

Ryan A. Rossi

Curriculum Vitae

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Erdős Number: 3

Research Interests

Machine learning, statistical relational learning, (large-scale) graph mining, representation learning, deep learning, matrix-based network computations, link prediction & recommendation, parallel computing

Education

- 2009–2015 Ph.D., Computer Science., *Purdue University*, USA.**
Title: "Improving Relational Machine Learning by Modeling Temporal Dependencies"
Concentrate in Relational Machine Learning (RML)
Recipient of Four Ph.D. Fellowships:
– National Science Foundation Graduate Fellowship (NSF GRFP)
– DoD: National Defense Science and Engineering Graduate Fellowship (NDSEG)
– Bilsland Dissertation Fellowship Awarded to Outstanding Ph.D. candidates
– Purdue University Fredrick N. Andrews Doctoral Fellowship (unused)
Advisor: Sunil Prabhakar
- 2013 MS in Computer Science., *Purdue University*, USA.**
Concentrate in Machine Learning
- 2005–2009 Bachelor of Science in Computer Science., *Coastal Carolina University (CCU)*, USA.**
* Valedictorian class of 2009. GPA: 4.0., Summa Cum Laude
Advisor: Jean-Louis Lassez (Retired IBM T.J. Watson Research Center)
Selected Courses: Machine Learning, Search Theory, Numerical Analysis, Bioinformatics
- Summer 11–12 LLNL Scholar , *Lawrence Livermore National Laboratory*, USA.**
- Summer 2010 NREIP, *Naval Research Laboratory (AI Center)*, USA.**
- 2009 NASA Fellow, *California Institute of Technology, JPL*, USA.**
- 2009 USRP Fellow, *Jet Propulsion Laboratory*, USA.**
- Summer 2008 NSF REU Fellow, *University of Massachusetts at Amherst*, USA.**
- Summer 2007 Research Fellow, *New Mexico Institute of Technology*, USA.**

Research Experience

- 2017–present Senior Research Scientist, Adobe Research.**
- 2015–2017 Member of Research Staff, *Palo Alto Research Center (PARC, a Xerox company)*, Machine Learning group.**
- 2013–2015 Visiting Researcher, *Palo Alto Research Center (PARC)*, Palo Alto, CA USA.**
Research focused on theory, algorithms & applications of relational (graph-based) machine learning
- Summer 2013 Research Intern, *Palo Alto Research Center (PARC)*, Palo Alto, CA USA.**
Advisor: Rong Zhou, Developed recommendation system via collective matrix-tensor factorization
- Led to filing two patents on scalable graph-based machine learning and analytics
 - Research and system were presented to clients, partners and researchers

- 2009–2015 **Research Assistant**, *Purdue University*, USA.
 Research: Machine Learning, Statistical Relational Learning
 Proposed methods for *role discovery in large dynamic graphs* and *dynamic relational classification*.
- Summer 2011–2012 **Research Assistant**, *Lawrence Livermore National Laboratory (ISCR)*, USA.
 Research focused on developing ML algorithms to characterize and model user behavior for detecting malicious intent/intrusions in real-time. Invited back for second year.
 Resulted in two papers on modeling dynamic roles in large networks.
- Summer 2010 **Research Assistant**, *Naval Research Laboratory (Artificial Intelligence Center)*, USA.
 Advisor: David Aha, Co-advisor: Luke McDowell (U.S. Naval Academy), NREIP
 Resulted in the JAIR paper "Transformation of Graph Data for Statistical Relational Learning"
- Summer 2009 **Research Assistant**, *California Institute of Technology (NASA JPL)*, USA.
 Advisor: Mark W. Powell, Summer Research Fellowship (returned to continue my research).
- Spring 2009 **Research Assistant**, *NASA Jet Propulsion Laboratory*, USA.
 Advisor: Mark W. Powell, Spring USRP Fellowship.
- Summer 2008 **Research Assistant**, *University of Massachusetts at Amherst*, USA.
 Advisor: David Jensen, Co-advisor: Brian Taylor. *REU NSF Fellowship*.
 "Experimental Methods for Improving the Design of Participatory Sensing Systems"
- Summer 2007 **Research Assistant**, *New Mexico Institute of Technology, ICASA*, USA.
 Advisor: Srinivas Mukkamala, Senior Research Scientist, ICASA
- 2005–2009 **Research Assistant**, *Coastal Carolina University*, USA.
 Advisor: Jean-Louis Lassez, Retired IBM T.J. Watson Research Center

Journal Publications

- [J20] Nesreen K. Ahmed, Nick Duffield, **Ryan A. Rossi**, *Online Sampling of Temporal Networks*, Transactions on Knowledge Discovery from Data (TKDD), 1–43, 2021.
- [J19] Hoda Eldardiry, Jennifer Neville, **Ryan A. Rossi**, *Ensemble Learning for Relational Data*, Journal of Machine Learning Research (JMLR), 2020.
- [J18] **Ryan A. Rossi**, Nesreen K. Ahmed, Aldo Carranza, David Arbour, Anup Rao, Sungchul Kim, and Eunyee Koh, *Heterogeneous Graphlets*, Transactions on Knowledge Discovery from Data (TKDD), 1–43, 2020.
- [J17] Xin Qian, **Ryan A. Rossi**, Fan Du, Sungchul Kim, Eunyee Koh, Sana Malik, Tak Yeon Lee, Nesreen K. Ahmed, *Personalized Visualization Recommendation*, Under submission, 1–43, 2021.
- [J16] **Ryan A. Rossi**, Di Jin, Sungchul Kim, Nesreen K. Ahmed, Danai Koutra, and John Boaz Lee, *On Proximity and Structural Role-based Embeddings in Networks: Misconceptions, Techniques, and Applications*, Transactions on Knowledge Discovery from Data (TKDD), 1–32, 2020.
- [J15] John Boaz Lee, Giang Nguyen, **Ryan A. Rossi**, Nesreen K. Ahmed, Eunyee Koh, and Sungchul Kim, *Dynamic Node Embeddings from Edge Streams*, IEEE Transactions on Emerging Topics in Computational Intelligence, 1–15, 2020.
- [J14] John Boaz Lee, **Ryan A. Rossi**, Sungchul Kim, Nesreen K. Ahmed, and Eunyee Koh, *Attention Models in Graphs: A Survey*, Transactions on Knowledge Discovery from Data (TKDD), 1–19, 2019.
- [J13] **Ryan A. Rossi** and Nesreen K. Ahmed, *Complex networks are structurally distinguishable by domain*, Social Network Analysis and Mining (SNAM), Vol. 9, No. 1, 51 pages, 2020.
- [J12] **Ryan A. Rossi**, Rong Zhou, and Nesreen K. Ahmed, *Deep Inductive Graph Representation Learning*, IEEE Transactions on Knowledge and Data Engineering (TKDE), 1–14, 2018.
- [J11] **Ryan A. Rossi**, Rong Zhou, and Nesreen K. Ahmed, *Estimation of Graphlet Counts in Massive Networks*, IEEE Transactions on Neural Networks and Learning Systems (TNNLS), 14 pages, 2018.
- [J10] **Ryan A. Rossi**, Nesreen K. Ahmed, and Rong Zhou, *Interactive Visual Graph Mining and Learning*, ACM Transactions on Intelligent Systems and Technology (TIST), 1–24, 2017.

- [J9] **Ryan A. Rossi** and Rong Zhou, *GraphZIP: A Clique-based Sparse Graph Compression Method*, Journal of Big Data, 2018.
- [J8] Nesreen K. Ahmed, Jennifer Neville, **Ryan A. Rossi**, Nick Duffield, Theodore L. Willke, *Graphlet Decomposition: Framework, Algorithms, and Applications*, Knowledge and Information Systems (KAIS), 689–722, 2016 *Invited paper to KAIS Journal Special Issue (ICDM Best papers).
- [J7] **Ryan Rossi**, *Relational Time Series Learning*, Knowledge Engineering Review (KER), Cambridge University Press, 1–15, 2018.
- [J6] **Ryan Rossi** and Rong Zhou, *Parallel Collective Factorization for Modeling Large Heterogeneous Networks*, Social Network Analysis and Mining (SNAM), 2016.
- [J5] **Ryan Rossi**, David F. Gleich, and Assefaw H. Gebremedhin, *Parallel Maximum Clique Algorithms with Applications to Network Analysis*, SIAM Journal on Scientific Computing (SISC), 37(5), C589–C616 (28 pages), 2015.
- [J4] **Ryan Rossi** and Nesreen K. Ahmed, *Role Discovery in Networks*, IEEE Transactions on Knowledge and Data Engineering (TKDE), 1112–1131, 2014.
- [J3] **Ryan Rossi** and Nesreen K. Ahmed, *Coloring Large Complex Networks*, Social Network Analysis and Mining (SNAM), Vol. 4, No. 1-228, 37 pages, 2014.
- [J2] David F. Gleich, **Ryan A. Rossi**, *A Dynamical System for PageRank with Time-Dependent Teleportation*, Internet Mathematics, 188–217, 2014.
- [J1] **Ryan Rossi**, Luke McDowell, David Aha, and Jennifer Neville, *Transforming Graph Representations for Statistical Relational Learning*, Journal of Artificial Intelligence Research (JAIR), pages 363–441, 2012. *Invited for presentation at IJCAI 2013 journal track.

