos, CA

2015 SIAM conference on Data Mining (SDM), *Methods and Applications of Network Sampling*, (Tutorial), Vancouver, British Columbia

2014 SIGKDD Conference on Knowledge Discovery and Data Mining, *Graph Sample and Hold: A Framework for Big Graph Analytics*, NewYork, NY

2014 Facebook Data Science, *Graph Sample and Hold: A Framework for Big Graph Analytics*, (Invited Talk), Menlo Park, CA

2014 Facebook Data Science, *Prediction and Analysis of User Activity and Time Spent in Social Networks*, (Invited Talk), Menlo Park, CA

2014 Yahoo! Labs, *Mining Large Graphs: Sampling, Estimation, and Role Discovery*, CA

2014 Rising Stars Workshop, UC Berkeley, *Graph Analytics in the Age of Big Data*, Berkeley, CA

2013 SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), *Network Sampling: Methods and Applications*, (Tutorial), Chicago, IL

2013 IEEE conference on Data Mining (ICDM), *Methods and Applications of Network Sampling*, (Tutorial), Dallas, TX

2013 Sony, *Web Usage Classification of Web-Connected Devices*, San Jose, CA

2013 Intel, Data Analytics, *Web Usage Classification of Web-Connected Devices*, Folsom, CA

2013 Purdue CS 50th Anniversary Celebration, *Network Sampling: From Static to Streaming Graphs*, West Lafayette, IN

2012 The 6th AAAI Conference on Weblogs and Social Media (ICWSM), *Network Sampling Designs for Relational Classification*, (Poster), Dublin, Ireland

2012 Women in Machine Learning Workshop, *Network Sampling Designs for Relational Classification*, (Poster), Lake Tahoe, NV

2012 The 1st Workshop on Big Data, Streams, and Heterogeneous Source Mining (Bigmine), *Space-Efficient Sampling from Social Activity Streams*, China

2012 Adobe Advanced Technoloy Labs, *Quantifying Social Media Impacts: from Analysis to Attribution*, San Jose, CA

2012 Adobe Labs, *Business Survival in the Age of Social Media*, San Jose, CA

2011 Grace Hopper Celebration of Women in Computing (GHC), *A Novel Approach for Network Sampling*, (Poster), Portland, OR

2011 Machine Learning Seminar at Purdue, *Reconsidering the Foundations of Network Sampling*, West Lafayette, IN

2011 Machine Learning Summer School at Purdue, *Network Sampling*, West Lafayette, IN

2010 The 8th Workshop on Mining and Learning with Graphs (MLG), *Time-Based Sampling of Social Network Activity Graphs*, Washington D.C.

2005 The 3rd International Conference on Informatics and Systems (INFOS), *A Proposed Intrusion Detection System for Encrypted Computer Networks*, Cairo

Open Source Software, Tools, and Data

- Parallel Parameterized Graphlet Decomposition Library (PGD)
  - Open source library for massive graph decomposition
  - Github Source, graphlets.org
- Network Data Repository
  - The first and largest network data repository with interactive analytics and visualization
  - 500+ publicly available network data sets at Network Repository
  - Tool for graph query and search
  - Tool for synthetic graph generation and visualization (GraphVis)

Research Grants

2016-2019 Intel Labs, *Approximation Methods for Massive Graph Analytics*, Total: $30,000, PI and Research Lead: Nesreen Ahmed.

2018-2023 NSF, *Collaborative Research: Framework: Software: CINES: A Scalable Cyberinfrastructure for Sustained Innovation in Network Engineering and Science*, PIs: Jure Leskovec (Stanford), Geoffrey Fox (IU), and Madhav Marathe (VT), Total: $4M.

2018-2020 NSF, *EAGER: Adaptive Sampling of Massive Graph Streams*, PI: Nick Duffield, TAMU, Total: $200,000.

