

LEMAN AKOGLU

Heinz College Dean's Associate Professor, Information Systems
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EMPLOYMENT

- **Carnegie Mellon University** Pittsburgh, PA
*Heinz College Dean's Associate Professor of Info. Sys. (**Tenured**)* *July 2022 - Present*
*Heinz College Dean's **Associate** Professor of Info. Sys. (Tenure-Track)* *July 2019 - June 2022*
*Heinz College **Dean's** Assistant Professor of Info. Sys. (Tenure-Track)* *Apr. 2019 - July 2019*
Asst. Professor of Information Systems (Tenure-Track) *Sep. 2016 - Apr. 2019*
H. John Heinz III College
Affiliated Faculty of SCS Computer Science Department
Affiliated Faculty of SCS Machine Learning Department
- **Amazon Inc.** Seattle, USA
Amazon Scholar *Sep. 2023 - Present*
Machine Learning Accelerator
- **Stony Brook University** Stony Brook, NY
Assistant Professor (Tenure-Track) *Aug. 2012 - Aug. 2016*
Department of Computer Science

EDUCATION

- **Carnegie Mellon University** Pittsburgh, PA
Ph.D., Computer Science *Sep. 2007 - Aug. 2012*
Thesis Mining and Modeling Real-world Networks: Patterns, Anomalies, and Tools.
Ph.D. advisor Christos Faloutsos
Committee Christos Faloutsos (Chair), Andrew Moore (CMU, Google Inc.), Aarti Singh (CMU), Andrew Tomkins (Google Inc.)
- **Bilkent University** Ankara, Turkey
B.S., Computer Science (with distinction) *Sep. 2003 - May 2007*
Senior thesis *Focused Crawling for Intelligent Portals*
Thesis advisor Ozgur Ulusoy
GPA 3.95/4.00, **Major GPA** 4.00/4.00 (Ranked 2nd/150)
- **Bursa Tan College** Bursa, Turkey
High School Education, GPA: 5.00/5.00 *Sep. 2002 - June 2003*
Ranked 1st among 2003 graduates
- **İzmir Science High School** İzmir, Turkey
High School Education, GPA: 5.00/5.00 *Sep. 2000 - June 2002*

RESEARCH INTERESTS

My research is in data mining and knowledge discovery, network science, and applied machine learning and statistics; with a focus on pattern discovery, anomaly, fraud, and event detection in large-scale, time-varying/streaming, multi-modal, noisy data through effective and scalable computational methods.

Areas:

- Data Mining and Knowledge Discovery
- Graph Mining
- Big Data & Statistics
- Pattern Discovery
- Network Science
- Real-World Graph Modeling
- Machine Learning
- Anomaly & Event Detection

HONORS & AWARDS

- Selected, **IJCAI 2021 Early-Career Spotlight** (among 15 all over the world), May 2021
- Received, **SDM/IBM Early Career Data Mining Research Award**, April 2021
- Received, **The Most Influential Paper Award** , Pacific Asia Conference on Knowledge Discovery and Data Mining (PAKDD) 2021
- Received, Adobe University Marketing Research Award, Oct. 2019
- Winner, **Best Research Paper** Award at SIAM SDM 2019
- Received, Heinz College Dean's Career Development Professorship, April 18, 2019
- Delivered, Gilbreth Lecture at the National Academy of Engineering, Feb 7, 2019
- Runner-up, **Best Student Machine Learning Paper** Award at ECML PKDD 2018
- Received, Adobe University Marketing Research Award, June 2017
- Runner-up, **Best Research Paper** Award at SIAM SDM 2016
- Received, Stony Brook University Discretionary Award by the CS Dept, Dec 2015
- Received, Facebook Faculty Research Award, May 2015
- Winner, **Best Research Paper** Award at SIAM SDM 2015
- Received, SIAM SDM Early Career Travel Award, Feb 2015
- Received, **NSF CAREER Award**, Jan 2015
- Received, Stony Brook University Discretionary Award by the CS Dept, Dec 2014
- Winner, **Best Paper** Award at ADC 2014
- Received, SIAM SDM Early Career Travel Award, Jan 2014
- Received, **Army Research Office Young Investigator Program Award**, Dec 2013
- Received, IBM First Patent Application Invention Achievement Award, 2012
- Received, PAKDD Student Travel Grant Award, 2012
- Winner, "Top IBM Intern" plaque in the Fifth Annual IBM Research Chess Tournament, 2011
- Winner, Facebook Grace Hopper Scholarship 2010
- Winner, Google ECML PKDD Conference and Travel Grant Award for Women in CS, 2010
- Winner, **Best Paper** Award at PAKDD 2010
- Winner, **Best Knowledge Discovery Paper** Award in ECML PKDD 2009
- Winner, "Instructors' Choice" Award for the Graphical Models class project 2008
- Winner, CMU Graduate Student Assembly Conference Funding on August 2008
- Ranked 2nd, Computer Science Department, Bilkent University, among 150 graduates, 2007
- High Honor Student, Bilkent University, for all terms, 2003-07
- Full Scholarship, Bilkent University, including tuition and monthly stipend, 2003-07
- Ranked 300th, National University Entrance Exam in Turkey among over 1 million students, 2003
- Ranked 5th, Science High School Entrance Exam in Turkey among over 300,000 students, 2000
- Winner, two bronze medals at Bursa Secondary Schools Chess Tournaments, 1996 and 1997

THESIS

- Leman Akoglu. *Mining and Modeling Real-world Networks: Patterns, Anomalies, and Tools*. Doctoral Dissertation, Carnegie Mellon University, Computer Science Department (CSD), 2012.

PUBLICATIONS

Also see my Google Scholar and DBLP pages.

PRE-PRINTS

1. Haomin Wen, Shurui Cao, Leman Akoglu
Uncertainty-aware Spatio-Temporal Human Mobility Modeling and Anomaly Detection
Submitted to KDD 2025
2. Yuchen Shen, Haomin Wen, Leman Akoglu
Zero-shot Outlier Detection via Prior-data Fitted Networks: Model Selection Bygone!
(re)Submitted to ICML 2025 <https://arxiv.org/abs/2409.05672>
3. Xueying Ding, Lingxiao Zhao, Lijun Yu, Leman Akoglu
Unified Discrete Diffusion for Categorical Data
Submitted to JMLR, Jan 2025, <https://arxiv.org/abs/2402.03701>
4. Jaemin Yoo, Lingxiao Zhao, Leman Akoglu
Self-tuning Self-Supervised Anomaly Detection
(re)Submitted to KDD 2025, <https://arxiv.org/abs/2306.12033>
5. Shubhranshu Shekhar, Jetson Leder-Luis, Leman Akoglu
Can Machine Learning Target Health Care Fraud? Evidence from Medicare Hospitalizations
<https://arxiv.org/abs/2211.02927>
6. Guilherme D. F. Silva, Leman Akoglu, Robson L. F. Cordeiro
C-ALLOUT: Catching & Calling Outliers by Type
<https://arxiv.org/pdf/2110.08257.pdf>
7. Lingxiao Zhao, Leman Akoglu
Connecting Graph Convolutional Networks and Graph-Regularized PCA
<https://arxiv.org/abs/2006.12294>, Mar. 2021
8. Yue Wu, Leman Akoglu, Ian Davidson
Coverage-based Outlier Explanation
<https://arxiv.org/abs/1911.02617>, Nov. 2019

PEER-REVIEWED JOURNAL ARTICLES

1. Steven Jecmen, Nihar B. Shah, Fei Fang, Leman Akoglu
On the Detection of Reviewer-Author Collusion Rings From Paper Bidding
Transactions on Machine Learning Research (TMLR), Jan. 2025
2. Jaemin Yoo, Tiancheng Zhao, Leman Akoglu
Data Augmentation is a Hyperparameter: Cherry-picked Self-Supervision for Unsupervised Anomaly Detection is Creating the Illusion of Success
Transactions on Machine Learning Research (TMLR), July 2023
3. Shubhranshu Shekhar, Dhivya Eswaran, Bryan Hooi, Jonathan Elmer, Christos Faloutsos, Leman Akoglu
Benefit-aware Early Prediction of Health Outcomes on Multivariate EEG Time Series
Journal of Biomedical Informatics, Jan. 2023
4. Lingxiao Zhao, Saurabh S. Sawlani, Leman Akoglu

5. Hung Nguyen, Pierre J. Liang, Leman Akoglu
Detecting Anomalous Graphs in Labeled Multi-Graph Databases
ACM Transactions on Knowledge Discovery from Data (TKDD),
<https://doi.org/10.1145/3533770>, Aug. 2022
6. Lingxiao Zhao and Leman Akoglu
*On Using Classification Datasets to Evaluate Graph Outlier Detection:
Peculiar Observations and New Insights*
Big Data Journal, Special Issue on Evaluation and Experimental Design in Data Min. and Mach.
Learn. <https://doi.org/10.1089/big.2021.0069>, Dec. 2021
7. Xiaoxiao Ma, Jia Wu, Shan Xue, Jian Yang, Chuan Zhou, Quan Z. Sheng, Hui Xiong,
Leman Akoglu
A Comprehensive Survey on Graph Anomaly Detection with Deep Learning
IEEE Transactions on Knowledge and Data Engineering (TKDE), Sep. 2021.
8. Hung Nguyen, Xuejian Wang, Leman Akoglu
End-to-End Continual Rare-Class Recognition with Emerging Novel Subclasses
ACM Transactions on Knowledge Discovery from Data (TKDD), Volume 14, Issue 5,
Article No. 61, August 2020.
9. Meghanath Macha and Leman Akoglu
Explaining Anomalies in Groups with Characterizing Subspace Rules
Data Mining and Knowledge Discovery (DAMI), 32(5), 1444-1480 (ECML PKDD Journal
Track), 2018.
10. Bryan Perozzi and Leman Akoglu
*Discovering Communities and Anomalies in Attributed Graphs: Interactive Visual Exploration and
Summarization*
ACM Transactions on Knowledge Discovery from Data (TKDD), Volume 12, Issue 2,
Article No. 24, Jan 2018.
11. Sokratis Vidos, Constantinos Kolias, Georgios Kambourakis, Leman Akoglu
Automatic Detection of Online Recruitment Frauds: Characteristics, Methods, and a Public Dataset
Future Internet, 9(1), 6; doi:10.3390/f9010006, Mar 2017.
12. Véronique Van Vlasselaer, Tina Eliassi-Rad, Leman Akoglu, Monique Snoeck, Bart Baesens.
GOTCHA! Network-based Fraud Detection for Social Security Fraud.
Management Science (INFORMS) MS-14-00232.R4, Feb 2016.
13. Shebuti Rayana and Leman Akoglu
Less is More: Building Selective Anomaly Ensembles
ACM Transactions on Knowledge Discovery from Data (TKDD), Jan 2016.
14. Hau Chan and Leman Akoglu
Optimizing Network Robustness by Edge Rewiring: A General Framework
Data Mining and Knowledge Discovery (DAMI), 30(5), 1395–1425. (DAMI-D-14-00490R3;
DOI: 10.1007/s10618-015-0447-5) (ECML PKDD Journal Track), 2016.
15. Vasudev Bhat, Adheesh Gokhale, Ravi Jadhav, Jagat Sastry Pudipeddi, Leman Akoglu
Effects of Tag Usage on Question Response Time: Analysis and Prediction in StackOverflow
Social Network Analysis and Mining (SNAM-D-14-00101R1) 5(1) (Springer), 2015.
16. Véronique Van Vlasselaer, Cristián Bravo, Olivier Caelen, Tina Eliassi-Rad, Leman Akoglu,
Monique Snoeck, Bart Baesens
*APATE: A Novel Approach for Automated Credit Card Transaction Fraud Detection using
Network-Based Extensions*

Decision Support Systems (Elsevier), 2015.