Other Peer-reviewed Publications

- [C77] Enayat Ullah, Tung Mai, Anup Rao, **Ryan A. Rossi**, and Raman Arora, *Machine unlearning via algorithmic stability*, Conference on Learning Theory (COLT), 2021.
- [C76] Xin Qian, **Ryan A. Rossi**, Fan Du, Sungchul Kim, Eunye Koh, Sana Malik, Tak Yeon Lee, Joel Chan, *Learning to Recommend Visualizations from Data*, ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), 2021.
- [C75] Hongjie Chen, **Ryan A. Rossi**, Kanak Mahadik, Sungchul Kim, Hoda Eldardiry, *Graph Deep Factor Model for Cloud Utilization Forecasting*, ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), 2021.
- [C74] Gromit Yeuk-Yin Chan, Tung Mai, Anup Rao, **Ryan A. Rossi**, Fan Du, Cláudio T. Silva, Juliana Freire, *Interactive Audience Expansion On Large Scale Online Visitor Data*, ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), 2021.
- [C73] Yikun Xian, Handong Zhao, Tak Yeon Lee, Sungchul Kim, **Ryan A. Rossi**, Zuohui Fu, Gerard de Melo, S. Muthukrishnan, *EXACTA: Explainable Column Annotation*, ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), 2021.
- [C72] Mohammad Mehrabi, Adel Javanmard, **Ryan A. Rossi**, Anup Rao and Tung Mai, *Fundamental Tradeoffs in Distributionally Adversarial Training*, International Conference on Machine Learning (ICML), 2021.
- [C71] Mojtaba Sahraee-Ardakan, Tung Mai, Anup Rao, **Ryan A. Rossi**, Sundeep Rangan and Alyson Fletcher, *Asymptotics of Ridge Regression in Convolutional Models*, International Conference on Machine Learning (ICML), 2021.
- [C70] Jun Yan, Mrigank Raman, Aaron Chan, Tianyu Zhang, **Ryan A. Rossi**, Handong Zhao, Sungchul Kim, Nedim Lipka and Xiang Ren, *Learning Contextualized Knowledge Structures for Commonsense Reasoning*, ACL, 2021.
- [C69] Mrigank Raman, Hansen Wang, PeiFeng Wang, Siddhant Agarwal, Sungchul Kim, **Ryan A. Rossi**, Handong Zhao, Nedim Lipka, Xiang Ren, *Learning to Deceive Knowledge Graph Augmented Models via Targeted Perturbation*, International Conference on Learning Representations (ICLR), 2021, Vienna, Austria.

- [C68] Jiong Zhu, **Ryan A. Rossi**, Anup Rao, Tung Mai, Nedim Lipka and Danai Koutra, *Graph Neural Networks with Heterophily*, AAAI, 2021.
- [C67] Enayat Ullah, Tung Mai, Anup Rao, **Ryan A. Rossi**, and Raman Arora, *Machine unlearning via algorithmic stability*, Symposium on Foundations of Responsible Computing (FORC).
- [C66] Hongchang Gao, Gang Wu, **Ryan A. Rossi**, *Provable Distributed Stochastic Gradient Descent with Delayed Updates*, SDM, 2021.
- [C65] Xin Qian, Eunyee Koh, Fan Du, Sungchul Kim, Joel Chan, **Ryan A. Rossi**, Sana Malik and Tak Yeon Lee, *Generating Accurate Caption Units for Figure Captioning*, WWW, 2021.
- [C64] Saed Rezayi, Handong Zhao, Sungchul Kim, **Ryan A. Rossi**, Nedim Lipka, Sheng Li, *Edge: Enriching Knowledge Graph Embeddings with External Text*, NAACL, 2021.
- [C63] Jun Yan, Mrigank Raman, Tianyu Zhang, **Ryan A. Rossi**, Handong Zhao, Sungchul Kim, Nedim Lipka, Xiang Ren, *Learning Contextualized Knowledge Structures for Commonsense Reasoning*, NeurIPS KR2ML Workshop, 2021.
- [C62] Nesreen Ahmed, Richard Alo, Catherine Amelink, Young Yun Baek, Aashish Chudhary, Kristy Collins, Albert Esterline, Edward Fox, Geoffrey Fox, Aric Hagberg, Ron Kenyon, Chris Kuhlman, Jure Leskovec, Dustin Machi, Madhav Marathe, Nataragan Meghanathan, Yasuo Miyasaki, Judy Qiu, Naren Ramakrishnan, S. S. Ravi, **Ryan A. Rossi**, Roc Sosis and Gregor von Laszewski, *net.science: A Cyberinfrastructure for Sustained Innovation in Network Science and Engineering*, Gateways, 2020.
- [C61] Youngsuk Park, **Ryan A. Rossi**, Zheng Wen, Gang Wu and Handong Zhao, *Structured Policy Iteration for Linear Quadratic Regulator*, International Conference on Machine Learning (ICML), 2020, Vienna, Austria.
- [C60] Aldo Carranza, **Ryan A. Rossi**, Anup Rao and Eunyee Koh, *Higher-order Clustering in Complex Heterogeneous Networks*, KDD, 2020, San Diego, California USA.
- [C59] **Ryan A. Rossi**, Nesreen K. Ahmed, Eunyee Koh, Sungchul Kim, Anup Rao, Yasin Abbasi-Yadkori, *A Structural Graph Representation Learning Framework*, Proceedings of the ACM International Conference on Web Search and Data Mining (WSDM), 2020, Houston, Texas USA.
- [C58] Gromit Yeuk-Yin Chan, Fan Du, **Ryan A. Rossi**, Anup Rao, Eunyee Koh, Cláudio T. Silva, Juliana Freire, *Real-Time Clustering for Large Sparse Online Visitor Data*, Proceedings of The Web Conference (WWW), 2020, Taipei, Taiwan.
- [C57] **Ryan A. Rossi**, Anup Rao, Tung Mai, Nesreen K Ahmed, *Fast and Accurate Estimation of Typed Graphlets*, Proceedings of The Web Conference (WWW), 2020, Taipei, Taiwan.
- [C56] **Ryan A. Rossi**, Anup Rao, Sungchul Kim, Eunyee Koh, Nesreen K Ahmed, *From Closing Triangles to Closing Higher-Order Motifs*, Proceedings of The Web Conference (WWW), 2020, Taipei, Taiwan.
- [C55] **Ryan A. Rossi**, Nesreen K. Ahmed, Eunyee Koh, Sungchul Kim, *Fast Hierarchical Graph Clustering in Linear-Time*, Proceedings of The Web Conference (WWW), 2020, Taipei, Taiwan.
- [C54] John Boaz Lee, **Ryan A. Rossi**, Xiangnan Kong, Sungchul Kim, Eunyee Koh and Anup Rao, *Graph Convolutional Networks with Motif-based Attention*, Proceedings of the 28th ACM International Conference on Information and Knowledge Management (CIKM), 2019, Beijing, China.
- [C53] Alireza Farhadi, MohammadTaghi Hajiaghayi, Tung Mai, Anup Rao, and **Ryan A. Rossi**, *Approximate Maximum Matching in Random Streams*, Proceedings of the Thirty-First Annual ACM-SIAM Symposium on Discrete Algorithms (SODA), 2020.
- [C52] **Ryan A. Rossi**, Somdeb Sarkhel, Nesreen K. Ahmed, *Inferring Individual Level Causal Models from Graph-based Relational Time Series*, AAAI StarAI, 2020, New York, New York USA.
- [C51] Tung Mai, Anup Rao, Matt Kapilevich, **Ryan A. Rossi**, Yasin Abbasi-Yadkori, and Ritwik Sinha, *On Densification for Minwise Hashing*, UAI, 2019, Tel Aviv, Israel.