Outreach

2019 Invited Panelist at the Workshop on Irregular Applications: Architecture and Algorithms at Super Computing 2019

2019 Invited Mentor, First Open NetSci Hackathon at NetSci 2019

2018 Invited Mentor, Women in Machine Learning at NIPS 2018

2018 Circle Leader, Intel Corp - Pay It Forward Program, mentorship and development opportunities for women

2017 AI Track Committee Member, Grace Hopper Conference of Women in Computing (GHC17)

2017 Program Committee Member, Workshop for Women in Machine Learning at NIPS (WiML17)

2016 Invited Panelist/Mentor at Stanford Artificial Intelligence Laboratory's Outreach Summer Program for Rising 10th Grade Girls (SAILORS), Stanford University - Goal: Expose high school students in underrepresented populations to the field of Artificial Intelligence

2016 Invited Mentor at the Women in Machine Learning Breakfast Event, at the AAAI conference on Artificial Intelligence, Phoenix, AZ

2016 Invited Panelist, Machine Learning Panel, Intel Software Professionals Conference (SWPC), Intel Corp.

2014 Invited Mentor at Purdue University Graduate Mentoring Program - Goal: Assist new incoming CS graduate students with their transition into graduate school and help them in developing their social and academic networks

Professional Service & Leadership

- Program Committee Chair:
  - IEEE Big Data Conference, Industry and Government Track (2018)
  - IPDPS Workshop on Graphs, Architectures, Programming, and Learning (2021)
- Sponsorship Chair:
  - SIAM International Conference on Data Mining (SDM 2019)
- Workshop Chair & Co-Organizer (2016-Present):
  - Organizing the annual Big Graphs Workshop on High Performance Big Graph Data Management, Analysis, and Mining - http://biggraphs.org
- Editorial Board:
  - Associate Editor, IEEE Transactions on Neural Networks and Learning Systems (TNNLS) (2020-2021)
  - Associate Editor, IEEE Signal Processing Magazine (2019-2020)
  - Member, Frontiers in Machine Learning and Artificial Intelligence (2018-Present)
- Senior Program Committee:
  - SIGKDD, ACM Conference on Knowledge Discovery and Data Mining (2021)
- Technical Program Committee:
  - SIGKDD, ACM Conference on Knowledge Discovery and Data Mining (2015-2020)
  - AAAI, National Conference on Artificial Intelligence (2014, 2019, 2020)
  - ICML, International Conference on Machine Learning (2020)
  - Neurips, Neural Information Processing Systems (2019)
  - SIGIR, ACM Conf. on Research & Development in Information Retrieval (2020)
  - NeurIPS 2019 Reproducibility Challenge(2019)
  - IJCAI, International Joint Conference on Artificial Intelligence (2019, 2020)
  - WWW, ACM Conference on World Wide Web (2018-2020)
  - ICPP, International Conference on Parallel Processing (2020)
  - SDM, SIAM International Conference on Data Mining (2019-2020)
  - VLDB, International Conference on Very Large Data Bases, Demo Track (2019)
  - IEEE Conference on Big Data (2019)
  - ECML, The European Conference on Machine Learning (2019)
  - ICANN, International Conference on Artificial Neural Networks (2019)
  - CIKM, ACM Conference on Information and Knowledge Management (2017, 2018)
  - NETSCI-X, International School and Conference on Network Science (2019)
  - EDBT, International Conference on Extending Database Technology (2019)
  - DSAA, IEEE International Conference on Data Science & Advanced Analytics (2018-2019)
  - HiPC, IEEE Conference on HPC, Data, and Analytics (2018)
  - IPDPS Workshop on Graph Algorithms and Machine Learning (GraPL 2018, 2020)
  - SuperComputing (SC) Workshop on Irregular Applications: Architectures and Algorithms (IA^3 2018, 2019)
  - AAAI Workshop on Plan, Activity, and Intent Recognition (PAIR 2018)

- Complex Networks, International Conference on Complex Networks and their Applications (2018-2019)
- WSDM workshop on heterogeneous network analysis and mining (HeteroNAM 2018)
- Women in Machine Learning at NIPS (WiML 2017-2018)
- MLG SIGKDD Workshop on Mining and Learning with Graphs (2017)
- ADMA Conference on Advanced Data Mining and Applications (2017)
- International Workshop on Machine learning, Optimization Big Data - (MOD 2016-2017)
- AI Track - Grace Hopper Conference of Women in Computing (GHC 2017)
- IEEE International Conference on Big Data 2014