17. Leman Akoglu, Hanghang Tong, Danai Koutra
Graph-based Anomaly Detection and Description: A Survey
Data Mining and Knowledge Discovery (DAMI), 29(3), 2015.
18. Yuan Yao, Hanghang Tong, Tao Xie, Leman Akoglu, Feng Xu, Jian Lu
Detecting High-quality Posts in Community Question Answering Sites
Information Sciences, 2015.
19. Leman Akoglu and Christos Faloutsos
RTG: A Recursive Realistic Graph Generator using Random Typing
Data Mining and Knowledge Discovery (DAMI) 19(2): 194-209, 2009.

PEER-REVIEWED CONFERENCE PAPERS

1. Shurui Cao, Leman Akoglu
Trajectory Anomaly Detection with By-Design Complementary Detectors
SIAM SDM (26.7%), Alexandria, VA, USA, May 2025
2. Boje Deforce, Meng-Chieh Lee, Bart Baesens, Estefania Serral, Jaemin Yoo, Leman Akoglu
TSA on AutoPilot: Self-tuning Self-supervised Time Series Anomaly Detection
SIAM SDM (26.7%), Alexandria, VA, USA, May 2025
3. Lingxiao Zhao, Xueying Ding, Leman Akoglu
PARD: Permutation-Invariant Autoregressive Diffusion for Graph Generation
NeurIPS (25.8%), Vancouver, Canada, Dec. 2024
4. Xueying Ding, Rui Xi, Leman Akoglu
Outlier Detection Bias Busted: Understanding Sources of Algorithmic Bias through Data-centric Factors
AAAI/ACM AIES (31.8%), San Jose, CA, Oct. 2024
5. Xueying Ding, Yue Zhao, Leman Akoglu
Fast Unsupervised Deep Outlier Model Selection with Hypernetworks
ACM SIGKDD (20%), Barcelona, Spain, Aug. 2024
6. Yue Zhao, Leman Akoglu
HPOD: Hyperparameter Optimization for Unsupervised Outlier Detection
AutoML (42%), Paris, France, Sep. 2024
7. Jeremy Lee, Lingxiao Zhao, Leman Akoglu
Descriptive Kernel Convolution Network with Improved Random Walk Kernel
ACM TheWebConf (20.2%), Singapore, May 2024
8. Konstantinos Sotiropoulos, Lingxiao Zhao, Pierre J. Liang, Leman Akoglu
ADAMM: Anomaly Detection of Attributed Multi-graphs with Metadata: A Unified Neural Network Approach
IEEE BigData (Regular, 17.5%), Sorrento, Italy, Dec. 2023
9. Leman Akoglu, Jaemin Yoo
Self-Supervision for Unsupervised Anomaly Detection: Pitfalls & Opportunities [Vision Paper]
IEEE BigData (Short, 21.1%), Sorrento, Italy, Dec. 2023
10. Xueying Ding, Nikita Seleznev, Senthil Kumar, Leman Akoglu
From Detection to Action: a Human-in-the-loop Toolkit for Anomaly Reasoning and Management
ACM ICAIF (International Conference on AI in Finance) (Oral, 27%), NYC, USA, Nov. 2023
11. Jaemin Yoo, Yue Zhao, Lingxiao Zhao, Leman Akoglu
DSV: An Alignment Validation Loss for Self-supervised Outlier Model Selection

ECML PKDD (24%), Turin, Italy, Sep. 2023

12. Martin Q. Ma, Yue Zhao, Xiaorong Zhang, Leman Akoglu
The Need for Unsupervised Outlier Model Selection: A Review and Evaluation of Internal Evaluation Strategies
ACM SigKDD Explorations Newsletter, June 2023
13. Xueying Ding, Lingxiao Zhao, Leman Akoglu
Hyperparameter Sensitivity in Deep Outlier Detection: Analysis and a Scalable Hyper-Ensemble Solution
NeurIPS (25.6%), New Orleans, LA, USA, Dec. 2022
14. Lingxiao Zhao, Neil Shah, Leman Akoglu
A Practical, Progressively-Expressive GNN
NeurIPS (25.6%), New Orleans, LA, USA, Dec. 2022
15. Ge Zhang, Zhenyu Yang, Jia Wu, Jian Yang, Shan Xue, Hao Peng, Jianlin Su, Chuan Zhou, Quan Z. Sheng, Leman Akoglu, Charu C. Aggarwal
Dual-discriminative Graph Neural Network for Imbalanced Graph-level Anomaly Detection
NeurIPS (25.6%), New Orleans, LA, USA, Dec. 2022
16. Yue Zhao, Sean Zhang, Leman Akoglu
Toward Unsupervised Outlier Model Selection
IEEE ICDM (Regular, 9.77%), Orlando, FL, USA, Dec. 2022
17. Shuli Jiang, Robson L. F. Cordeiro, Leman Akoglu
D.MCA: Outlier Detection with Explicit Micro-Cluster Assignments
IEEE ICDM (Short, 20%), Orlando, FL, USA, Dec. 2022
18. Lingxiao Zhao, Saurabh Sawlani, Arvind Srinivasan, Leman Akoglu
Graph Anomaly Detection with Unsupervised GNNs
IEEE ICDM (Short, 20%), Orlando, FL, USA, Dec. 2022
19. Dimitris Berberidis, Pierre J. Liang, Leman Akoglu
Summarizing Labeled Multi-Graphs
ECML PKDD (25.96%), Grenoble, France, Sep. 2022
20. Sean Zhang, Zihan Wang, Varun Ursekar, Leman Akoglu
SPARX: Distributed Outlier Detection at Scale
ACM SIGKDD (Applied Data Science Track) (25.89%), Washington, DC, Aug. 2022
21. Lingxiao Zhao, Wei Jin, Leman Akoglu, Neil Shah
From Stars to Subgraphs: Uplifting Any GNN with Local Structure Awareness
ICLR, Virtual, Apr. 2022
22. Yue Zhao, Ryan Rossi, Leman Akoglu
METAOD: Automating Outlier Detection via Meta-Learning
NeurIPS (26%), Virtual, Dec. 2021.
23. Saurabh S. Sawlani, Lingxiao Zhao, Leman Akoglu
Fast Attributed Graph Embedding via Density of States
IEEE ICDM (Full paper) (9.9%), Virtual, Dec. 2021.
Invited to KAIS Journal Special Issue (ICDM Best papers)
24. Leman Akoglu
Anomaly Mining - Past, Present and Future
IJCAI, Early Career Track, 2021 <https://arxiv.org/abs/2105.10077>
25. Meng-Chieh Lee, Hung T. Nguyen, Dimitris Berberidis, Vincent S. Tseng, Leman Akoglu
GAWD: Graph Anomaly Detection in Weighted Directed Graph Databases
IEEE/ACM ASONAM (Regular paper), Virtual, Nov. 2021.

26. Shubhranshu Shekhar, Neil Shah, Leman Akoglu
FAIROD: *Fairness-aware Outlier Detection*
AAAI/ACM AIES (Oral presentation) (9.6%), Virtual, May 2021.
27. Yue Zhao, Xiyang Hu, Cheng Cheng, Cong Wang, Changlin Wan, Wen Wang, Jianing Yang, Haoping Bai, Zheng Li, Cao Xiao, Yunlong Wang, Zhi Qiao, Jimeng Sun, Leman Akoglu
SUOD: *Accelerating Large-scale Unsupervised Heterogeneous Outlier Detection*
MLSys (23.5%), Virtual, Apr. 2021.
28. Meng-Chieh Lee, Yue Zhao, Aluna Wang, Pierre J. Liang, Leman Akoglu, Vincent S. Tseng and Christos Faloutsos
AUTOAUDIT: *Mining Accounting and Time-Evolving Graphs*
IEEE BigData (short paper), Virtual, Dec. 2020.
29. Jiong Zhu, Yujun Yan, Lingxiao Zhao, Mark Heimann, Leman Akoglu, Danai Koutra
Beyond Homophily in Graph Neural Networks: Current Limitations and Effective Design Choices
NeurIPS (20.1%), Virtual, Dec. 2020.
30. Lingxiao Zhao and Leman Akoglu
PAIRNORM: *Tackling Oversmoothing in GNNs*
ICLR (26.5%), Addis Ababa, Ethiopia, Apr. 2020.
31. Xiaoyi Gu, Leman Akoglu, Alessandro Rinaldo
Statistical Analysis of Nearest Neighbor Methods for Anomaly Detection
NeurIPS (24.4%), Vancouver, Canada, Dec. 2019.
32. Hung Nguyen, Xuejian Wang, Leman Akoglu
Continual Rare-Class Recognition with Emerging Novel Subclasses
ECML PKDD (17.71%), Würzburg, Germany, Sep. 2019.
33. Tahora H. Nazer, Matthew Davis, Mansooreh Karami, Leman Akoglu, David Koelle, Huan Liu
Bot Detection: Will Focusing on Recall Cause Overall Performance Deterioration?
SBP-BRIMS, Washington DC, USA, July 2019.
34. Lakmal B. Meegahapola, Thivya Kandappu, Kasthuri Jayarajah, Leman Akoglu, Shili Xiang, Archan Misra
BuSCOPE: *Fusing Individual & Aggregated Mobility Behavior for “Live” Smart City Services*
ACM MobiSys (23.25%), Seoul, Korea, June 2019.
35. Tuan M. V. Le and Leman Akoglu
ContraVis: Contrastive and Visual Topic Modeling for Comparing Document Collections
TheWebConf (18%), San Francisco, CA, May 2019.
36. Hemank Lamba and Leman Akoglu
Learning On-the-Job to Re-rank Anomalies from Top-1 Feedback
SIAM SDM (22.7%), Calgary, Canada, May 2019.
[Best Research Paper](#)
37. Xuan Wu*, Lingxiao Zhao* Leman Akoglu
A Quest for Structure: Jointly Learning the Graph Structure and Semi-Supervised Classification
ACM CIKM (17%), Turin, Italy, Oct. 2018.
38. Bryan Hooi, Leman Akoglu, Dhivya Eswaran, Hyun Ah Song, Amritanshu Pandey, Marko Jereminov, Larry Pileggi, Christos Faloutsos
Online Localized Change Detection for Sensor Data on a Graph
ACM CIKM (17%), Turin, Italy, Oct. 2018.
39. Shubhranshu Shekhar and Leman Akoglu
Incorporating Privileged Information to Unsupervised Anomaly Detection
ECML PKDD (26%), Dublin, Ireland, Sep. 2018.
[Best Student Machine Learning Paper Runner-up \(plenary talk\)](#)