- [C50] Di Jin, **Ryan A. Rossi**, Eunyee Koh, Sungchul Kim, Anup Rao, and Danai Koutra, *Latent Network Summarization: Bridging Network Embedding and Summarization*, KDD, 2019, Anchorage, Alaska USA.
- [C49] Di Jin, Mark Heimann, **Ryan A. Rossi**, and Danai Koutra, *node2bits: Compact Time- and Attribute-aware Node Representations for User Stitching*, ECML/PKDD, 2019, Würzburg, Germany.
- [C48] Nesreen K. Ahmed, **Ryan A. Rossi**, John Boaz Lee, Theodore L. Willke, Rong Zhou, Xiangnan Kong, Hoda Eldardiry, *role2vec: Role-based Network Embeddings*, DLG KDD, 2019, Anchorage, Alaska USA.
- [C47] Charles Chen, Ruiyi Zhang, Eunyee Koh, Sungchul Kim, Scott Cohen, **Ryan A. Rossi**, *Fig-Caps: Relational Reasoning in Figure Captioning*, IEEE Winter Conference on Applications of Computer Vision (WACV), 2020.
- [C46] **Ryan A. Rossi**, Nesreen K. Ahmed, Aldo Carranza, David Arbour, Anup Rao, Sungchul Kim and Eunyee Koh, *Heterogeneous Graphlets*, MLG KDD, 2019, Anchorage, Alaska USA.
- [C45] Charles Chen, Eunyee Koh, Sungchul Kim, **Ryan A. Rossi**, Scott Cohen, *Neural caption generation over figures*, UbiComp/ISWC, 2019.
- [C44] Di Jin, **Ryan A. Rossi**, Danai Koutra, Eunyee Koh, Sungchul Kim and Anup Rao, *Latent Network Summarization*, MLG KDD, 2019, Anchorage, Alaska USA.
- [C43] Youngsuk Park, Kanak Mahadik, **Ryan A. Rossi**, Gang Wu, Handong Zhao, *Linear Quadratic Regulator for Resource-Efficient Cloud Services*, ACM Symposium on Cloud Computing (SoCC'19), 2019.
- [C42] Donghyun Kim, Sungchul Kim, Handong Zhao, **Ryan A. Rossi**, Sheng Li and Eunyee Koh, *Domain Switch-Aware Holistic Recurrent Neural Network for Modeling Multi-Domain User Behavior*, WSDM, 2019, Melbourne, Australia.
- [C41] Giang Hoang Nguyen, John Boaz Lee, **Ryan A. Rossi**, Nesreen K. Ahmed, Eunyee Koh, and Sungchul Kim, *Dynamic Network Embeddings: From Random Walks to Temporal Random Walks*, BigData, 2018, Seattle, Washington.
- [C40] John Boaz Lee, **Ryan A. Rossi**, Xiangnan Kong, *Graph Classification using Structural Attention*, KDD, 2018, London, UK.
- [C39] **Ryan A. Rossi**, Rong Zhou, Nesreen K. Ahmed, and Hoda Eldardiry, *Relational Similarity Machines (RSM): A Similarity-based Learning Framework for Graphs*, BigData, 2018, Seattle, Washington.
- [C38] Charles Chen, Sungchul Kim, Hung Bui, **Ryan A. Rossi**, Branislav Kveton, Eunyee Koh, and Razvan Bunescu, *Predictive Analysis by Leveraging Temporal User Behavior and User Embeddings*, CIKM, 2018, Turin, Italy.
- [C37] **Ryan A. Rossi**, Nesreen K. Ahmed, and Eunyee Koh, *Higher-order Network Representation Learning*, WWW, 2018, Lyon, France.
- [C36] **Ryan A. Rossi**, Rong Zhou, and Nesreen K. Ahmed, *Deep Inductive Network Representation Learning*, 3rd International Workshop on Learning Representations for Big Networks (WWW BigNet), 2018, Lyon, France.
- [C35] Giang Hoang Nguyen, John Boaz Lee, **Ryan A. Rossi**, Nesreen K. Ahmed, Eunyee Koh, and Sungchul Kim, *Continuous-Time Dynamic Network Embeddings*, 3rd International Workshop on Learning Representations for Big Networks (WWW BigNet), 2018, Lyon, France.
- [C34] **Ryan A. Rossi**, Nesreen K. Ahmed, Hoda Eldardiry, and Rong Zhou, *Similarity-based Multi-label Learning*, International Joint Conference on Neural Networks (IJCNN), 2018, Rio de Janeiro, Brazil.
- [C33] Nesreen K. Ahmed, **Ryan A. Rossi**, Rong Zhou, John Boaz Lee, Xiangnan Kong, Theodore L. Willke, Hoda Eldardiry, *Learning Role-based Graph Embeddings*, StarAI IJCAI, 2018, Stockholm, Sweden.

- [C32] Nesreen K. Ahmed, **Ryan A. Rossi**, Rong Zhou, John Boaz Lee, Xiangnan Kong, Theodore L. Willke, Hoda Eldardiry, *Representation Learning in Large Attributed Graphs*, WiML NIPS, 2017, Long Beach, CA USA.
- [C31] James P. Canning, Emma E. Ingram, Sammantha Nowak-Wolff, Adriana M. Ortiz, Nesreen K. Ahmed, **Ryan A. Rossi**, Karl R. B. Schmitt, Sucheta Soundarajan, *Network Classification and Categorization*, International Conference on Complex Networks (CompleNet), 2018, Boston, MA USA.
- [C30] Nesreen K. Ahmed, Nick Duffield, Theodore L. Willke, **Ryan A. Rossi**, *On Sampling from Massive Graph Streams*, VLDB, 1430–1441, 2017, Munich, Germany.
- [C29] Nesreen K. Ahmed, **Ryan A. Rossi**, Theodore L. Willke, and Rong Zhou, *Edge Role Discovery via Higher-order Structures*, PAKDD, 2017, Jeju, Korea.
- [C28] Nesreen K. Ahmed, **Ryan A. Rossi**, Theodore L. Willke, and Rong Zhou, *A Higher-order Latent Space Network Model*, Proceedings of the AAAI PAIR (Plan, Activity, and Intent Recognition) Workshop, 2017, San Francisco, CA USA.
- [C27] **Ryan A. Rossi** and Rong Zhou, *Leveraging Multiple GPUs and CPUs for Graphlet Counting in Large Networks*, ACM International Conference on Information and Knowledge Management (CIKM), 2016, Indianapolis, IN USA.
- [C26] Nesreen K. Ahmed, **Ryan A. Rossi**, Theodore L. Willke, and Rong Zhou, *Estimation of Local Subgraph Counts*, Proceedings of the IEEE International Conference on Big Data, 2016, Washington D.C., USA.
- [C25] **Ryan A. Rossi**, Rong Zhou, and Nesreen K. Ahmed, *Relational Similarity Machines*, Proceedings of the 12th International Workshop on Mining and Learning with Graphs (KDD MLG), Pages 8, 2016, San Francisco, CA USA.
- [C24] Nesreen Ahmed, Theodore L. Willke, and **Ryan A. Rossi**, *Exact and Estimation of Local Edge-centric Graphlet Counts*, KDD BigMine, 2016, San Francisco, CA USA.
- [C23] **Ryan A. Rossi** and Nesreen K. Ahmed, *An Interactive Data Repository with Visual Analytics*, SIGKDD Explorations, 2016.
- [C22] **Ryan Rossi** and Rong Zhou, *Towards Interactive Relational Learning*, Twenty-Ninth Conference on Artificial Intelligence (AAAI), 2016, Phoenix, Arizona USA.
- [C21] Nesreen K. Ahmed, Jennifer Neville, **Ryan A. Rossi**, Nick Duffield, *Efficient Graphlet Counting for Large Networks*, IEEE International Conference on Data Mining (ICDM), pages 10, 2015. *Invited to KAIS Journal Special Issue (ICDM Best papers), Atlantic City, NJ USA.
- [C20] **Ryan A. Rossi** and Rong Zhou, *Scalable Relational Learning for Large Heterogeneous Networks*, IEEE International Conference on Data Science and Advanced Analytics (DSAA), 10 pages, 2015, Paris, France.
- [C19] Nesreen K. Ahmed and **Ryan A. Rossi**, *Interactive Visual Graph Analytics on the Web*, Proceedings of the 9th International AAAI Conference on Web and Social Media, pages 566–569, 2015, Oxford, UK.
- [C18] **Ryan Rossi** and Nesreen K. Ahmed, *The Network Data Repository with Interactive Graph Analytics and Visualization*, Twenty-Ninth Conference on Artificial Intelligence (AAAI) DT, pages 4292–4293, 2015, Austin, Texas USA.
- [C17] **Ryan Rossi**, *Fast Triangle Core Decomposition for Mining Large Graphs*, Advances in Knowledge Discovery and Data Mining, 310–322, 2014, Tainan, Taiwan.
- [C16] **Ryan A. Rossi**, David F. Gleich, Assefaw H. Gebremedhin, Md. Mostofa Ali Patwary, *A Parallel Maximum Clique Algorithm for Large Graphs*, Proceedings of the 23rd ACM International Conference Companion on World Wide Web, 2014, Seoul, Korea.
- [C15] **Ryan Rossi**, Sonia Fahmy, and Nilothpal Talukder, *A Multi-Level Approach for Evaluating Internet Topology Generators*, Networking, 1–9, 2013, New York, USA.
- [C14] **Ryan Rossi**, Brian Gallagher, Jennifer Neville, and Keith Henderson, *Modeling Dynamic Behavior in Large Evolving Graphs*, In Proceedings of the Sixth ACM International Conference on Web Search and Data Mining (WSDM), pp. 667–676, 2013, Rome, Italy.

