

# Chao Zhang

University of Illinois, Urbana-Champaign  
Department of Computer Science  
201 N. Lincoln Ave  
Urbana, IL 61801

Office: Siebel Center 1119  
Phone: +1 (217) 898-3585  
Email: czhang82@illinois.edu  
Homepage: <http://chaozhang.org>

## Research Interests

Data mining, machine learning, text mining, spatiotemporal data mining, deep learning, reinforcement learning

## Education

**Ph.D. in Computer Science, University of Illinois at Urbana-Champaign**, Urbana, IL, expected 2018.  
Advisor: Prof. Jiawei Han

**M.S. in Computer Science, Zhejiang University**, Hangzhou, China, 2013.  
Thesis: Evaluating Geo-Social Influence in Location-Based Social Networks

**B.S. in Computer Science, Zhejiang University**, Hangzhou, China, 2010.  
Graduate of Chu Kochen Honors College

## Research Experience

**University of Illinois at Urbana-Champaign**, Urbana, IL  
*Research Assistant, Data Mining Group*, 2013.08 – present

**U.S. Army Research Lab**, Adelphi, MD  
*Visiting Researcher*, 2017.04 – 2017.05

**Facebook Inc.**, Menlo Park, CA  
*Research Scientist Intern, Feed Ranking Team*, 2016.05 – 2016.08

**Microsoft Research**, Beijing, China  
*Research Scientist Intern, Technology Strategy Group*, 2014.05 – 2014.09

**National University of Singapore**, Singapore  
*Research Assistant, Database Group*, 2013.03 – 2013.06

**Zhejiang University**, Hangzhou, China  
*Research Assistant, Database Group*, 2010.09 – 2013.03

**NetEase Research Center**, Hangzhou, China  
*Research Intern*, 2010.01 – 2010.06

## Teaching Experience

**CS 412: Introduction to Data Mining**, UIUC

*Guest Lecturer & Teaching Assistant*, Fall 2017

**CS 412: Introduction to Data Mining**, Coursera

*Teaching Assistant*, Fall 2016

**Cluster Analysis in Data Mining**, Coursera

*Teaching Assistant*, Fall 2016

**Pattern Discovery in Data Mining**, Coursera

*Teaching Assistant*, Spring 2016

**CS 512: Advanced Data Mining**, UIUC

*Teaching Assistant*, Fall 2015

## Publications

### Conference Papers

1. **Chao Zhang**, Fangbo Tao, Xiushi Chen, Jiaming Shen, Meng Jiang, Brian Sadler, Michelle Vanni, Jiawei Han. TaxoGen: Unsupervised Topic Taxonomy Construction by Adaptive Term Embedding and Clustering. To appear in the *ACM SIGKDD Conference on Knowledge Discovery and Pattern Mining (KDD)*, 2018. (**Full paper**, acceptance rate  $\approx 18.4\%$ )
2. Jiaming Shen, Zeqiu Wu, Dongming Lei, **Chao Zhang**, Xiang Ren, Michelle T. Vanni, Brian M. Sadler, Jiawei Han. HiExpan: Task-Guided Taxonomy Construction by Hierarchical Tree Expansion. To appear in the *ACM SIGKDD Conference on Knowledge Discovery and Pattern Mining (KDD)*, 2018. (**Full paper**, acceptance rate  $\approx 18.4\%$ )
3. Yu Shi, Qi Zhu, Fang Guo, **Chao Zhang**, Jiawei Han. Easing Embedding Learning by Comprehensive Transcription of Heterogeneous Information Networks. To appear in the *ACM SIGKDD Conference on Knowledge Discovery and Pattern Mining (KDD)*, 2018. (**Full paper**, acceptance rate  $\approx 18.4\%$ )
4. Jie Feng, Yong Li, and **Chao Zhang**. DeepMove: Predicting Human Mobility with Attentional Recurrent Networks. To appear in the *International World Wide Web Conference (WWW)*, 2018. (**Full paper**, acceptance rate  $\approx 14.8\%$ )
5. **Chao Zhang**, Mengxiong Liu, Zhengchao Liu, Carl Yang, Luming Zhang, Jiawei Han. Spatiotemporal Activity Modeling Under Data Scarcity: A Graph-Regularized Embedding Approach. To appear in *AAAI Conference on Artificial Intelligence (AAAI)*, 2018. (**Full paper**, acceptance rate  $\approx 25.0\%$ )
6. Wanzheng Zhu\*, **Chao Zhang**\*, Shuochao Yao, Xiaobin Gao, Jiawei Han. A Spherical Hidden Markov Model for Semantics-Rich Human Mobility Modeling. To appear in *AAAI Conference on Artificial Intelligence (AAAI)*, 2018. (**Full paper**, acceptance rate  $\approx 25.0\%$ )
7. Carl Yang, **Chao Zhang**, Jiawei Han, Xuewen Chen, Jieping Ye. Did You Enjoy the Ride: Understanding Passenger Experience via Heterogeneous Network Embedding. To appear in *IEEE International Conference on Data Engineering (ICDE)*, 2018.