40. Meghanath Macha, Deepak Pai, Leman Akoglu
Contextual Outlier Detection with Multiple Contexts: Application to Ad Fraud
ECML PKDD (26%), Dublin, Ireland, Sep. 2018.
41. Nikhil Gupta, Dhivya Eswaran, Neil Shah, Leman Akoglu, Christos Faloutsos
Beyond Outlier Detection: LookOut for Pictorial Explanation
ECML PKDD (26%), Dublin, Ireland, Sep. 2018.
42. Abhinav Maurya, Leman Akoglu, Ramayya Krishnan, Daniel Bay
A Lens into Employee Peer Reviews via Sentiment-Aspect Modeling
ACM/IEEE ASONAM (industry track), Barcelona, Spain, Aug. 2018.
43. Emaad A. Manzoor, Hemank Lamba, Leman Akoglu
x-STREAM: Outlier Detection in Feature-Evolving Data Streams
ACM SIGKDD (18.4%), London, UK, Aug. 2018.
44. Junting Ye and Leman Akoglu.
Robust Semi-Supervised Learning on Multiple Networks with Noise
PAKDD (regular, 17.8%), Melbourne, Australia, June 2018.
45. Emaad A. Manzoor and Leman Akoglu
RUSH! Targeted Time-limited Coupons via Purchase Forecasts
ACM SIGKDD (poster, 21.46%), Halifax, Nova Scotia, Canada, Aug. 2017.
46. Heeyoung Kwon, Mirza Basim Baig, Leman Akoglu
A Domain-Agnostic Approach to Spam-URL Detection via Redirects
PAKDD (28.2%), Jeju, South Korea, May 2017.
47. Abhinav Mishra and Leman Akoglu
Ranking in Heterogeneous Networks with Geo-Location Information
SIAM SDM (26%), Houston, Texas, April 2017.
48. Aria Rezaei, Bryan Perozzi, Leman Akoglu
Ties That Bind - Characterizing Classes by Attributes and Social Ties
WWW Companion, Alternate Web Science Track, Perth, AU, April 2017.
49. Shebuti Rayana, Wen Zhong, Leman Akoglu
Sequential Ensemble Learning for Anomaly Mining: A Bias-Variance Perspective
IEEE ICDM (19.6%), Barcelona, Spain, Dec. 2016.
50. Emaad A. Manzoor, Sadegh M. Milajerdi, Leman Akoglu
Fast Memory-Efficient Anomaly Detection in Streaming Heterogeneous Graphs
ACM SIGKDD (full paper, 8.93%), San Francisco, CA, USA, Aug. 2016.
51. Junting Ye, Santhosh Kumar, Leman Akoglu
Temporal Opinion Spam Detection Using Multiple Indicative Signals
ICWSM (poster), Cologne, Germany, May 2016.
52. Bryan Perozzi and Leman Akoglu
Scalable Anomaly Ranking of Attributed Neighborhoods
SIAM SDM (25.9%), Miami, Florida, May 2016.
Best Research Paper Runner-up
53. Shebuti Rayana and Leman Akoglu
Collective Opinion Spam Detection using Active Inference
SIAM SDM (25.9%), Miami, Florida, May 2016.
54. Bryan Hooi, Neil Shah, Alex Beutel, Stephan Gunnemann, Leman Akoglu, Mohit Kumar, Disha Makhija, and Christos Faloutsos
BIRDNEST: Bayesian Inference for Ratings-Fraud Detection
SIAM SDM (25.9%), Miami, Florida, May 2016.

55. Junting Ye and Leman Akoglu
Discovering Opinion Spammer Groups by Network Footprints
ECML PKDD (23.2%), Porto, Portugal, Sep. 2015.
56. Shebuti Rayana and Leman Akoglu
Collective Opinion Spam Detection: Bridging Review Networks and Metadata
ACM SIGKDD (19.4%), Sydney AU, Aug. 2015.
57. Veronique Van Vlasselaer, Tina Eliassi-Rad, Leman Akoglu, Monique Snoeck, Bart Baesens
AFRAID: Fraud Detection via Active Inference in Time-evolving Social Networks
IEEE/ACM ASONAM, Paris, France, Aug. 2015.
58. Mirza Basim Baig and Leman Akoglu
Correlation of Node Importance Measures: An Empirical Study through Graph Robustness
WWW Companion, Web Science Track (13.8%), Florence, Italy, May 2015.
Invited to a Special Issue of the Journal of Web Science (JWS)
59. Shebuti Rayana and Leman Akoglu
Less is More: Building Selective Anomaly Ensembles—Application to Event Detection in Temporal Graphs
SIAM SDM, Vancouver, BC, Canada, April 2015. (Oral presentation)
60. Hau Chan, Shuchu Han, Leman Akoglu
Where Graph Topology Matters: The Robust Subgraph Problem
SIAM SDM, Vancouver, BC, Canada, April 2015. (Oral presentation)
Best Research Paper
Invited to “Best of SDM 2015” Special Issue of Statistical Analysis and Data Mining J. (SAM)
61. Veronique Van Vlasselaer, Leman Akoglu, Tina Eliassi-Rad, Monique Snoeck, Bart Baesens
Guilt-by-Constellation: Fraud Detection by Suspicious Clique Memberships
HICSS, Kauai, HI, Jan. 2015.
62. Leman Akoglu, Rohit Khandekar, Vibhore Kumar, Srinivasan Parthasarathy, Deepak Rajan, Kun-Lung Wu
Fast Nearest Neighbor Search on Large Time-Evolving Graphs
ECML PKDD, Nancy, France, September 2014.
63. Bryan Perozzi, Leman Akoglu, Patricia Iglesias Sánchez, Emmanuel Müller
Focused Clustering and Outlier Detection in Large Attributed Graphs
ACM SIGKDD, NYC, New York, August 2014.
64. Vasudev Bhat, Adheesh Gokhale, Ravi Jadhav, Jagat Sastry Pudipeddi, Leman Akoglu
Min(e)d Your Tags: Analysis of Question Response Time in StackOverflow
IEEE/ACM ASONAM, Beijing, China, August 2014.
*Invited to appear in **SNAM** (Social Network Analysis and Mining) journal by Springer (ASONAM best papers)*
65. Yuan Yao, Hanghang Tong, Tao Xie, Leman Akoglu, Feng Xu, Jian Lu
Joint Voting Prediction for Questions and Answers in CQA
IEEE/ACM ASONAM, Beijing, China, August 2014.
*Invited to appear in **SNAM** (Social Network Analysis and Mining) journal by Springer (ASONAM best papers)*
66. Tiantian Gao, Leman Akoglu
Fast Information-Theoretic Agglomerative Co-Clustering
ADC, Brisbane, Australia, July 2014. (Oral presentation)
Best Paper
67. Leman Akoglu
Quantifying Political Polarity Based on Bipartite Opinion Networks
ICWSM, Ann Arbor, Michigan, June 2014.

68. Jun Seok Kang, Song Feng, Leman Akoglu, Yejin Choi
ConnotationWordNet: Learning Connotation of the Word+Sense Network
ACL, Baltimore, MD, June 2014. (Oral presentation)
69. Jagat Sastry Pudipeddi, Leman Akoglu, Hanghang Tong
User Churn in Focused Q&A Sites: Characterizations and Prediction
WWW, Web Science Track, Seoul, Korea, Apr. 2014.
70. Hau Chan, Leman Akoglu, Hanghang Tong
Make It or Break It: Manipulating Robustness in Large Networks
SIAM SDM, Philadelphia, PA, Apr. 2014. (Oral presentation)
71. Hau Chan and Leman Akoglu
External Evaluation of Topic Models: A Graph Mining Approach
IEEE ICDM, Dallas, Texas, Dec. 2013.
72. Vivek Kulkarni, Jagat S. Pudipeddi, Leman Akoglu, Joshua T. Vogelstein, R. Jacob Vogelstein, Sephira Ryman, Rex E. Jung
Sex Differences in the Human Connectome
BHI: Brain and Health Informatics, Maebashi, Japan, Oct. 2013.
73. Leman Akoglu, Rishi Chandy, Christos Faloutsos
Opinion Fraud Detection in Online Reviews by Network Effects
ICWSM, Boston, MA, July 2013.
74. Evangelos E. Papalexakis, Leman Akoglu, Dino Ienco
Do more views of a graph help? Community Detection and Clustering in Multi-Graphs
FUSION, Istanbul, Turkey, July 2013.
75. Leman Akoglu, Jilles Vreeken, Hanghang Tong, Duen H. Chau, Nikolaj Tatti, Christos Faloutsos
Mining Connection Pathways for Marked Nodes in Large Graphs
SIAM SDM, Austin, Texas, May 2013.
76. Leman Akoglu, Hanghang Tong, Jilles Vreeken, Christos Faloutsos
Fast and Reliable Anomaly Detection in Categorical Data
ACM CIKM, Maui, Hawaii, Oct 2012.
77. Duen Horng Chau, Leman Akoglu, Jilles Vreeken, Hanghang Tong, Christos Faloutsos
TourViz: Interactive Visualization of Connection Pathways in Large Graphs (Demo paper)
ACM SIGKDD, Beijing, China, Aug 2012.
78. Keith Henderson, Brian Gallagher, Tina Eliassi-Rad, Hanghang Tong, Sugato Basu, Leman Akoglu, Danai Koutra, Lei Li, Christos Faloutsos
RolX: Structural Role Extraction & Mining in Large Graphs
ACM SIGKDD, Beijing, China, Aug 2012.
79. Leman Akoglu, Duen Horng Chau, U Kang, Danai Koutra, Christos Faloutsos
OPAvion: Mining and visualization in large graphs (Demo paper)
ACM SIGMOD, Arizona, May 2012.
80. Leman Akoglu, Hanghang Tong, Brendan Meeder, Christos Faloutsos
PICS: Parameter-free Identification of Cohesive Subgroups in Large Attributed Graphs
SIAM SDM, CA, Apr. 2012.
81. Leman Akoglu, Pedro Olmo Vaz de Melo, Christos Faloutsos
Quantifying Reciprocity in Large Weighted Communication Networks
PAKDD, Kuala Lumpur, Malaysia, May 2012.
82. Keith Henderson, Brian Gallagher, Lei Li, Leman Akoglu, Tina Eliassi-Rad, Hanghang Tong, Christos Faloutsos
It's Who You Know: Graph Mining Using Recursive Structural Features

ACM SIGKDD, San Diego, CA, Aug. 2011.

83. U Kang, Mary McGlohon, Leman Akoglu, and Christos Faloutsos
Patterns on the Connected Components of Terabyte-Scale Graphs
IEEE ICDM, Sydney, Australia, Dec. 2010.
84. Pedro Olmo Vaz de Melo, Leman Akoglu, Christos Faloutsos, Antonio Loureiro
Surprising Patterns for the Call Duration Distribution of Mobile Phone Users
ECML PKDD, Barcelona, Spain, Sep. 2010.
85. Keith Henderson, Tina Eliassi-Rad, Christos Faloutsos, Leman Akoglu, Lei Li, Koji Maruhashi, B. Aditya Prakash, Hanghang Tong
MetricForensics: A Multi-Level Approach for Mining Volatile Graphs
ACM SIGKDD, Washington, D.C., July 2010.
86. Leman Akoglu, Mary McGlohon, Christos Faloutsos
OddBall: Spotting Anomalies in Weighted Graphs
PAKDD, Hyderabad, India, June 2010.
Best Research Paper
PAKDD 2020 The Most Influential Paper Award
87. Leman Akoglu and Christos Faloutsos
Event Detection in Time Series of Mobile Communication Graphs
27th Army Science Conference, Orlando, Florida, Dec. 2010.
88. Leman Akoglu and Christos Faloutsos
RTG: A Recursive Realistic Graph Generator using Random Typing
ECML PKDD, Bled, Slovenia, Sep. 2009.
Best Knowledge Discovery Paper
89. Nan Du, Christos Faloutsos, Bai Wang, Leman Akoglu
Large Human Communication Networks: Patterns and a Utility-Driven Generator
ACM SIGKDD, Paris, France, June 2009.
90. Leman Akoglu, Mary McGlohon, Christos Faloutsos
RTM: Laws and a Recursive Generator for Weighted Time-Evolving Graphs
IEEE ICDM, Pisa, Italy, Dec. 2008.
91. Mary McGlohon, Leman Akoglu, Christos Faloutsos
Weighted Graphs and Disconnected Components: Patterns and a Generator
ACM SIGKDD, Las Vegas, Nevada, Aug. 2008.