- [C13] **Ryan A. Rossi**, David F. Gleich, Assefaw H. Gebremedhin, *Triangle Core Decomposition and Maximum Cliques*, SIAM Workshop on Network Science, 1–2, 2013.
- [C12] **Ryan Rossi** and David Gleich, *Dynamic PageRank using Evolving Teleportation*, Algorithms and Models for the Web Graph, volume 7323 of Lecture Notes in Computer Science, pages 126–137. Springer, 2012, Nova Scotia, Canada.
- [C11] **Ryan Rossi**, Brian Gallagher, Jennifer Neville, and Keith Henderson, *Role-Dynamics: Fast Mining of Large Dynamic Networks*, Proceedings of the 21st ACM International Conference Companion on World Wide Web (WWW), pages 997–1006, 2012, Lyon, France.
- [C10] **Ryan Rossi** and Jennifer Neville, *Time-Evolving Relational Classification and Ensemble Methods*, In Proceedings of the Pacific-Asia International Conference on Knowledge Discovery and Data Mining (PAKDD), pages 1–13, 2012, Kuala Lumpur, Malaysia.
- [C9] **Ryan Rossi** and Jennifer Neville, *Modeling the Evolution of Discussion Topics and Communication to Improve Relational Classification*, In Proceedings of the 1st SOMA Workshop, 16th ACM SIGKDD Conference on Knowledge Discovery and Data Mining, 89–97, 2010, Washington D.C., USA.
- [C8] Khawaja S. Shams, Mark W. Powell, Tom M. Crockett, Jeffrey S. Norris, **Ryan Rossi**, Tom Soderstrom, *Polyphony: A Workflow Orchestration Framework for Cloud Computing*, 10th IEEE/ACM International Conference on Cluster, Cloud and Grid Computing (CCGrid), pages 606–611, 2010., Melbourne, Australia.
- [C7] **Ryan A. Rossi**, *Latent Semantic Analysis of the Languages of Life*, *Communications in Computer and Information Science*, ISICA, CCIS 51, 128–137, 2009.
- [C6] Mark W. Powell, **Ryan A. Rossi**, and Khawaja S. Shams, *A Scalable Image Processing Framework for Gigapixel Mars and Other Celestial Body Images*, IEEE Aerospace, 1–11, 2009, Big Sky, Montana.
- [C5] John Stamey, **Ryan A. Rossi**, *Automatically Identifying Relations in Privacy Policies*, Proceedings of the 27th ACM International Conference on Design of Communication, 233–238, 2009, Bloomington, Indiana.
- [C4] Jean-Louis Lassez, **Ryan A. Rossi**, Kumar Jeev, *Ranking Links on the Web: Search and Surf Engines*, New Frontiers in Applied Artificial Intelligence (IEA/AIE), volume 5027 of Lecture Notes of Artificial Intelligence, 199–208 (2008), Wroclaw, Poland.
- [C3] Jean-Louis Lassez, **Ryan A. Rossi**, Stephen Sheel, Srinivas Mukkamala, *Signature Based Intrusion Detection System using Latent Semantic Analysis*, IEEE World Congress on Computational Intelligence, International Joint Conference of Neural Networks, IJCNN, 1068–1074 (2008), Hong Kong.
- [C2] John Stamey, Jean-Louis Lassez, **Ryan Rossi**, Daniel Boorn, *Client-Side Dynamic Metadata in Web 2.0*, Proceedings of the 25th ACM International Conference on Design of Communication, 155–161 (2007), El Paso, Texas.
- [C1] Jean-Louis Lassez, **Ryan A. Rossi**, Axel E. Bernal, *Crick’s Hypothesis Revisited: The Existence of a Universal Coding Frame*, *IEEE International Conference on Bioinformatics and Life Science Computing*, AINA/BLSC, 745–751 (2007), Niagara Falls, Canada.

Patents

- [P47] Fan Du, Zening Qu, **Ryan A. Rossi**, Sungchul Kim, Sumit Shekhar, Eunyee Koh, Tak Yeon Lee, Sana Lee, Saurabh Mahapatra, Vasanthi Holtcamp, Nikhil Belsare, Andrew Thomson, *Natural Language Interface and Mixed-initiative Recommendation Model for Creating Data Stories*, Adobe Research, Patent application filed 06/3/2021, App.#17/YYYY,YYY, 2021.
- [P46] Eunyee Koh, Tak Yeon Lee, Andrew Thomson, Vasanthi Holtcamp, **Ryan A. Rossi**, Fan Du, Caroline Kim, Tong Yu, Shunan Guo, Nedim Lipka, and Shriram Revankar, *Content Go: Helping Marketers Create Better Email Contents with Smart Suggestions*, Adobe Research, Patent application filed 07/23/2021, App. #17/YYYY,YYY, 2021.