8. Huajie Shao, Shuochao Yao, Yiran Zhao, **Chao Zhang**, Jinda Han, Lance Kaplan, Lu Su, and Tarek Abdelzaher. A Constrained Maximum Likelihood Estimator for Unguided Social Sensing. To appear in *IEEE International Conference on Computer Communications (InfoCom)*, 2018. (**Full paper**, acceptance rate  $\approx 19.2\%$ )
9. Shuochao Yao, Yiran Zhao, Huajie Shao, Aston Zhang, **Chao Zhang**, Shen Li, and Tarek Abdelzaher. RDeepSense: Reliable Deep Mobile Computing Models with Uncertainty Estimations. To appear in *ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp)*, 2018.
10. **Chao Zhang**, Liyuan Liu, Dongming Lei, Quan Yuan, Honglei Zhuang, Tim Hanratty, and Jiawei Han. TrioVecEvent: Embedding-Based Online Local Event Detection in Geo-Tagged Tweet Streams. In *ACM SIGKDD Conference on Knowledge Discovery and Pattern Mining (KDD)*, 2017. (**Oral paper**, acceptance rate  $\approx 8.5\%$ )
11. Carl Yang, Lanxiao Bai, **Chao Zhang**, Quan Yuan and Jiawei Han. Bridging Collaborative Filtering and Semi-Supervised Learning: A Neural Approach for POI Recommendation. In *ACM SIGKDD Conference on Knowledge Discovery and Pattern Mining (KDD)*, 2017. (Poster paper, acceptance rate  $\approx 17.5\%$ )
12. **Chao Zhang**, Keyang Zhang, Quan Yuan, Luming Zhang, Tim Hanratty, and Jiawei Han. ReAct: Online Multimodal Embedding for Recency-Aware Spatiotemporal Activity Modeling. In *ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR)*, 2017. (**Full paper**, acceptance rate  $\approx 21.5\%$ )
13. **Chao Zhang**, Keyang Zhang, Quan Yuan, Haoruo Peng, Yu Zheng, Tim Hanratty, Shaowen Wang and Jiawei Han. Regions, Periods, Activities: Uncovering Urban Dynamics via Cross-Modal Representation Learning. In *International World Wide Web Conference (WWW)*, 2017 (**Full paper**, acceptance rate  $\approx 17.0\%$ )
14. Quan Yuan, Wei Zhang, **Chao Zhang**, Xinhe Geng, Gao Cong, and Jiawei Han. PRED: Periodic Region Detection for Mobility Modeling of Social Media Users. In *ACM International Conference on Web Search and Data Mining (WSDM)*, 2017. (**Full paper**, acceptance rate  $\approx 15.8\%$ )
15. Quan Yuan, Jingbo Shang, Xin Cao, **Chao Zhang**, Xinhe Geng and Jiawei Han. Detecting Multiple Periods and Periodic Patterns in Event Time Sequences. In *ACM International Conference on Information and Knowledge Management (CIKM)*, 2017. (**Full paper**, acceptance rate  $\approx 8.5\%$ )
16. Di Yao, **Chao Zhang**, Jianhui Huang and Jingping Bi. SERM: A Recurrent Model for Next Location Prediction in Semantic Trajectories. In *ACM International Conference on Information and Knowledge Management (CIKM)*, 2017. (Short paper, acceptance rate  $\approx 30.0\%$ )
17. Di Yao, **Chao Zhang**, Zhihua Zhu, Jianhui Huang, and Jingping Bi. Trajectory Clustering via Deep Representation Learning. In *International Joint Conference on Neural Networks (IJCNN)*, 2017.
18. **Chao Zhang**, Keyang Zhang, Quan Yuan, Luming Zhang, Tim Hanratty, and Jiawei Han. GMove: Group-Level Mobility Modeling Using Geo-Tagged Social Media. In *ACM SIGKDD Conference on Knowledge Discovery and Pattern Mining (KDD)*, 2016. (**Oral paper**, acceptance rate  $\approx 8.9\%$ )
19. **Chao Zhang**, Guangyu Zhou, Quan Yuan, Honglei Zhuang, Yu Zheng, Lance Kaplan, Shaowen Wang, and Jiawei Han. GeoBurst: Real-time Local Event Detection in Geo-tagged Tweet Stream. In *ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR)*, 2016. (**Full paper**, acceptance rate  $\approx 18.2\%$ )
20. **Chao Zhang**, Yu Zheng, Xiuli Ma, and Jiawei Han. Assembler: Efficient Discovery of Spatial Co-evolving Patterns in Massive Geo-sensory Data. In *ACM SIGKDD Conference on Knowledge Discovery and Pattern Mining (KDD)*, 2015. (**Oral paper**, acceptance rate  $\approx 19.4\%$ )