WORKSHOP PAPERS

1. Boje Deforce, Meng-Chieh Lee, Bart Baesens, Estefania Serral, Jaemin Yoo, Leman Akoglu
TSA on AutoPilot: Self-tuning Self-supervised Time Series Anomaly Detection
NeurIPS 2024 Workshop on Self-Supervised Learning - Theory and Practice, December 2024
2. Lingxiao Zhao, Leman Akoglu
Connecting Graph Convolutional Networks and Graph-Regularized PCA
ICML 2020 Workshop on Graph Representation Learning and Beyond (GRL+ 2020), July 2020
3. Nikhil Gupta, Dhivya Eswaran, Neil Shah, Leman Akoglu, Christos Faloutsos
Beyond Outlier Detection: LookOut for Pictorial Explanation
5th ACM SIGKDD Workshop on Outlier Detection De-constructed, Aug. 2018.
4. Neil Shah, Alex Beutel, Bryan Hooi, Leman Akoglu, Stephan Gunnemann, Disha Makhija, Mohit Kumar, Christos Faloutsos
EdgeCentric: Anomaly Detection in Edge-Attributed Networks
IEEE ICDM Workshop on Data Mining for Cyber Security, Dec. 2016.

5. Rachee Singh, Hyungjoon Koo, Najmehalsadat Miramirkhani, Fahimeh Mirhaj, Leman Akoglu, Phillipa Gill. *The Politics of Routing: Investigating the Relationship Between AS Connectivity and Internet Freedom*
6th USENIX Workshop on Free and Open Communications on the Internet (FOCI), Aug. 2016.
6. Shebuti Rayana and Leman Akoglu
Collective Opinion Spam Detection: Bridging Review Networks and Metadata (Presentation)
WIN: Workshop on Information in Networks, NYC, USA, Oct. 2015.
7. Bryan Perozzi, Leman Akoglu, Patricia Sanchez, Emmanuel Muller
Focused Clustering and Outlier Detection in Large Attributed Graphs. (Poster)
WIN: Workshop on Information in Networks, NYC, USA, Oct. 2015.
8. Shebuti Rayana and Leman Akoglu
An Ensemble Approach for Event Detection and Characterization in Dynamic Graphs
ACM SIGKDD 2nd Workshop on Outlier Detection and Description under Data Diversity (ODD²@KDD 2014), NYC, NY, USA, Aug. 2014.
9. Charu Aggarwal, Leman Akoglu, Emmanuel Muller, Raymond T. Ng (editors)
Proceedings of the KDD 2014 Workshop on Outlier Detection and Description under Data Diversity
ACM SIGKDD 2nd Workshop on Outlier Detection and Description (ODD²@KDD 2014), NYC, New York, USA, Aug. 2014.
10. Leman Akoglu, Emmanuel Muller, Jilles Vreeken (editors)
Proceedings of the KDD 2013 Workshop on Outlier Detection and Description
ACM SIGKDD 1st Workshop on Outlier Detection and Description (ODD@KDD 2013), Chicago, IL, USA, Aug. 2013.
11. Leman Akoglu
Classifying & Ranking Political Polarity by Network Effects. (Presentation)
WIN: Workshop on Information in Networks, New York, USA, Oct. 2013.
12. Leman Akoglu, Jilles Vreeken, Hanghang Tong, Duen Horng Chau, Christos Faloutsos
Mining and Visualizing Connection Pathways in Large Information Networks. (Poster)
WIN: Workshop on Information in Networks, New York, USA, Sep. 2012.
13. Leman Akoglu and Christos Faloutsos
ValuePick: Towards a Value-Oriented Dual-Goal Recommender System
IEEE ICDM Workshop on Optimization Based Methods for Emerging Data Mining Problems, Sydney, Australia, Dec. 2010.
14. Leman Akoglu and Bhavana Dalvi
Structure, Tie Persistence and Event Detection in Large Phone and SMS Networks
ACM SIGKDD 8th Workshop on Mining and Learning with Graphs, Washington, D.C., July 2010.

All articles can be downloaded from www.cs.cmu.edu/~lakoglu/pubs.html

BOOK CHAPTER

- Mary McGlohon, Leman Akoglu, Christos Faloutsos
Statistical Properties of Social Networks
Chapter 2 in Social Network Data Analytics (Edited by Charu C. Aggarwal).
- Leman Akoglu
Graph-based Anomaly Mining: Methods and Applications (Invited)
Big Data in Complex and Social Networks, CRC Press, Taylor & Francis Group. (Edited by My T. Thai, Weili Wu, and Hui Xiong).

GRANTS

- **Co-PI:** National Science Foundation (NSF) Program on Fairness in Artificial Intelligence (FAI) *Toward Fairer Outlier Detection*, with Co-PI: Ian Davidson (UC Davis).
\$700,000 (09/01/2023 – 08/31/2026)
- **Co-PI:** IARPA Hidden Activity Signal and Trajectory Anomaly Characterization (HAYSTAC) *Anomaly Detection (TA-2 Team B)*. Lead: Novateur Research Solutions LLC, CMU subcontract portion: \$800,000 (11/28/2022 – 11/27/2026)
- **Co-PI:** NBER Application *Detecting & Analyzing Anomalies in Massive Medicare Claims Data: A Scalable and Interpretable Approach*. with Lowell Taylor (CMU), Jetson Leder-Luis (BU), Jinghong Liang (CMU).
Pilot (Jul 2022 - June 2023)
- **PI:** PwC Risk and Regulatory Services Innovation Center *Using Graph Neural Networks (GNNs) for Anomaly Detection in General- and Sub-ledger Bookkeeping Data*.
\$323,000 (Mar. 1, 2022 - Feb 28, 2023)
- **PI:** Army Network Enterprise Technology Command (NETCOM) *Creating Non-Traditional Solutions and Novel Approaches to Maximize the Impact of Advanced Algorithms, Autonomy, and Artificial Intelligence (A4I)*.
\$350,000 (1st term, Oct 1, 2020 - Sep 30, 2021);
\$336,538 (2nd term, Oct 1, 2021 - Mar 31, 2023)
- **PI:** PwC Risk and Regulatory Services Innovation Center *GL Anomaly Detection Applications and Graph Learning Research*.
\$345,152 (June 1, 2020 - May 31, 2021)
- **Co-PI:** PNC Center for Financial Services Innovation *PNC CMU Payment Network* (with Christos Faloutsos)
\$200,000 (Mar 31, 2020 - Jun 30, 2021)
- **PI:** Adobe University Marketing Research Awards Program *Entity Resolution and User De-duplication of Recurring Fraudsters and Free-loaders*.
\$50,000 (October 1, 2019 - May 31, 2020)
- **PI:** PwC Risk and Regulatory Services Innovation Center *Detecting Accounting Abnormalities in General Ledger Detail Reports*.
\$220,098 (October 1, 2018 - September 30, 2019)
- **PI:** PwC Risk and Regulatory Services Innovation Center *Early Detection of Risk from Streaming Media Documents*.
\$146,980 (October 1, 2018 - September 30, 2019)
- **PI:** Adobe University Marketing Research Awards Program *Real-time Detection of Online Click & Display Advertising Exchange Fraud*.
\$50,000 (June 1, 2017 - May 31, 2018)
- **PI:** PwC Risk and Regulatory Services Innovation Center *Fraud Analytics: Description, Sense-making and Detection*.
\$121,425 (April 1, 2017 - April 30, 2018)
- **PI:** PNC Center for Financial Services Innovation *Dynamic Customer Spendings Modeling for Business Analytics*.
\$30,000 (Sep 15, 2016 - Sep 15, 2017)
- **PI:** Defense Advanced Research Projects Agency (DARPA) (Award# FA8650-15-C-7561) *MARPLE: Mitigating APT damage by Reasoning with Provenance in Large Enterprise networks*.
with (IBM) J.R. Rao, S. Chari, I. Molloy, X. Hu, D. Schales; (Northwestern) Y. Chen; (Stony Brook) R. Sekar, S. Stoller; (UIC) V. Venkatakrishnan, R. Gjomemo.

(CMU transfer = \$417,052) (2015–2019)

- Facebook Faculty Research Award (\$25,000 in discretionary funds). (2015)
- **PI:** National Science Foundation (NSF) (**CAREER Award**# IIS-1452425)
A General Framework for Methodical and Interpretable Anomaly Mining.
\$507,165 (5/1/2015–4/30/2020)
- **PI:** National Science Foundation (NSF) (Medium Award# IIS-1408287)
Collective Opinion Fraud Detection: Identifying and Integrating Cues from Language, Behavior, and Networks. with Yejin Choi (U of Washington), Christos Faloutsos (CMU), Bing Liu (UIC).
\$1,200,000 (CMU portion = \$309,700) (2014–2018)
- **Lead Investigator:** Northrop Grumman Aerospace Systems (NSF Center for Dynamic Data Analysis) *Ensemble Methods for Event Detection.*
\$35,000 (annual, 2013–2014, 2014–2015, 2015–2016)
- **PI:** Army Research Office (ARO) Young Investigator Award. (Contract No. W911NF-14-1-0029)
Anomaly Detection and Description in Complex Dynamic Networks \$50,000 (06/2014–05/2016)
- **Co-PI:** Office of Naval Research (ONR) SBIR (Award#N141-075)
Patterns of Life Calculation from Big Graphs. with Narayanan Ramanathan (ObjectVideo).
\$50,000. (May 2014–Nov 2014).

INDUSTRY RESEARCH EXPERIENCE

- **IBM T. J. Watson Research Labs** Hawthorne, NY, USA
Graduate assistant May 2011 - Sep. 2011
 - Interned with the SmallBlue Data Analytics research group under Dr. Ravi Konuru, and supervised by Dr. Hanghang Tong.
 - Developed effective methods to spot anomalous data instances, interactions and events in complex data. **Keywords:** data compression, anomaly detection, filtering
- **IBM T. J. Watson Research Labs** Hawthorne, NY, USA
Graduate assistant June 2010 - Sep. 2010
 - Interned with the Large-Scale Streaming Graph Analytics research group under Dr. Kun-Lung Wu, and supervised by Dr. Rohit Khandekar.
 - Developed efficient distributed approximation algorithms to compute Personalized PageRank scores for a given node for very large graphs that grow in a streaming fashion. **Keywords:** incremental PageRank, disk-resident graphs, distributed graph algorithms
- **Microsoft Research Labs** Redmond, WA, USA
Summer intern June 2009 - August 2009
 - Interned with the Search Quality & Cyber-Intelligence research group under Dr. Yi-Min Wang, and supervised by Dr. Chao Liu.
 - Analyzed the structure and dynamics of the User Browsing Graph with over 1 billion trails.
- **Bilkent University** Ankara, Turkey
Senior Thesis: Focused Crawling for Intelligent Portals Sep. 2006 - May 2007
 - Extended the Rule-Based Focused Crawling algorithm by applying page fragmentation, and developed effective information extraction algorithms using machine learning approaches.
- **BOSCH Industry and Trade Inc.** Bursa, Turkey
Summer training in the Research and Development Department July 2006 - Sep. 2006
 - Designed the relational database for tracking the hardware and employees in the department and designed and implemented the GUI for searching and making updates in the system.
- **Bilkent University** Ankara, Turkey
RETINA Research Project June 2006 - July 2006
 - Worked with Dr. Pinar Duygulu and Dr. Selim Aksoy on a research project on content-based classification and retrieval of image and video data.