- [P45] Tung Mai, Kirankumar Shiragur, Anup Rao, **Ryan A. Rossi**, Georgios Theocharous, Michele Saad, *Item Transfer Systems*, Adobe Research, Patent application filed 07/15/2021, App. #17/YYYY,YYY, 2021.
- [P44] **Ryan A. Rossi**, Jiong Zhu, Tung Mai, Anup Rao, Nedim Lipka, Viswanathan Swaminathan, *Graph Neural Networks For Datasets With Heterophily*, Adobe Research, Patent application filed 3/23/2021, App. #17/210,157, 2021.
- [P43] **Ryan A. Rossi**, Xin Qian, Eunyee Koh, Fan Du, Tak Yeon Lee, Sana Lee, Sungchul Kim, *Machine Learning Techniques for Generating Visualization Recommendations*, Adobe Research, Patent application filed 3/22/2021, App. #17/207,959, 2021.
- [P42] Tak Yeon Lee, Qisheng Li, Eunyee Koh, Fan Du, **Ryan A. Rossi**, Sana Lee, *Systems for Suggesting Content Components*, Adobe Research, Patent application filed 2/23/2021, App. #17/183,055, 2021.
- [P41] Nedim Lipka, Seyedsaed Rezayidemne, Vishwa Vinay, **Ryan A. Rossi**, Franck Dernoncourt, Tracy King, *Knowledge-derived Search Suggestion*, Adobe Research, Patent application filed 2/8/2021, App. #17/170,520, 2021.
- [P40] Sana Lee, **Ryan A. Rossi**, Camille Harris, Zening Qu, Fan Du, Eunyee Koh, Tak Yeon Lee, Sungchul Kim, Handong Zhao, Sumit Shekhar, *Configuration of User Interface for Intuitive Selection of Insight Visualizations*, Adobe Research, Patent application filed 1/29/2021, App. #17/161,770, 2021.
- [P39] Eunyee Koh, Shenyu Xu, **Ryan A. Rossi**, Tak Yeon Lee, Fan Du, Sana Lee, *Generating Visual Data Stories*, Adobe Research, Patent application filed 1/28/2021, App. #17/161,406, 2021.
- [P38] **Ryan A. Rossi**, *Selection of Outlier-detection Programs Specific to Dataset Meta-features*, Adobe Research, Patent application filed 1/15/2021, App. #17/150,890, 2021.
- [P37] Sungchul Kim, Di Jin, **Ryan A. Rossi**, Eunyee Koh, *Temporal-Based Network Embedding and Prediction*, Adobe Research, Patent application filed 11/11/2020, App. #17/095,070, 2020.
- [P36] Eunyee Koh, Xin Qian, Tak Yeon Lee, Sana Lee, **Ryan A. Rossi**, Fan Du, Duy-Trung Dinh, *Automated Caption Generation from a Dataset*, Adobe Research, Patent application filed 11/10/2020, App. #17/094,435, 2020.
- [P35] **Ryan A. Rossi**, Vasanthi Holtcamp, Nathan Ross, John Anderson, Eunyee Koh, Sungchul Kim, Fan Du, Sana Lee, Tak Yeon Lee, *Personalized Visualization Recommendation System*, Adobe Research, Patent application filed 11/6/2020, App. #17/091,941, 2020.
- [P34] **Ryan A. Rossi**, Hongjie Chen, Kanak Mahadik, Sungchul Kim, *Systems for Forecasting Computing Metric Values*, Adobe Research, Patent application filed 11/4/2020, App. #17/089,157, 2020.
- [P33] Manoj A. Kilaru, Vishwa Vinay, Vidit Jain, Shaurya Goel, **Ryan A. Rossi**, Pratyush Garg, Nedim Lipka, Harkanwar Singh, *Generating Occurrence Contexts for Objects in Digital Content Collections*, Adobe Research, Patent application filed 10/26/2020, App. #17/079,945, 2020.
- [P32] **Ryan A. Rossi**, Vasanthi Holtcamp, Nathan Ross, John Anderson, Eunyee Koh, Fan Du, Sana Lee, Tak Yeon Lee, *Graph-based Configuration of User Interface for Selection of Features in Visualization Applications*, Adobe Research, Patent application filed 9/9/2020, App. #17/015,495, 2020.
- [P31] **Ryan A. Rossi**, Anup Rao, Tung Mai, *System and Methods for Estimating Typed Graphlets in Large Data*, Adobe Research, Patent application filed 8/31/2020, App. #17/008,339, 2020.
- [P30] Gang Wu, Hongchang Gao, **Ryan A. Rossi**, Viswanathan Swaminathan, *Deep Relational Factorization Machine Techniques for Content Usage Prediction via Multiple Interaction Types*, Adobe Research, Patent application filed 7/27/2020, App. #16/939,661, 2020.

- [P29] Kanak Mahadik, **Ryan A. Rossi**, Sana Malik, Georgios Theocharous, Handong Zhao, Gang Wu, *Predictive Resource Scaling for Efficient Resource Management*, Adobe Research, Patent application filed 5/5/2020, App. #16/867,104, 2020.
- [P28] Fan Du, Yeuk-Yin Chan, **Ryan A. Rossi**, Anup Rao, Eunye Koh, Charles Menguy, Margarita Savova, *Dynamic Clustering of Sparse Data Utilizing Hash Partitions*, Adobe Research, Patent application filed 4/17/2020, App. #16/852,110, 2020.
- [P27] Yikun Xian, Handong Zhao, Tak Yeon Lee, **Ryan A. Rossi**, Sungchul Kim, *Generating Explanatory Paths for Predicted Column Annotations*, Adobe Research, Patent application filed 2/20/2020, App. #16/796,681, 2020.
- [P26] Yikun Xian, Handong Zhao, Tak Yeon Lee, Sungchul Kim, **Ryan A. Rossi**, *Dynamically Determining Schema Labels Using a Hybrid Neural Network Encoder*, Adobe Research, Patent application filed 1/24/2020, App. #16/751,755, 2020.
- [P25] Alireza Farhadi, **Ryan A. Rossi**, Anup Rao, Tung Mai, *Single-Pass Matching in Large Data Streams*, Adobe Research, Patent application filed 11/19/2019, App. #16/688,700, 2019.
- [P24] **Ryan A. Rossi**, *Multi-Item Influence Maximization*, Adobe Research, Patent application filed 11/7/2019, App. #16/677,007, 2019.
- [P23] Di Jin, Sungchul Kim, **Ryan A. Rossi**, Eunye Koh, *A System and Method for Enriching Data via Temporal Embeddings and Models*, Adobe Research, Patent application filed 7/22/2020, App. #XX, 2020.
- [P22] **Ryan A. Rossi**, Sungchul Kim, Eunye Koh, Anup Rao, Russell Stringham, *Analytics System Entity Resolution*, Adobe Research, Patent application filed 9/12/2019, App. #16/569,484, 2019.
- [P21] **Ryan A. Rossi**, *Feature-based Network Embedding*, Adobe Research, Patent application filed 7/10/2019, App. #16/507,204, 2019.
- [P20] **Ryan A. Rossi**, Aldo Gael Carranza, David Arbour, Anup Rao, Sungchul Kim, Eunye Koh, *System for Identifying Typed Graphlets*, Adobe Research, Patent application filed 6/25/2019, App. #16/451,956, 2019.
- [P19] **Ryan A. Rossi**, Aldo Carranza, Anup Rao, Eunye Koh, *Higher-order Network Clustering and Embedding*, Adobe Research, Patent application filed 4/29/2019, App. #16/397,839, 2019.
- [P18] Anup Rao, Tung Mai, Yasin Abbasi-Yadkori, **Ryan A. Rossi**, Ritwik Sinha, Matt Kapilevich, *Utilizing One Hash Permutation And Populated-value-Slot-Based Densification For Generating Audience Segment Trait Recommendations*, Adobe Research, Patent application filed 3/28/2019, App. #16/367,628, 2019.
- [P17] John Boaz Lee, **Ryan A. Rossi**, Sungchul Kim, Eunye Koh and Anup Rao, *Graph Convolutional Networks with Motif-based Attention*, Adobe Research, Patent application filed 3/8/2019, App. #16/297,024, 2019.
- [P16] Charles Chen, Eunye Koh, Sungchul Kim, **Ryan A. Rossi**, Scott Cohen, *Figure Captioning System and Related Methods*, Adobe Research, Patent application filed 3/7/2019, App. #16/296,076, 2019.
- [P15] **Ryan A. Rossi**, Di Jin, Sungchul Kim, Anup Rao, Eunye Koh, *Latent Network Summarization*, Adobe Research, Application filed 1/18/2019, App. #16/252,169, 2019.
- [P14] **Ryan A. Rossi**, Sungchul Kim, Eunye Koh, Anup Rao, *Higher-Order Network Embedding*, Adobe Research, Patent application filed 11/29/2018, App. #16/204,616, 2018. US Patent No. 10,728,105. Awarded 07/28/2020. .
- [P13] **Ryan A. Rossi**, Sungchul Kim, Eunye Koh, *Time-Dependent Network Embedding*, Adobe Research, Patent application filed 11/15/2018, App. #16/192,313, 2018. US Patent No. 10,728,104. Awarded 07/28/2020. .
- [P12] **Ryan A. Rossi**, Hoda Eldardiry, *Similarity-based Multi-label Learning*, Palo Alto Research Center, Patent application filed 12/31/2018, App. #16/237,439, 2018.