- Journal Reviewing:
  - Journal of Machine Learning Research (JMLR 2015-2019)
  - IEEE Transactions on Information Theory (2018)
  - ACM Transactions on Knowledge Discovery from Data (TKDD 2015-2019)
  - IEEE Transactions on Knowledge and Data Engineering (TKDE 2015-2019)
  - IEEE Transactions on Parallel and Distributed Systems (TPDS 2020)
  - Data Mining and Knowledge Discovery Journal, Springer (DMKD 2014-2018)
  - Journal of Applied Network Science, Springer (2019)
  - Information Sciences Journal, Elsevier (INS 2018)
  - IEEE Transactions on Services Computing (TSC 2018)
  - Data and Knowledge Engineering, Elsevier (DKE 2018)
  - Knowledge and Information Systems (KAIS 2016-2017)
  - ACM Transactions on Database Systems (TODS 2015)
  - Proceedings of Very Large Databases (VLDB 2015)
  - IEEE Transactions on Computational Social Systems (TCSS 2016)
  - IEEE Transactions on Neural Networks and Learning Systems (TNNLS 2011-2016)
  - International Journal of Forecasting, Elsevier (IJF 2009)
  - Physica A: Statistical Mechanics and its Applications, Elsevier 2013-2014
- External Reviewer:
  - SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 2014)
  - Workshop on online social networks (WOSN 2013)
- Student organizer, Machine Learning Summer School at Purdue, 2011
- Treasurer of Egyptian Students Association at Purdue University, 2009
- Activities Coordinator of Egyptian Students Association at Purdue University, 2011
- Proposal Reviewer:
  - Research support program at Fonds de recherche du Québec – Nature et technologies, Quebec, Canada (2018)
- Professional Membership:
  - Women in Machine Learning (WiML)
  - Women Engineers at Intel
  - Computing Research Association for Women (CRA-W)
  - Professional Member IEEE, ACM, SIAM, SIGKDD, IEEE SPS, SIAG-DM, AAAS
  - Purdue Alumni Association

Skills

- Analysis of Big and Semi-Structured Data:
  - Social Media: Twitter, Yelp, Groupon, Living Social, Yipit
  - Web data: Open directory project (dmoz.org), Alexa.com
  - Network data: Facebook, Citation and Collaboration Social Networks, Email, IP Traffic
  - Time-series Data: M3 Competition, NN3 Competition
  - Functional Magnetic Resonance (fMRI)
- Programming skills:
  - Python, MATLAB, R, STATA
  - C/C++, OpenMP, Hive/Mapreduce, mysql
  - Web Crawling and Scraping
- Language:
  - English – Conversationally fluent
  - Arabic – Mother-tongue
  - French – Basic reading
- Writing:
  - Creative writing, fiction, reporting, and documenting

Students Supervised

- Aaron Zweig (Phd student, New York University, CILVR Lab), 2020
- Ambar Pal (Phd student, Johns Hopkins University, MINDS Lab), 2020
- Ancy Tom (Phd student, Univ. Minnesota, Karypis Lab), 2017-2020
- Ameer Haj-Ali (Phd student, UC Berkeley, RISE Lab), 2019
- Guixiang Ma (Phd student, UIC, now at Intel), 2018-2019
- Yunhong Xu (Phd student, TAMU, now at Facebook), 2017
- Vachik Dave (Phd student, IUPUI, now at Walmart Labs), 2018
- John Boaz Lee (Phd student, WPI, now at Facebook), 2017-2018
- Shaden Smith (Phd student, Univ. Minnesota, now at Microsoft), 2017
- Sebastian Musslick (Phd student, Princeton University, Cohen Lab), 2016-2017
- Liangzhen Xia (MS student, TAMU, now at facebook), 2017-2018
- Giang Nguyen (MS student, WPI, now at Henry M. Jackson Foundation), 2017-2018
- James Canning (Undergrad student, SUNY Geneseo), NSF REU 2017
- Emma Ingram (Undergrad student, Univ. Alabama), NSF REU 2017
- Adriana Ortiz (Undergrad student, Univ. Puerto Rico), NSF REU 2017