- Participated in the database design of the image/video repository, the GUI design and the implementation for classification and retrieval, and experiments on TRECVID 2006 data.

- **Armakom IT Inc.**

Summer training in the IT department

Ankara, Turkey

June 2006 - July 2006

- **Havelsan Aerospace Electronics Industry and Trade Inc.**

Summer training in the IT Department

Ankara, Turkey

June 2005 - July 2005

TEACHING

- **Instructor** (Spring 2023) 95-828 *Machine Learning for Problem Solving*, CMU (Enrollment: Sections A&B 66+50)
- **Instructor** (Spring A4 2023) 95-869 *Big Data and Large Scale Computing*, CMU (Enrollment: 45)
- **Instructor** (Fall A2 2022) 95-869 *Big Data and Large Scale Computing*, CMU (Enrollment: 40)
- **Instructor** (Spring 2022) 95-828 *Machine Learning for Problem Solving*, CMU (Enrollment: Sections A&B 95+75)
- **Instructor** (Spring A4 2022) 95-869 *Big Data and Large Scale Computing*, CMU (Enrollment: 43)
- **Instructor** (Fall A1 2021) 95-869 *Big Data and Large Scale Computing*, CMU (Enrollment: 36)
- **Instructor** (Spring 2021, Virtual) 95-828 *Machine Learning for Problem Solving*, CMU (Enrollment: 66)
- **Instructor** (Spring A1 2021, Virtual) 95-869 *Big Data and Large Scale Computing*, CMU (Enrollment: 38)
- **Instructor** (Fall A1 2020, Virtual) 95-869 *Big Data and Large Scale Computing*, CMU (Enrollment: 54)
- **Instructor** (Fall A1 2019) 95-869 *Big Data and Large Scale Computing*, CMU (Enrollment: 40)
- **Instructor** (Spring A4 2019) 95-869 *Big Data and Large Scale Computing*, CMU (Enrollment: 38)
- **Instructor** (Spring 2019) 95-828 *Machine Learning for Problem Solving*, CMU (two sections; Enrollments: 40 and 64)
- **Instructor** (Spring A4 2018) 95-869 *Big Data and Large Scale Computing*, CMU (Enrollment: 27)
- **Instructor** (Spring 2018) 95-828 *Machine Learning for Problem Solving*, CMU (Enrollment: 68)
- **Instructor** (Fall A2 2017) 95-801 *Data Mining Techniques*, CMU (Enrollment: 23)
- **Instructor** (Fall A2 2017) 95-869 *Big Data and Large Scale Computing*, CMU (Enrollment: 35)
- **Instructor** (Spring A4 2017) 95-869 *Big Data and Large Scale Computing*, CMU (Enrollment: 34)
- **Instructor** (Spring 2017) 95-828 *Machine Learning for Problem Solving*, CMU (Enrollment: 46)
- **Instructor** CSE-591 Data Science Fundamentals, Stony Brook, Fall 2015. (Enrolled: 44)
- **Instructor** CSE-512 Machine Learning, Stony Brook, Spring 2015. (Enrolled: 46; 10 AMS)
- **Instructor** CSE-590 Data Mining meets Graph Mining, Stony Brook, Fall 2014. (Enrolled: 50)
- **Instructor** CSE-512 Machine Learning, Stony Brook, Spring 2014. (Enrolled: 58)
- **Instructor** CSE-590 Networks & Data Mining Techniques, Stony Brook, Fall 2013. (Enrolled: 49)
- **Instructor** CSE-512 Machine Learning, Stony Brook, Spring 2013. (Enrolled: 40)
- **Instructor** CSE-590 Selected Topics in Data Mining & Networks, Stony Brook, Fall 2012. (Enrolled: 33)
- **Teaching Assistant** Database Applications, Instructor: Prof. Christos Faloutsos, Fall 2009.
- **Teaching Assistant** Machine Learning, Instructor: Prof. Aarti Singh, Fall 2010. Guided 5 groups of 2-3 each, on research course projects.

INVITED TALKS

- Workshop on Cyber Security and Privacy sponsored by National Science Foundation (NSF) and the Sao Paulo Research Foundation (FAPESP), March 18–21, 2025; Sao Paulo, Brazil
- **Keynote** at the IEEE International Conference on Data Science and Advanced Analytics (DSAA), Oct 6–10, 2024; San Diego, CA, USA
Toward Foundation Models for Unsupervised Learning
- **Keynote** at the International Conference on Automated Machine Learning (AutoML), Sep 9–12, 2024; Paris, France
Unsupervised Model Selection
- Keynote at MIT Graph Exploitation Symposium, July 16–17, 2024; Dedham, MA, USA
Graph Generation: Autoregression meets Diffusion
- Fields Conference on Complex Networks in Banking and Finance, June 24–27, 2024; Toronto, CA
Anomaly Detection for Finance
- **Keynote** at the Workshop on Trustworthy Learning on Graphs (TrustLOG), in conjunction with TheWebConf 2024; May 14, 2024
Detecting Decorated Graph Anomalies
- Temple University, Fox School of Business, Global Institute for Artificial Intelligence and Business Analytics, April 12, 2024; Virtual
Can Machine Learning Target Health Care Fraud? Evidence from Medicare Hospitalizations
- MLG/DLG Workshop at SIGKDD, Aug. 7, 2023; Long Beach, California
Expressive, Scalable, and Interpretable Graph Embeddings
- PFIA: French Platform on Artificial Intelligence, Jul. 3–5, 2023; Strasbourg, France
Automating Unsupervised Learning
- Workshop on Modelling and Mining Complex Networks as Hypergraphs, May 15–19, 2023; Toronto, Canada
Graph-based Anomaly Detection: Problems, Algorithms and Applications
- NYU Stern School of Business Tech (IS) Research Seminar, Mar 1, 2023; NYC, USA
Unsupervised Machine Learning for Explainable Health Care Fraud Detection
- **Plenary Lecture** at the 2nd Online Winter School on Deep Learning: From Perceptrons to Transformers, Indian Statistical Institute (ISI) Kolkata; Feb 19, 2023
Embedding Graphs with Expressiveness, Scale, and Interpretation
- **Keynote** at the 9th International Conference on Information Management and Big Data, Nov. 16–18, 2022; Lima, Peru
Unsupervised Machine Learning for Explainable Medicare Fraud Detection
- **Keynote** at the 25th Discovery Science Conference, Oct. 10–12, 2022; Montpellier, France
Unsupervised Model Selection in Outlier Detection: The Elephant in the Room
- Machine Learning on Graphs (MLoG) Workshop, in conjunction with WSDM 2022; Feb. 25, 2022
Graph-level Embedding: Speed, Interpretation, Expressiveness
- International Workshop on Intelligence-Augmented Anomaly Analytics (IAAA'21), in conjunction with ICDM 2021; Dec. 7, 2021 (Virtual)
Recent Trends in Outlier Mining: Automation and Fairness
- Huawei GlobalConnect Workshop, Nov. 23, 2021 (Virtual)
Scalable and Interpretable Outlier Mining
- **Keynote** at the 30th ACM International Conference on Information and Knowledge Management (CIKM), Nov. 1–5, 2021, (Virtual)
Anomaly Mining: Past, Present and Future
- Google Scalable Algorithms for Semi-supervised and Unsupervised Learning Workshop, Oct. 5–7, 2021 (Virtual)
Distributed Outlier Detection at Scale

- IJCAI 2021 **Early-Career Spotlight Talk**, Aug. 25, 2021, (Virtual)
Anomaly Mining - Past, Present and Future
- 2nd Workshop on Artificial Intelligence for Anomalies and Novelties (AI4AN 2021), in conjunction with IJCAI 2021. Aug 21, 2021, (Virtual)
Automating Unsupervised Outlier Model Selection
- 6th SIGKDD Workshop on Outlier Detection and Description. Aug. 15, 2021, (Virtual)
Fairness in Outlier Detection: Being Wise or Otherwise
- AI for Materials Science: Mining and Learning Interpretable, Explainable, and Generalizable Models from Data, June 23, 2021, (Virtual)
User-centered Outlier Mining: Explanation and Interaction
- BBVA AI Factory, BBVA Bank, June 22, 2021, (Virtual)
Fairness-aware Outlier Detection
- CMU Turkish Alumni AI Panel: Degisen Dunya, Degistiren Yapay Zeka, June 19, 2021, (Virtual)
Invited Panelist, Applications of AI Research in Turkey
- PAKDD 2021 **The Most Influential Paper Talk**, May 14, 2021, (Virtual)
Anomaly Detection in Graphs - Past, Present and Future
- Workshop on Graph Learning Benchmarks at TheWebConf (WWW) 2021, Apr 19, 2021; (Virtual)
On Using Classification Datasets to Evaluate Graph Outlier Detection: Peculiar Observations and New Insights
- NetSI's Machine Learning with Graphs Seminar, Apr 9, 2021; (Virtual)
On Using Classification Datasets to Evaluate Graph Outlier Detection: Peculiar Observations and New Insights
- AAAI 2021 Workshop on Deep Learning on Graphs (DLG), Feb 8, 2021; (Virtual)
Tackling Structure Learning and Oversmoothing for Graph-based SSL
- IEEE Big Data Workshop on Graph Techniques for Adversarial Activity Analytics Workshop, Dec 10, 2020; (Virtual)
Detecting Anomalous Behavior in Large Graph Databases
- **Keynote** at the 9th International Conference on Complex Networks, Dec 1–3, 2020; (Virtual)
Graph-based Anomaly Detection: Problems, Algorithms and Applications
- NJIT's Data Science Seminar, Nov 11, 2020; (Virtual)
Graph-based Anomaly Detection: Problems, Algorithms and Applications
- Interpretable Data and Network Mining at the 2020 INFORMS Annual Meeting, Nov 8–11, 2020; Washington DC
Human-in-the-loop Anomaly Mining: Explanation and Interactive Detection
- Mining and Learning on Graphs at the 2020 INFORMS Annual Meeting, Nov 8–11, 2020; Washington DC
Tackling Structure And Oversmoothing for Graph-based SSL
- AI in Finance Summit, Sep 5–6, 2019; NYC
Anomaly Mining: Detection, Explanation, Interaction
- Stanford University RAIN (Research in Algorithms and Incentives in Networks) Seminar, May 22, 2019; Stanford, CA
A Quest for Structure: Joint Graph Structure & Semi-Supervised Inference
- Amazon Research at Palo Alto, May 21, 2019
Anomaly Mining: Detection, Explanation, Interaction
- University of California Riverside, Feb 8, 2019; Host: Evangelos Papalexakis
Anomaly Mining: Detection and Beyond
- Gilbreth Lecture at the National Academy of Engineering National Meeting, February 7, 2019; Irvine, CA
Anomaly Mining: Detection and Beyond