- [P11] Jungho Park, Ajay Raghavan, **Ryan A. Rossi**, Yosuke Tajika, Akira Minegishi, and Tet-suyoshi Ogura, *System and Method for Anomaly Characterization Based on Joint Historical and Time-series Analysis*, Palo Alto Research Center (Xerox PARC), Patent application filed, App. #16/170815, 2018.
- [P10] Ajay Raghavan, **Ryan A. Rossi**, and Jungho Park, *System and Method for Binned Inter-Quartile Range Analysis in Anomaly Detection of Time-series Data*, Palo Alto Research Center (Xerox PARC), Patent application filed, 2018.
- [P9] **Ryan A. Rossi**, Ajay Raghavan, and Jungho Park, *One-class Similarity Machines for Anomaly Detection*, Palo Alto Research Center (Xerox PARC), Patent application filed, 2018.
- [P8] **Ryan A. Rossi**, Rong Zhou, *Deep Graph Representation Learning*, Palo Alto Research Center, US Patent No. 10482375, 2019.
- [P7] **Ryan A. Rossi**, Rong Zhou, *A Graph Search Engine*, Palo Alto Research Center, Patent application filed, 2017.
- [P6] **Ryan A. Rossi**, Rong Zhou, *System and Method for Hybrid Task Management Across CPU and GPU for Efficient Data Mining*, Palo Alto Research Center, US Patent No. 10235182, 2019.
- [P5] **Ryan A. Rossi**, Rong Zhou, *Localized Visual Graph Filters For Complex Graph Queries*, Palo Alto Research Center, Patent application filed, 2016.
- [P4] **Ryan A. Rossi**, Rong Zhou, *Fast and Accurate Unbiased Graphlet Estimation*, Palo Alto Research Center, Patent application filed, 2015.
- [P3] **Ryan A. Rossi**, Rong Zhou, *A System and Method for Compressing Graphs via Cliques to Speedup Graph Algorithms and Reduce Storage Requirements*, Palo Alto Research Center, Patent application filed, 2015.
- [P2] **Ryan A. Rossi**, Rong Zhou, *Relational Time Series Classification using Similarity*, Palo Alto Research Center, Patent application filed, 2015.
- [P1] **Ryan A. Rossi**, Rong Zhou, *Parallel Collective Matrix Factorization Framework for Big Data*, Palo Alto Research Center, US Patent No. 10235403, 2019.

Research Grants

- 2018-2023 NSF, *CINES: A Scalable Cyberinfrastructure for Sustained Innovation in Network Engineering and Science*, PIs: Madhav Marathe (VTech), Jure Leskovec (Stanford), Geoffrey Fox (IU), Total: **\$4,000,000**
- 2017 Xerox Research: DocuShare.
A Deep Similarity-based Graph Model for Learning Relevant Tags from Unstructured Data.
PI: *Ryan Rossi*, Co-PI: Hoda Eldardiry. Awarded **\$450,000** total
- 2016-2018 XIG Explore Research: Self Machine Learning Program.
Relational Deep Learning.
PI: *Ryan Rossi*. **\$300,000** awarded over 3 years, **\$900,000** total
Deep learning in graphs including inductive network representation learning, graph embeddings, and learning representations from attributed graphs
- 2017 Xerox Research: Horizon 3 Research Program.
Intelligent Workflow Automation using AI Planning, Learning, and Conversation Agents.
PI: Rong Zhou, Co-PI: *Ryan Rossi*. Awarded **\$720,000** total
- 2016 NVIDIA Hardware Research Gift.
Deep Graph Learning using Higher-order Functions based on Network Motifs.
PI: *Ryan Rossi*.
- 2015-2017 Xerox Foundation: University Research Collaboration.
Learning from an Expert in Noisy, Structured Domains: Adapting to Healthcare Problems.
co-PI & Liaison Manager: *Ryan Rossi* (subcontract with Indiana University), **\$90,000**

Books & Book Chapters

- Role Discovery **Ryan A. Rossi** and Nesreen Ahmed, *Role Discovery (Invited Book Chapter) in "Social Media Analytics: Advances and Applications"*, Eds. Jiliang Tang and Charu Aggarwal, CRC Press, 2017.
- Bioinformatics Jean-Louis Lassez, **Ryan A. Rossi**, Stephen Sheel, *Introduction to Bioinformatics using Action Labs*, Digital University Press, ISBN 978-1-257-69489-1, 2008.

Technical Reports

- [9] John Boaz Lee, **Ryan A. Rossi**, Xiangnan Kong, *Deep Graph Attention Model*, arXiv:1709.06075, 1–8, September 2017.
- [8] Nesreen K. Ahmed, **Ryan A. Rossi**, Rong Zhou, John Boaz Lee, Xiangnan Kong, Theodore L. Willke, Hoda Eldardiry, *A Framework for Generalizing Graph-based Representation Learning Methods*, arXiv:1709.04596, 1–9, September 2017.
- [7] James P. Canning, Emma E. Ingram, Sammantha Nowak-Wolff, Adriana M. Ortiz, Nesreen K. Ahmed, **Ryan A. Rossi**, Karl R. B. Schmitt, Sucheta Soundarajan, *Network Classification and Categorization*, arXiv:1709.04481, September 2017.
- [6] **Ryan A. Rossi**, Rong Zhou, and Nesreen K. Ahmed, *Estimation of Graphlet Statistics*, arXiv:1701.01772v2, 1–14, 2017.
- [5] Nesreen K. Ahmed, Jennifer Neville, **Ryan A. Rossi**, Nick Duffield, *Fast Parallel Graphlet Counting for Large Networks*, arXiv:1506.04322, 1–25, 2015.
- [4] **Ryan A. Rossi** and Nesreen K. Ahmed, *NetworkRepository: A Graph Data Repository with Visual Interactive Analytics*, arXiv:1410.3560, 1–6, 2014.
- [3] **Ryan A. Rossi**, David F. Gleich, Assefaw H. Gebremedhin, Md. Mostofa Ali Patwary, *What if CLIQUE were fast? Maximum Cliques in Information Networks and Strong Components in Temporal Networks*, arXiv:1210.5802, 2012.
- [2] **Ryan A. Rossi** and Jennifer Neville, *Representations and Ensemble Methods for Dynamic Relational Classification*, CoRR abs/1111.5312, 2011.
- [1] **Ryan A. Rossi**, *Discovering Latent Graphs with Positive and Negative Links to Eliminate Spam in Adversarial Information Retrieval*, NASA JPL, 2009.

Selected Talks

- 2018 BigData, *Dynamic Network Embeddings: From Random Walks to Temporal Random Walks*, Seattle, Washington.
- 2018 BigData, *Relational Similarity Machines (RSM): A Similarity-based Learning Framework for Graphs*, Seattle, Washington.
- 2018 WWW, *Higher-Order Network Representation Learning*, Lyon, France.
- 2018 WWW BigNet, *Deep Inductive Network Representation Learning*, Lyon, France.
- 2017 Adobe Research, *Machine Learning in Large Graphs*, San Jose, CA.
- 2016 DARPA, *HiperGraph: High-Performance Graph Analytics*, Washington, DC.
- 2016 CIKM, *Leveraging Multiple GPUs and CPUs for Graphlet Counting in Large Networks*, Indianapolis, Indiana.
- 2016 AAAI, *Towards Interactive Relational Learning*, Phoenix, Arizona.
- 2015 DSAA, *Parallel Collective Factorization*, Paris, France.
- 2015 XIG Conference, *Deep Learning on the GPU*, Webster, NY.
- 2015 FIU SCIS Invited Lecture Series, *Modeling and Mining Dynamic Attributed Networks*, Miami, FL.
- 2015 NJIT CS Colloquium, *Relational Machine Learning for Dynamic Networks*, Newark, NJ.