- Singapore Management University Research Seminar, Nov 14, 2018
Event Detection and Localization via Time-Varying Sensing on a Graph
- Aalto University, Nov 8, 2018; Finland. Host: Aristides Gionis;
Anomaly Mining: Detection and Beyond
- Capital One Workshop on Anomaly Detection, Oct 23, 2018; McLean, Virginia
Anomaly Mining: Detection with Networks and Beyond
- Dagstuhl Seminar on Automating Data Science, Germany, Sep 30–Oct 5, 2018; Dagstuhl, Germany
Moderator: Automation in Data Science for Unsupervised Tasks
- Japan-American Frontiers of Engineering Symposium (partnership of US National Academy of Engineering and Engineering Academy of Japan), June 18-20, 2018; Tsukuba, Japan
Anomaly Mining: Detection and Beyond
- NetSci 2018 Satellite on Machine Learning In Network Science, June 12, Paris, France
Attributed Networks: Social Circles, Summarization, Comparison
- NetSci 2018 Satellite on Statistical Inference of Network Models, June 11, Paris, France
A Quest for Structure: Joint Graph Structure & Semi-Supervised Inference
- ACM WSDM International Workshop on Misinformation and Misbehavior Mining on the Web (MIS2), February 9, 2018
Opinion Spam Detection: A Story of Networks, Meta-data and an Oracle
- ACM WSDM International Workshop on Heterogeneous Networks Analysis, February 9, 2018
Mining Rich Graphs: Ranking, Classification, and Anomaly Detection
- IEEE ICDM 2017 Workshop on High Performance Graph Data Mining and Machine Learning, November 18, 2017
Online Detection of Anomalous Heterogeneous Graphs with Streaming Edges
- UT Southwestern Medical Center CSB (Computational & Systems Biology) Seminar, Host: Murat Cobanoglu, October 23, 2017
autoMated Data Description (ODD): Explaining Anomalies for Human Interpretation
- UT Austin McCombs School of Business Information Management Seminar, October 18, 2017
Discovering Networks of Fraudulent Users in Online Review Platforms
- University of Pittsburgh Big Data Science Colloquium, Host: Yu-ru Lin, September 22, 2017
Discovering Communities and Anomalies in Attributed Graphs: Interactive Visual Exploration and Summarization
- ACM KDD Interactive Data Exploration and Analytics (IDEA) Workshop, August 14, 2017
Understanding Node-Attributed Networks: Interactive Exploration and Summarization
- SIAM SDM 2017 Workshop Women in Data Science (WinDS), April 29, 2017
Opinion Spam Detection with Multimodal Data
- SCS Network Science Seminar Series, April 25, 2017
Ranking in Heterogeneous Networks with Geo-Location Information
- Machine Learning Special Seminar, CMU, October 18, 2016
Tackling Anomaly Mining Problems in the Wild with Networks and Beyond
- ACM KDD International Workshop on Mining and Learning with Graphs (MLG), August 14, 2016
Communities and Anomalies in Attributed Networks
- Army Research Labs, Adelphi, MD, July 15, 2016
Tackling Anomaly Mining Problems in the Wild
- ICML 2016 Anomaly Detection Workshop, June 24, 2016
Tackling Anomaly Mining Problems in the Wild
- Amazon India, Machine Learning Team, June 8, 2016
Opinion Spam Detection with Networks and Beyond
- Flipkart, Host: Mohit Kumar, June 6, 2016
Opinion Spam Detection with Networks and Beyond

- Keynote talk at SDM 2016 Workshop on Mining Networks and Graphs, May 7, 2016
Fraud Detection with Networks and Beyond
- Georgia Tech, Computational Science and Engineering, Host: Le Song, March 2016
3 D's of Anomaly Mining in Complex Graphs: Definition, Detection, Description
- University of Southern California, Host: Yan Liu, March 2016
3 D's of Anomaly Mining in Complex Graphs: Definition, Detection, Description
- University of Maryland, College Park, February 2016
3 D's of Anomaly Mining in Complex Graphs: Definition, Detection, Description
- Carnegie Mellon University, Heinz College, Host: Daniel Neill, February 2016
3 D's of Anomaly Mining in Complex Graphs: Definition, Detection, Description
- Northeastern University (Network Science Institute), Hosts: Tina Eliassi-Rad, Yizhou Sun, February 2016
3 D's of Anomaly Mining in Complex Graphs: Definition, Detection, Description
- University of Massachusetts Amherst, Host: Andrew McCallum, February 2016
3 D's of Anomaly Mining in Complex Graphs: Definition, Detection, Description
- Carnegie Mellon University, Electrical and Computer Engineering, January 2016
3 D's of Anomaly Mining in Complex Graphs: Definition, Detection, Description
- NII Shonan Meeting on “Analytics on Complex Networks: Scalable Solutions for Empirical Questions” Japan, February 2016.
- University of Illinois at Chicago, Hosts: Bing Liu and Tanya Berger-Wolf, November 2015
3 D's of Anomaly Mining in Complex Graphs: Definition, Detection, and Description
- CMU Tepper School of Business, Host: Wolfgang Gatterbauer, November 2015
Robust Semi-Supervised Classification with Multi-Relational Graphs
- KU Leuven, Host: Bart Baesens, October 2015
3 D's of Anomaly Mining in Complex Graphs: Definition, Detection, and Description
- Workshop on Statistical and Computational Challenges in Networks and Cybersecurity. Montreal, Canada. May 2015
Mining Large Graphs for Detecting Anomalies, Events, and Fraud
- University of Pittsburgh, Host: Alexandros Labrinidis, April 2015
3 D's of Anomaly Mining in Complex Graphs: Definition, Detection, and Description
- Huawei Technologies R&D, Santa Clara, CA. Nov. 2014
Large-scale Graph Analytics for Anomaly Mining and Event Detection
- NICTA and University of Sydney, Sydney, AU. Host: Sanjay Chawla, July 2014.
Anomaly Detection and Description in Large Complex Graphs
- KPMG LLP, Woodcliff Lake, NJ. Host: Rajiv Dulepet, April 2014.
Data Analytics Round Table
- Twitter Inc., San Francisco, CA. Host: Ramnath Balasubramanyan, Mar. 2014.
Mining Typed Information Networks with Applications to Finding Fraud, Polarization, and Word-Sense Connotation
- University of California Santa Barbara, CA. Host: Xifeng Yan, Mar. 2014.
Measuring and Manipulating the Robustness of Large Networks
- Stony Brook University, East-West Biomedical Informatics Workshop, Mar. 2014.
Sex Differences in the Human Connectome
- Lawrence Berkeley National Lab, Berkeley, CA. Host: Aydin Buluc, Jan. 2014.
Robustness of Large Networks: Measuring and Manipulating
- Rensselaer Polytechnic Institute, Troy, NY. Host: Sibel Adali, Nov. 2013.
Mining Signed Information Networks with Applications to Detecting Fraud and Polarization
- Northrop Grumman Information Systems University Tech Day, Colshire, VA Nov. 2013
Cyber Network Anomaly Detection, Analysis, Visualization

- NEC Laboratories America Inc., Princeton Campus, NJ. Host: Abhishek Sharma, Oct. 2013.
Detecting and Characterizing Highly Volatile Events in Large Temporal Graphs
- NSF CDDA Workshop at Rutgers University. Sep. 2013.
Anomaly Detection in Large Graphs
- City University of New York (CUNY), NY. Host: Hanghang Tong, April 2013.
Opinion Fraud Detection in Online Reviews using Network Effects
- NSF CDDA Workshop at CEWIT, March 2013.
Fast and Reliable Information-Theoretic Anomaly Detection and Description
- Google, Pittsburgh, PA. Host: Andrew Moore, October 2012.
Spotting Opinion Fraud in Online Reviews
- Singapore Management University (SMU). Host: Kyriakos Mouratidis, June 2012.
Large Graph Analytics: Patterns, Anomalies, and Tools
- Sabanci University, Turkey. Host: Yucel Saygin, May 2012.
Large Graph Analytics: Patterns, Anomalies, and Tools
- Google Research, New York City, Research Talk, April 2012.
Large-scale Graph Analytics: Patterns, Anomalies, and Tools
- Carnegie Mellon, Machine Learning Lunch Seminar, April 2012.
Efficient Vertex-Proximity Query Processing on Large Time-Evolving Graphs
- Washington State University, CS Seminar, March 2012. Host: Larry Holder
Large-scale Graph Analytics: Patterns, Anomalies, and Tools
- Virginia Tech, CS Seminar, March 2012. Host: Lenny Heat
Massive Graph Analytics: Patterns, Anomalies, and Tools
- University of Waterloo, Research Seminar and Mock Lecture, March 2012. Host: Bill Cowan
Large-scale Graph Analytics: Patterns, Anomalies, and Tools
- IBM Research, Yorktown NY, Machine Learning Group Talk, Feb. 2012.
Large-scale Graph Analytics: Patterns, Anomalies, and Tools
- Stony Brook University, Research Talk, Feb. 2012.
Large-scale Graph Analytics: Patterns, Anomalies, and Tools
- Clemson University, Research Talk. Host: Brian Dean, Feb. 2012.
Large-scale Graph Analytics: Patterns, Anomalies, and Tools

ADVISING&MENTORING

DATA Lab website can be found at <http://datalab.heinz.cmu.edu/>

News/Awards

- Lingxiao Zhao receives 2023-24 Daniel and Rise Nagin Dissertation Fellowship
- Yue Zhao receives 2022 Norton Labs Graduate Fellowship
- Shubhranshu Shekhar receives 2021 George Duncan Award for his 2nd Heinz paper
- Hemank Lamba receives SIAM SDM 2019 Student Travel Award
- Lingxiao Zhao receives 2018 SIGIR Student Travel Grant to present his paper at CIKM
- Xuejian Wang receives 2018 PwC Presidential PhD Fellowship Award
- Meghanath Macha receives 2018 Suresh Konda Award for his 1st Heinz paper
- Bryan Perozzi receives the ACM SIGKDD 2017 Doctoral Dissertation Award
- Emaad A. Manzoor receives KDD 2017 Student Travel Award and CMU Graduate Student Assembly Conference Funding
- Meghanath Macha receives 2017 PwC Presidential PhD Fellowship Award
- Juntao Ye receives AAAI ICWSM 2016 Student Travel Award
- Bryan Perozzi receives SIAM SDM 2016 Student Travel Award
- Shebuti Rayana receives SIAM SDM 2016 Student Travel Award
- Hau Chan wins Catacosinos Fellowship for Excellence in Computer Science

- Shebuti Rayana receives SIAM SDM 2015 Student Travel Award
- Hau Chan receives SIAM SDM 2014 Student Travel Award
- Hau Chan receives IEEE ICDM 2013 Student Travel Award

Research assistants

- Jaemin Yoo (Post-Doc, PhD: Seoul National University), Mar 2022 – June 2023
- Saurabh Sunil Sawlani (Post-Doc, PhD: Georgia Tech), Jul 2020 – June 2021
- Zihan (Zoe) Wang, (MISM, Carnegie Mellon University), June 2021 - Aug 2021
- Martin Ma, (MS, SCS/CompBio, Carnegie Mellon University), Jul 2020 - May 2021
- Meng-Chieh Lee (MS, National Chiao Tung University), visiting student, Aug 2019 – May 2020
- Dimitrios Bermperidis (Post-Doc, PhD: University of Minnesota), Jul 2019 – Jun 2020
- Jing Mao, (MS: ECE, Carnegie Mellon University), May 2019 – Aug 2019
- Hung T. Nguyen (Post-Doc, PhD: Virginia Commonwealth University), Aug 2018 – Aug 2019
- Tuan M. V. Le (Post-Doc, PhD: Singapore Management University), Aug 2017 – Jul 2018
- Lingxiao Zhao, (MS: ECE, Carnegie Mellon University), Feb 2018 – Aug 2018