- 2015 Air Force Institute of Technology (AFIT) ECE Seminar, *Modeling and Mining Dynamic Attributed Networks*, Dayton, OH.
- 2015 Sandia National Lab, *Modeling and Mining Dynamic Networks*.
- 2015 WFU CS Colloquium, *Relational Time-series Learning for Improving Mining and Prediction Tasks*, Wake Forest, NC.
- 2015 WPI CS Colloquium, *Modeling and Mining Dynamic Attributed Networks*, Worcester, MA.
- 2015 The Network Data Repository with Interactive Graph Analytics and Visualization, *Twenty-Ninth Conference on Artificial Intelligence (AAAI)*, Austin, TX.
- 2014 Poster Symposium @ PARC, *Parallel Collective Factorization for Predictive and Descriptive Modeling of Large Heterogeneous Networks*.
- 2013 Purdue CS 50th Anniversary Celebration, *Find Cliques Fast with our Parallel Max-Clique Algorithms for Billion Edge Graphs*, West Lafayette, IN.
- 2013 Palo Alto Research Center, *Parallel Collective Matrix Factorization Framework for Real-time Recommendations in Big Data*.
- 2012 Pacific-Asia Conference on Knowledge Discovery and Data Mining, *Temporal-Relational Ensemble Methods*, Kuala Lumpur, Malaysia.
- 2012 9th Workshop on Algorithms and Models for the Web Graph, *Dynamic PageRank using Evolving Teleportation*, Halifax, Nova Scotia, Canada.
- 2012 Lawrence Livermore National Laboratory, *Dynamic PageRank using Evolving Teleportation*, Livermore, CA.
- 2010 16th ACM SIGKDD Conference on Knowledge Discovery and Data Mining, Social Media Analytics, *Modeling the Evolution of Discussion Topics and Communication to Improve Relational Classification*, Washington, DC.
- 2011 ISCR Annual Symposium held at Lawrence Livermore National Laboratory, *Modeling Temporal Behavior in Large Networks*, Livermore, CA.
- 2009 Jet Propulsion Laboratory, *A Scalable Image Processing Framework for Gigapixel Mars and Other Celestial Body Images*, Pasadena, CA.
- 2008 University of Massachusetts Amherst, *Discovering Causal Inferences within a Collaborative Peer Production System (Poster)*, Amherst, MA.
- 2007 IEEE International Conf, on Bioinformatics and Life Sciences Computing, *Crick's Hypothesis Revisited: The Existence of a Universal Coding Frame*, Niagara Falls, Canada.
- 2007 Moscow State University in Russia, *Crick's Hypothesis Revisited: The Existence of a Universal Coding Frame (Invited)*, Moscow, Russia.
- 2007 Bioinformatics 3rd Annual Research Symposium, *Crick's Hypothesis Revisited: The Existence of a Universal Coding Frame*, Clemson University.
- 2007 ACM Consortium for Computing Sciences in Colleges, *Presented a workshop: Computing and the Mysteries of Life: Bioinformatics (Invited)*.
- 2007 Computer Security Conference, *Secure Web Programming Metrics and COSECMO*.
- 2006 Celebration of Inquiry: Guiding our Changing World, *Crick's Hypothesis Revisited: The Existence of a Universal Coding Frame*, Coastal Carolina University.
- 2006 Science Success Seminar for Freshmen, *Undergraduate Research: What, Why and How? (Invited)*, Coastal Carolina University.
- 2006 SoTL Conference: On the Subject, *Bioinformatics Action Labs*.
- 2008 Computer Security Conference, *Signature Based Intrusion Detection using Latent Semantic Analysis*.
- 2008 Computer Security Conference, *Detecting Spam Sites by Ranking Links*.

Honors and Awards

- 2020 Elevation to IEEE Senior Member.
- 2017 Research Impact Award (PARC).
- 2016 PARC Research Award (Nominated by peers).
- 2012–2014 National Science Foundation (NSF) Graduate Fellow (GRFP).
- 2009–2012 Department of Defense: National Defense Science & Engineering PhD (NDSEG) Fellow.
- 2014–2015 Bilsland Dissertation Fellowship Awarded to Outstanding Ph.D. candidates.
- 2009 Purdue University Fredrick N. Andrews Doctoral Fellow.
- 2012 WAW Travel Award.
- 2011 NASA Invention Award (Monetary) for NPO-47898 (Polyphony: Workflow Orchestration Framework for High Performance and Parallel Computing).
- 2011–2012 LLNL Scholar (Cyber Defenders).
- 2010 Naval Research Laboratory (NREIP) Fellow: Center for Applied Research in Artificial Intelligence, Office of Naval Research (DoN).
- Summer 2009 NASA USRP Fellow, Jet Propulsion Laboratory, California Institute of Technology.
- 2009 National Aeronautics and Space Administration SC Space Grant.
- Spring 2009 NASA USRP Fellow, Jet Propulsion Laboratory, California Institute of Technology.
- 2008 REU NSF Fellowship Award, University of Massachusetts at Amherst.
- 2009–2014 Science, Mathematics And Research for Transformation (SMART) Fellow (declined).
- 2009–2014 Duke University Doctoral Fellow (declined).
- 2005–2009 Full merit scholarship, Coastal Carolina University.
- 2009 President's Award (Graduating with 4.0 GPA).
 - Erdős Number 3, Rossi-Duffield-Alon-Erdős.
- 2008 Outstanding Graduating Senior, College of Natural and Applied Sciences (CCU).
- 2007 Research Fellow, New Mexico Institute of Technology.
- 2007 Selected by University to Represent the College of Sciences at Moscow State University Conference (CCU).
- 2007 College of Natural and Applied Sciences Ambassador for Commencement (CCU).
- 2006–2007 Awarded Scholarship of Teaching and Learning Grant for Action Labs.
- 2006 Student Excellence in Research Award, Coastal Carolina University.
- 2005–2011 Inducted in Upsilon Pi Epsilon (CS) at Purdue and CCU, Pi Mu Epsilon (Math), Omicron Delta Kappa (Leadership), Phi Eta Sigma (Top freshmen).
- 2005–2009 Supported by NSF Grant ATM-0521002 (Jean-Louis Lassez & Var Limpasuvan).
- 2005–2009 President's List.
- 2003–2004 Obtained 11 Software Engineering and Information Technology Certifications at age 16-17: Microsoft Certified Solution Developer (MCSD), MCAD, CIW-A, CCNA, Linux+, Project+, i-Net+, Server+, Security+, Network+, A+, and MCP.

Teaching

- Spring 2008 **Lecturer**, *Search Engine Theory, CS 465*, Coastal Carolina University.
- Fall 2008 **Lecturer**, *Bioinformatics, BINF 101*, Coastal Carolina University.
- Spring 2007 **Lecturer**, *Numerical Methods, MATH 360*, Coastal Carolina University.
- Spring 2007 **Teaching Assistant**, *Bioinformatics, BINF 101*, Coastal Carolina University.
- Fall 2007 **Lecturer**, *Algorithms in Bioinformatics, CS 460*, Coastal Carolina University.
- Fall 2007 **Teaching Assistant**, *Bioinformatics, BINF 101*, Coastal Carolina University.
- Spring 2007 **Teaching Assistant**, *Algorithm Design II, CS 150*, Coastal Carolina University.
- Spring 2006 **Teaching Assistant**, *Algorithm Design I, CS 140*, Coastal Carolina University.

2006–2008 As a teaching assistant I gave lectures, developed: homework, labs, and programs, held office hours, maintained course website. I also graded the homework, labs and projects.

Students Supervised

- 2020 **Jiong Zhu**, *University of Michigan*, Ph.D. Student.
- 2019-2020 **Xin Qian**, *University of Maryland*, Ph.D. Student.
- 2020 **Yue Zhao**, *CMU*, Ph.D. Student.
- 2020 **Sejoon Oh**, *Georgia Tech*, Ph.D. Student.
- 2020 **Mojtaba Sahraee-Ardakan**, *USC*, Ph.D. Student.
- 2020 **Enayat Ullah**, *John Hopkins University*, Ph.D. Student.
- 2019-2020 **Jun Yan**, *USC*, Ph.D. Student.
- 2020 **Shenyu Xu**, *Georgia Tech*, Ph.D. Student.
- 2020 **Zening Qu**, *University of Washington*, Ph.D. Student.
- 2020 **Ihudiya Finda Ogbonnaya-Ogburu**, *University of Michigan*, Ph.D. Student.
- 2020 **Zhuohao Zhang**, *University of Illinois at Urbana-Champaign*, Ph.D. Student.
- 2020 **Galen Weld**, *University of Washington*, Ph.D. Student.
- 2020 **Chenhan Yuan**, *Virginia Tech*, Ph.D. Student.
- 2020 **Camille Harris**, *Georgia Tech*, Ph.D. Student.
- 2020 **Mrigank Raman**, *USC*, Ph.D. Student.
- 2020 **Zihao Zhou**, *UCSD*, Ph.D. Student.
- 2019 **Alireza Farhadi**, *University of Maryland (UMD)*, Ph.D. Candidate.
- 2019-2020 **Hongjie Chen**, *Virginia Tech*, Ph.D. Candidate.
- 2019 **Youngsuk Park**, *Stanford University*, Ph.D. Candidate.
- 2019 **Yikun Xian**, *Rutgers University*, Ph.D. Candidate.
- 2019-2020 **Saed Rezayi**, *University of Georgia (UGA)*, Ph.D. Candidate.
- 2019-2020 **Gromit Yeuk-Yin Chan**, *New York University (NYU)*, Ph.D. Candidate.
- 2019 **Kirankumar Shiragur**, *Stanford University*, Ph.D. Candidate.
- 2019 **Hongchang Gao**, *University of Pittsburgh*, Ph.D. Candidate.
- 2019 **He Jia**, *Georgia Institute of Technology*, Ph.D. Candidate.
- 2018-2020 **Di Jin**, *University of Michigan*, Ph.D. Candidate,
Research led to a paper entitled “Deep Graph Attention Models” published at KDD.
Patent application filed on the research.
Serving on his Ph.D. committee .
- 2018-2019 **Mark Heimann**, *University of Michigan*, Ph.D. Candidate.
- 2018 **Aldo Carranza**, *Stanford University*, Ph.D. Student.
- 2018 **Zahra Shakeri**, *Rutgers University*, Ph.D. Candidate.
- 2018 **Donghyun Kim**, *POSTECH*, Graduated @ Oath/Yahoo Research.
- 2018-2019 **Jianjun Luo**, *Worcester Polytechnic Institute (WPI)*, Ph.D. Candidate.
- 2018-2019 **Charles Chen**, *Ohio State University*, Ph.D. Candidate.
- 2017 **Jungho Park**, *Seoul National University*, Ph.D. Candidate,
Filed 3 patent applications related to anomaly detection in large multi-variate time series.
- 2017-2019 **John Boaz Lee**, *Worcester Polytechnic Institute (WPI)*, Ph.D. Candidate,
Research led to a paper entitled “Deep Graph Attention Models” published at KDD.
Patent application filed on the research.
Served on his Ph.D. committee “Deep Learning on Graph-structured Data”. Successfully defended and now at Facebook Research. .
- 2017-2018 **Giang Hoang Nguyen**, *Worcester Polytechnic Institute (WPI)*, Masters Student.