Graduate (PhD/MS) students

- Xueying Ding (PhD, Carnegie Mellon University), advisor, F 2021 – present
- Yue Zhao (PhD, Carnegie Mellon University), advisor, F 2019 – present
- Lingxiao Zhao, (MLPS PhD, Carnegie Mellon University), advisor, F 2018 – present
- Shubhranshu Shekhar (MLPS PhD, Carnegie Mellon University), advisor, F 2017 – present
- Sachin Grover, (PhD, Carnegie Mellon University), F 2018 – F 2019
- Xuejian Wang, (PhD, Carnegie Mellon University), F 2018 – F 2019
- Hemank Lamba (PhD, Carnegie Mellon University), advisor, F 2017 – F 2018
- Meghanath Macha (PhD, Carnegie Mellon University), advisor, F 2016 – S 2018
- Emaad Ahmed Manzoor (PhD, Carnegie Mellon University), advisor, F 2015 - S 2018
- Shebuti Rayana (PhD, Stony Brook University), advisor, 2013 - 2017
- Abhinav Maurya (PhD, Carnegie Mellon University), project advisor, Summer 2017
- Runshan Fu (PhD, Carnegie Mellon University), project advisor, F 2016 - S 2017
- Iris Roelens (PhD, Ghent University), visiting student, F 2016 - S 2017
- Juntong Ye (PhD, Stony Brook University), advisor, F 2014 - S 2016
- Aria Rezaei (PhD, Stony Brook University), advisor, F 2015 - S 2016
- Mohammadzaman Zamani (PhD, Stony Brook University), advisor, F 2014 - S 2015
- Hau Chan (PhD, Stony Brook University), co-advisor with Luis Ortiz, 2015 - 2016
- Mirza Basim Baig (PhD, Stony Brook University), advisor, 2014 - 2015
- Bryan Perozzi (PhD, Stony Brook University), collaboration, 2013 -
- Shuchu Han (PhD, Stony Brook University), collaboration, 2012 - 2014
- {Connor Ford, William Kajos, Hayden Moore, Logan Smith} (MISM, Carnegie Mellon University), Capstone Project Research Practicum, S 2021
- Lingxiao Zhao, (MS, ECE, Carnegie Mellon University), Independent Study, F 2017 - S 2018
- Xuan Wu, (MS, ISR/SCS, Carnegie Mellon University), Independent Study, S 2017 - F 2017
- Anurag Gandhi, (MISM, Carnegie Mellon University), Independent Study, F 2017
- {Rashmi Raghunandan, Shruti Sridhar, Upasna Suman} (MISM, Carnegie Mellon University), Independent Project, S 2017

- {Qianyi Hu, Le Le, Ting Ying Yin, Lewen Zhang} (MS, Carnegie Mellon University), Capstone Project Research Practicum, S 2017
- Christian Perez, (MS, LTI, Carnegie Mellon University), Independent Study, F 2016
- {Emilio Esposito, Luan Jiang, Xiao Gong, Bingnan Zhou} (MISM, Carnegie Mellon University), Capstone Project Research Practicum, F 2016
- {Kee Wei Lam, Yu-Hsin Lin, Ming-Hsun Tsai} (MISM, Carnegie Mellon University), Independent Study, F 2016
- Abhinav Mishra (MS, Stony Brook University), MS project advisor, S 2015 - F 2016
- Santhosh K. M. Lakshminarayanan (MS, Stony Brook), MS project advisor, F 2014 - F 2016
- Heeyoung Kwon (MS, Stony Brook University), MS thesis advisor, S 2014 - S 2015
- Zichao Dai (MS, Stony Brook University), MS project advisor, 2013 - 2014
- Vasudev Bhat (MS, Stony Brook University), MS project advisor, 2013 - 2014
- Jagat S. Pudipeddi (MS, Stony Brook University), MS project advisor, 2012 - 2013
- Vivek Kulkarni (MS, Stony Brook University), MS project advisor, 2012 - 2013
- Tiantian Gao (MS, Stony Brook University), MS project advisor, Fall 2012

Undergraduate/High-school students

- Nikhil Gupta (IIT Delhi), summer research advisor, 06/2017-08/2017
- Monica Helena Ribeiro (Stony Brook University), summer research advisor, 06/2015-09/2015
- Gabriel Augusto Baierle (Stony Brook University), summer research advisor, 06/2015-09/2015
- Junhee Park (Stony Brook University), research project advisor, 06/2013-09/2013
- Melissa Thomas (Herricks High School), summer research advisor, 06/2015-09/2015

PhD thesis committee

- Hongjing Zhang (PhD, CS, UC Davis), expected 2023
- Namyoung Park (PhD, SCS, Carnegie Mellon), expected 2022
- Xiaoyi Ivy Gu (PhD, Statistics & Data Science, Carnegie Mellon), expected 2022
- Tong Zhao (PhD, U. of Notre Dame), expected 2022
- Dawei Zhou (PhD, UIUC), 2021
- Abhinav Maurya (PhD, MLD/Heinz, Carnegie Mellon), expected 2021
- Yuexin Wu (PhD, LTI/SCS, Carnegie Mellon), 2020
- William Herlands (PhD, MLD/Heinz, Carnegie Mellon), 2020
- Tahora H. Nazer (PhD, Arizona State University), 2019
- Bryan Hooi (PhD, SCS, Carnegie Mellon), 2019
- Junting Ye (PhD, CS, Stony Brook University), 2019
- Kijung Shin (PhD, SCS, Carnegie Mellon), 2019
- Ankita Mangal (PhD, Materials Science and Engineering, Carnegie Mellon), 2018
- Rami Al-Rfou' (PhD, CS, Stony Brook University), 2015
- Bryan Perozzi (PhD, CS, Stony Brook University), 2016
- Hao Huang (PhD, CS, Stony Brook University), 2014

PhD thesis committee (International)

- Asara Senaratne (Doctor of Philosophy, Australian National University), 2023
- Andrian Putina (Doctor of Philosophy, L'Ecole Doctorale de l'Institut Polytechnique de Paris), 2022
- Edward Toth (Doctor of Philosophy (Engineering and IT), University of Sydney), 2019
- Polina Rozenshtein (Doctoral programme in Science, Aalto University), 2018
- Aleks Kallio (Doctoral programme in Science, Aalto University), 2015
- Véronique Van Vlasselaer (Doctor of Philosophy, CS, KU Leuven), 2015
- Laura Langohr (Doctor of Philosophy, CS, University of Helsinki), 2014

COMMUNITY ACTIVITIES

Program Committees

- **Program Co-Chair** (2025) International Conference on Automated Machine Learning (AutoML)
- **Area Chair** (2025) ACM Conference on Knowledge Discovery and Data Mining (SIGKDD)
- **Member** (2024) SIGKDD Dissertation Award Committee
- **Area Chair** (2024) ACM Conference on Knowledge Discovery and Data Mining (SIGKDD)
- **Program Co-Chair** (2024, 2022) International Conference on Web Search and Data Mining (WSDM)
- **Senior Member** (2024, 2022) International Joint Conference on Artificial Intelligence (IJCAI)
- **Area Chair** (2024) European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML PKDD)
- **Member** 19th Workshop on Modelling and Mining Networks (WAW 2024)
- **Member** (2023) Best Papers Awards Committee, ACM Conference on Knowledge Discovery and Data Mining (SIGKDD)
- **Program Co-Chair** (2023) ACM Conference on Knowledge Discovery and Data Mining (SIGKDD)
- **Area Chair** (2023) Association for the Advancement of Artificial Intelligence (AAAI)
- **Senior Member** (2023, 2019, 2018, 2017, 2016) International Conference on Web Search and Data Mining (WSDM)
- **Area Chair** (2022, 2021, 2020, 2019, 2018, 2017, 2016) IEEE International Conference on Data Mining (ICDM)
- **Member** (2022) Awards Committee (Best Papers & Early Career Award) SIAM International Conference on Data Mining (SDM)
- **Program Co-Chair** (2022) International Conference on Web Search and Data Mining (WSDM)
- **Senior Member** (2022, 2021, 2020, 2019) ACM Conference on Knowledge Discovery and Data Mining (SIGKDD)
- **Senior Member** (2022, 2019, 2018, 2017, 2016) SIAM International Conference on Data Mining (SDM)
- **Senior Member** (2022) 31st International Joint Conference on Artificial Intelligence (IJCAI-ECAI)
- **Senior Member** (2022) Social Network Analysis and Graph Algorithms Track (The Web Conference)
- **Tutorials Co-Chair** (2021, 2019, 2018) Conference on Knowledge Discovery and Data Mining (KDD)
- **Program Co-Chair** (2021) SIAM International Conference on Data Mining (SDM)
- **Area Chair** (2021, 2020, 2019, 2018, 2017, 2016) IEEE International Conference on Data Mining (ICDM)
- **Area Chair** (2021) International Joint Conference on Artificial Intelligence (IJCAI)
- **Member** ECML PKDD 2020 Best Paper Award Committee
- **Tutorials Co-Chair** (2019) Conference on Information and Knowledge Management (CIKM)
- **Member** (2019, 2015, 2014) European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML PKDD)
- **Member** (2019, 2017, 2016, 2013) Mining and Learning with Graphs (MLG) (in conj. with KDD)
- **Member** (2019) The Fifth International Conference on Machine Learning, Optimization, and Data Science (LOD)
- **Member** (2019) ACM KDD 2019 Workshop on Learning and Mining for Cybersecurity (LEMINGS)
- **Member** (2018, 2016, 2015, 2014) Conference on Knowledge Discovery and Data Mining (KDD)
- **Program Co-Chair** (2018) International Conference on Intelligent Information Technologies (ICIIT)

- **Tutorials Co-Chair** (2018) IEEE International Conference on Data Mining (ICDM)
- **Program Track Co-Chair** (2018) Social Networks and Graph Analysis Track of the World Wide Web Conference (WWW)
- **Member** (2018) Conference on Information and Knowledge Management (CIKM)
- **Member** (2018) IEEE International Conference on Big Knowledge (ICBK)
- **Member** (2018) 7th International Conference on Computational Data and Social Networks (CSoNet)
- **Member** (2018) First International Workshop on Online Social Networks and Media: Network Properties and Dynamics (in conj. with WWW)
- **Panelist** (2017) IEEE ICDM PhD Forum
- **Senior Member** (2017) Conference on Information and Knowledge Management (CIKM)
- **Publicity Chair** (2017) INFORMS Conference on Data Science
- **Workshops Co-Chair** (2017) Conference on Knowledge Discovery and Data Mining (KDD)
- **Workshops Co-Chair** (2017) SIAM International Conference on Data Mining (SDM)
- **Member** (2017) International School and Conference on Network Science (NetSci)
- **Member** (2017, 2016, 2014) International Conference on Social Informatics (SocInfo)
- **Member** (2017) High Performance Graph Data Mining and Machine Learning Workshop (HPGDML) (in conj. with ICDM)
- **Student Travel Awards Co-Chair** (2016) Conference on Knowledge Discovery and Data Mining (KDD)
- **PhD Forum Co-Chair** (2016) European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML/PKDD)
- **Tutorial Co-Chair** (2016) Pacific Asia Conference on Knowledge Discovery and Data Mining (PAKDD)
- **Member** (2016) International Joint Conference on Artificial Intelligence (IJCAI)
- **Member** (2016) International Workshop on Machine learning, Optimization & big Data (MOD)
- **Member** (2016) Third Workshop on Mining Networks and Graphs at the SIAM Data Mining (SDM)
- **Member** (2015, 2014, 2013) IEEE International Conference on Data Mining (ICDM)
- **Member** (2015, 2014, 2013) SIAM International Conference on Data Mining (SDM)
- **PhD Forum Co-Chair** (2015) IEEE International Conference on Data Mining (ICDM)
- **Publicity Co-Chair** (2015) SIAM International Conference on Data Mining (SDM)
- **Member** (2015, 2014) SIAM Workshop on Network Science (SIAMNS)
- **Member** (2015, 2014, 2013) Interactive Data Exploration and Analytics (IDEA) (in conj. with KDD)
- **Member** (2015) Workshop on Ensemble of Anomaly Detection Algorithms (EADA) (in conj. IEEE/WIC/ACM IAT 2015)
- **Member** (2015) BigGraphs Workshop at IEEE BigData 2015
- **Member** (2015) 1st International Workshop on Dynamics in Networks (DyNo) (in conj. with IEEE/ACM ASONAM)
- **Member** (2015) Workshop on Diffusion, Activity and Events in Networks: Models, Methods & Applications (in conj. with WWW 2015)
- **Member** (2015) WWW Social Networks and Graph Analysis Track
- **Member** (2014) ECML/PKDD 2014 Nectar Track
- **Member** (2014) Workshop on Diffusion Networks and Cascade Analytics of the ACM WSDM
- **Member** (2014) Ph.D. Workshop in Information and Knowledge Management (PIKM) (in conjunction with CIKM)
- **Member** (2014) International Conference on Web Search and Data Mining (WSDM)
- **Member** (2014) International Conference on Big Data Science (BigDataScience)
- **Member** (2014) Workshop on Big Scholarly Data: Towards the Web of Scholars (BigScholar) (in conjunction with WWW)
- **Member** (2013) IEEE ICDM PhD Student Forum
- **Member** (2013) Conference on Knowledge Discovery and Data Mining Demo Track (KDD)
- **Member** (2013) IEEE International Conference on Data Engineering (ICDE)