Ph.D. Committees

- 2020– **Hongjie Chen**, *Virginia Tech*, Ph.D. Candidate.
- 2018– **Di Jin**, *University of Michigan*, Ph.D. Candidate,
Dissertation: “Network Summarization and Embedding” .
- 2016–2020 **John Boaz Lee**, *Worcester Polytechnic Institute (WPI)*, Ph.D. Candidate,
Dissertation: “Deep Learning on Graph-structured Data” .

Research Software & Codes

- 2015–present **Parameterized Graphlet Decomposition Library (PGD)**, <http://graphlets.org>,
A fast parallel high-performance parameterized graphlet decomposition library for massive networks.
<http://github.com/nkahmed/pgd.git> .
- 2013–present **Network Repository (NR)**, <http://networkrepository.com>,
*The first **interactive data repository** that integrates visualization with state-of-the-art statistical methods and analytic techniques to support discovery and exploration of data in real-time. NR is the largest network data repository (5000+ donations, 30+ collections, and growing.).*
- 2014–present **GraphVIS**, <http://graphvis.com>,
Interactive visual graph mining and machine learning on the web. Visualize and explore network data easily. The most powerful visual analytics platform for network data. GraphVIS is the result of years of research in relational machine learning and graph mining. A free demo version is available at <http://networkrepository.com/graphvis>.
- 2013 **Parallel Maximum Clique (PMC) Library**, *A parallel high performance library for solving the maximum clique problem for dense graphs as well as large sparse networks,*
Download: <http://www.maxcliques.com>.
- 2013–present **MLVis**, <http://mlvis.com>,
MLVis is an interactive data repository that makes it easy to find, explore, and understand (ML) data. It provides researchers with open, persistent, robust, and accessible data along with web-based visual analytic tools to easily understand, explore, and compare data.
- 2012 **Dynamic PageRank**, *A package for modeling the importance and influence of nodes in dynamic networks with external interest/attributes.*
Download: http://www.ryanrossi.com/dynamic_pagerank.

Professional Service & Leadership

Invited SPC/PC Member:

- 2021–2022 Associate Editor for *Frontiers in Big Data (Machine Learning and Artificial Intelligence)*
- 2020–2021 International Conference on Learning Representations (ICLR)
- 2019–2022 Neural Information Processing Systems (NeurIPS)
- 2019–2022 International Conference on Machine Learning (ICML)
- 2019–2020 European Conference on Machine Learning (ECML/PKDD)
- 2018–2021 SIAM International Conference on Data Mining (SDM)
- 2016–2022 International Joint Conferences on Artificial Intelligence (IJCAI)
- 2016–2022 World Wide Web Conference (WWW)
- 2015–2022 AAAI Conference on Artificial Intelligence
- 2019–2022 International Conference on Information and Knowledge Management (CIKM)
- 2019–2021 International Conference on Artificial Neural Networks (ICANN)
- 2019–2020 ACM CHI Conference on Human Factors in Computing Systems

- 2012,2017 SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)
- 2016-2021 IEEE Big Data
 - 2019 NetSci-X
 - 2018 3rd International Workshop on Learning Representations for Big Networks (WWW BigNet)
 - 2018 IJCAI-ECAI SocInf+MAISoN Workshop
- 2016-2020 BigGraphs Workshop at IEEE BigData
 - 2016 ICDM SoMeRis Workshop

Journal Reviewing

- 2018- Review Editor, Machine Learning and Artificial Intelligence, Frontiers in Big Data
- 2012-20 Transactions on Knowledge and Data Engineering (TKDE)
- 2015-20 Artificial Intelligence
- 2019-20 Journal of Machine Learning Research
- 2012-13, 2017-20 Data Mining and Knowledge Discovery (DMKD)
- 2018-20 Theoretical Computer Science (TSC)
- 2019-20 Information Systems
- 2019-20 Network Science
 - 2020 IEEE Transactions on Intelligent Transportation Systems
 - 2020 ACM Computing Surveys
 - 2020 Journal of Statistical Mechanics: Theory and Experiment (JSTAT)
 - 2020 IEEE Transactions on Network Science and Engineering
- 2019-20 IEEE Intelligent Systems
- 2018-19 ACM Transactions on Intelligent Systems and Technology (TIST)
- 2018-19 Social Network Analysis and Mining
 - 2019 Information Processing and Management
 - 2019 Applied Network Science
 - 2019 Future Internet
- 2015-2017 Internet Mathematics
- 2015-2019 Knowledge and Information Systems (KAIS)
- 2016-2020 IEEE Transactions on Neural Networks and Learning Systems (TNNLS)
 - 2018 IEEE Internet of Things Journal
 - 2018 IEEE Transactions on Emerging Topics in Computational Intelligence
- 2013-2014 The Annals of Applied Statistics
 - 2016 Physica A: Statistical Mechanics and its Applications
- 2016-2017 ACM Transactions on Information Systems (TOIS)
- 2015-2018 Journal of Big Data
 - 2016 Optimization Methods and Software

Proposal Reviewing

- 2019 Natural Sciences and Engineering Research Council of Canada (NSERC)
- 2018 Swiss National Science Foundation (SNSF)
- 2017 NSF Information & Intelligent Systems Panel

Other Service

- 2005–Present AAAI, IEEE, ACM, and SIAM Member.

- 2004–Present Microsoft Certified Member, Cisco Certified Member, CompTIA Member, Certified Internet Webmaster Member
- 2009–2015 Machine Learning @ Purdue.
- 2009–2015 Indiana Center for Database Systems (ICDS).
- 2009–2012 Network Learning and Discovery Laboratory, *Purdue*.
- 2008–2009 President, Upsilon Pi Epsilon, National Computer Science Honor Society (CCU)
- 2007–2008 Vice President, Upsilon Pi Epsilon, National Computer Science Honor Society (CCU)
- 2007–2008 President, ACM Student Chapter & Numbers and Bytes (CCU)
- 2008 Volunteer Mentor for Middle School Students.

Computer Skills

Certifications	Microsoft Certified Solution Developer (MCS D), Microsoft Certified Applications Developer (MCAD), CIW-A, CCNA, Linux+, Project+, i-Net+, Server+, Security+, Network+, A+, MCP	
OS	Linux/Unix, Mac OSX, Windows, DOS	Scientific Matlab, Julia, Maple, R, Scilab
Programming	C/C++, Python, Java, C#, Ruby, PHP, Javascript, JQuery, Ajax, ASP, SQL, Haskell, CoQ (Interactive Prover), 80x86 Assem.	Media HTML, Photoshop, Flash, VTK, 3D Max, Radiant, 3D Worldcraft
Distributed Computing	Hadoop/MapReduce, MPI, OpenMP, Spark, Accumulo, Amazon Elastic Cloud (EC2)	Tools/Typo. Eclipse, Spyder, MS Visual Studio, Git/SVN/CVS, L ^A T _E X, MS Office