- **Member** (2013) Association for the Advancement of Artificial Intelligence (AAAI)
- **Member** (2013) The International Workshop on Large Scale Network Analysis (LSNA) (in conjunction with WWW)
- **Co-chair** (2013) International Workshop on Graph Data Management (GDM) (in conjunction with ICDE)

Workshop Organizer

- 7th ACM SIGKDD 2024 Workshop on **Machine Learning in Finance** with Nitesh Chawla, Josep Domingo-Ferrer, Eren Kurshan, Senthil Kumar, Vidyut Naware, Tanveer Faruque, Saurabh Nagrecha, Mahashweta Das, Isha Chaturvedi, Jose A. Rodriguez-Serrano
- 6th ACM SIGKDD 2023 Workshop on **Machine Learning in Finance** with Nitesh Chawla, Senthil Kumar, Vidyut Naware, Tanveer Faruque, Saurabh Nagrecha, Mahashweta Das
- 5th ACM SIGKDD 2022 Workshop on **Machine Learning in Finance** with Nitesh Chawla, Senthil Kumar, Vidyut Naware, Tanveer Faruque, Saurabh Nagrecha
- 1st IEEE ICDM 2021 Workshop on **IAAA: Intelligence-Augmented Anomaly Analytics** with Feng Xia, Charu Aggarwal, Huan Liu
- 6th ACM SIGKDD 2021 Workshop on **ODD: Outlier Detection and Description** with Siddharth Bhatia, Bryan Hooi, Sourav Chatterjee, Xiaodong Jiang, Manish Gupta
- 4th ACM SIGKDD 2021 Workshop on **Machine Learning in Finance** with Nitesh Chawla, Tanveer Faruque, Senthil Kumar, Saurabh Nagrecha, Jose A. Rodriguez-Serrano
- 3rd ACM SIGKDD 2020 Workshop on **Machine Learning in Finance** with Nitesh Chawla, Tanveer Faruque, Senthil Kumar, Saurabh Nagrecha, Jose A. Rodriguez-Serrano
- 2nd ACM SIGKDD 2019 Workshop on **Anomaly Detection in Finance** with Nitesh Chawla, Tanveer Faruque, Prabhajan Kambadur, Senthil Kumar, Saurabh Nagrecha
- 5th ACM SIGKDD Workshop on **Outlier Detection De-constructed** ODDv5.0 @ KDD 2018 with Evgeny Burnaev, Charu Aggarwal, Christos Faloutsos
- WWW 2018 the 2nd **Women in Data Science** (WinDS) Workshop
- 4th ACM SIGKDD Workshop on **Outlier Definition, Detection, and Description on Demand** ODD4.0 @ KDD 2016 with Franziska Bell, Emmanuel Müller, Ted E. Senator
- 3rd ACM SIGKDD Workshop on **Outlier Definition, Detection, and Description** ODDx3 @ KDD 2015 with Sanjay Chawla, Emmanuel Müller, Ted E. Senator
- IJCAI (2016, 2015) Workshop on **Heterogeneous Information Network Analysis** (HINA)
- 2nd ACM SIGKDD Workshop on **Outlier Detection and Description under Data Diversity** ODD² @ KDD 2014 with Charu Aggarwal, Emmanuel Müller, Raymond T. Ng
- WWW Workshop on **Big Graph Mining** (1st BGM@WWW 2014)
- 1st IEEE ICDM Workshop on **Mining Social Data at Work** (MSDW@ICDM 2013)
- 1st ACM SIGKDD Workshop on **Outlier Detection and Description** ODD @ KDD 2013 with Emmanuel Müller and Jilles Vreeken
- ACM SIGMOD Workshop on **Dynamic Networks Management and Mining** (DyNetMM 2013)

Tutorials

- (ACM CCS 2015) Fraud Detection through Graph-Based User Behavior Modeling. Alex Beutel, Leman Akoglu, Christos Faloutsos. (3 hours)
- (ACM KDD 2015) Graph-Based User Behavior Modeling: From Prediction to Fraud Detection. Alex Beutel, Leman Akoglu, Christos Faloutsos. (3 hours)
- (ACM WSDM 2014) Big Graph Mining for Web & Social Media: Algorithms, Anomaly Detection, Applications. U Kang, Leman Akoglu, Polo Chau. (3 hours)

- (IEEE/ACM ASONAM 2013) Big Graph Mining: Algorithms, Anomaly Detection, and Applications. U Kang, Leman Akoglu, Polo Chau. (2 hours)
- (ACM WSDM 2013) Anomaly, Event, and Fraud Detection in Large Graph Datasets. Leman Akoglu, Christos Faloutsos. (6 hours)
- (IEEE ICDM 2012) What is Strange in Large Networks? Graph-based Irregularity and Fraud Detection. Leman Akoglu, Christos Faloutsos. (4 hours)

Reviewer

- DOE Scientific Machine Learning for Complex Systems Reviewer, June 2023
- NSF III CAREER Review Panelist, Nov 2016
- NSF CISE/IIS Review Panelist, June 2015
- NSF CISE/III Review Panelist, Dec 2014
- NSF IIS Review Panelist, 2013
- NSF BIGDATA Review Panelist, 2012
- Data Mining and Knowledge Discovery Journal (DAMI)
- IEEE Transactions on Knowledge and Data Engineering (TKDE)
- ACM Transactions on Knowledge Discovery from Data (TKDD)
- IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
- Transactions on Dependable and Secure Computing (TDSC)
- Knowledge and Information Systems (KAIS)
- KDD, ICDM, SDM, WWW, WSDM, ICWSM, ECML/PKDD

University Service

- AIMP (AI for Management and Policy) Master's Programs Development Committee Member
- (2023, 2022, 2021) University Committee on Non-Tenure Appointments, Member
- 2022 CMU Research Computing Advisory Committee (RCAC), Heinz College Rep.
- 2016-present PhD (Admissions) Committee, Heinz College, CMU
- 2020-2023 CMU Academic Review Board (ARB) Member
- 2019-2020 Heinz College Dean's Evaluation Committee Member
- April 2019 Research talk at the National Security Agency Research Meeting at CMU
- 2017-18 Co-organizer for the College Seminar and HILS (Heinz Informal Lunch Seminar) series
- Sep 2017 PhD Seminar research talk for 1st year students, CMU
- 2017 Committee Lead for ML-PP joint PhD program curriculum
- Sep 2016 PhD Seminar research talk for 1st year students, CMU
- 2015 CS Graduate Student Orientation Talk on Data Mining Research, SBU
- Coordinator: Data Science & Engineering Specialization to MS in CS (MSCS) Program, SBU
- April 2015 Women in CS Professor Mixer, SBU
- 2014-15 Graduate student admissions committee, SBU
- 2014 IACS Graduate Program Committee member, SBU
- 2013 CS Graduate Student Orientation Talk on Data Mining Research, SBU
- 2013-14 Graduate student admissions committee, SBU
- 2012-13 Graduate student admissions committee, SBU

Other Service

- **IEEE Spectrum Article Review** *It's Too Easy to Hide Bias in Deep-Learning Systems* by Matthew Hutson
- **Book Review** *Outlier Analysis* by Charu C. Aggarwal
- **Book Review** *Introduction to Data Mining Ch. 9 on Anomaly Detection* by Pang-Ning Tan, Michael Steinbach, Anuj Karpatne, Vipin Kumar
- **Book Review** *Outlier Detection for Temporal Data* by Manish Gupta, Charu C. Aggarwal, Jiawei Han, and Jing Gao
- **Mentor** Broadening Participation in Data Mining Workshop (BPDM 2016, in conj. w/ KDD)
- Editorial Board Member: Data Mining & Knowledge Discovery (DMKD) (Jan-Sep 2016)
- Associate Editor: IEEE Trans. on Knowledge & Data Engineering (TKDE) (Jan'16-Jan'17)
- 2013 Guest Editor for Discrete Dynamics in Nature and Society (Special Issue on Discrete Analysis of Social Networks and Societies)

PATENTS

1. **System and Method for Large Volume Data Analytics** Inventors: Leman Akoglu and Narayanan Ramanathan (ObjectVideo). U.S. Provisional Application No. 62/061,935, filed October 9, 2014.
2. **Vertex-proximity query processing in large time-evolving graphs** Inventors: Rohit M. Khandekar, Kun-Lung Wu, Leman Akoglu, Deepak Rajan, Vibhore Kumar, Srinivasan Parthasarathy. IBM T. J. Watson Research, filed Sep. 2011, approved: July 2014. US20130151536
3. **Anomaly, association and clustering detection** Inventors: Hanghang Tong, Leman Akoglu, Ching-Yung Lin, Ravi Konuru. IBM T. J. Watson Research, filed Dec. 2011, approved: US20140074838
4. **Dynamic anomaly, association and clustering detection** Inventors: Hanghang Tong, Leman Akoglu, Ching-Yung Lin, Ravi Konuru. IBM T. J. Watson Research, filed Dec. 2011, approved: US20140074796

SKILLS

Programming Languages MatLab, Java, C, C++, C#, QT, Visual Basic, SQL, PHP, .NET, Perl, Python, Verilog, Assembly (Intel & MIPS), L^AT_EX

Databases PostgreSQL, Oracle, MySQL, Microsoft SQL Server

Spoken Languages Turkish (native), English (fluent), Spanish (intermediate level), German (intermediate level), Japanese (beginner level).

Extracurricular Activities Chess, (Latin, Ballroom, Argentine tango, Swing) dancing, hiking, zumba

REFERENCES

Christos Faloutsos, Fredkin Professor
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Pittsburgh, PA 15213
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Brickyard Suite 553 (CIDSE)
Tempe, AZ 85281
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