21. **Chao Zhang**, Shan Jiang, Yucheng Chen, Yidan Sun, and Jiawei Han. Fast Inbound Top-K Query for Random Walk with Restart. In *European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML/PKDD)*, 2015. (**Best Student Paper Runner-up, full paper**, acceptance rate  $\approx 23.2\%$ )
22. Wei Feng, **Chao Zhang**, Wei Zhang, Jiawei Han, Jianyong Wang, Charu Aggarwal, and Jianbin Huang. StreamCube: Hierarchical Spatio-temporal Hashtag Clustering for Event Exploration over the Twitter Stream. In *IEEE International Conference on Data Engineering (ICDE)*, 2015. (**Full paper**, acceptance rate  $\approx 25.0\%$ )
23. **Chao Zhang**, Jiawei Han, Lidan Shou, Jiajun Lu, and Thomas La Porta. Splitter: Mining Fine-Grained Sequential Patterns in Semantic Trajectories. In *International Conference on Very Large Data Bases (VLDB)*, 2014. (**Full paper**, acceptance rate  $\approx 20.0\%$ )
24. Luming Zhang, Yue Gao, **Chao Zhang**, Hanwang Zhang, Qi Tian, and Roger Zimmermann. Perception-Guided Multimodal Feature Fusion for Photo Aesthetics Assessment. In *ACM Multimedia International Conference (MM)*, 2014.
25. **Chao Zhang**, Lidan Shou, Ke Chen, Gang Chen, and Yijun Bei. Evaluating Geo-Social Influence in Location-Based Social Networks. In *ACM International Conference on Information and Knowledge Management (CIKM)*, 2012. (**Full paper**, acceptance rate  $\approx 13.4\%$ )
26. **Chao Zhang**, Lidan Shou, Ke Chen, and Gang Chen. See-To-Retrieve: Efficient Processing of Spatio-Visual Keyword Queries. In *ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR)*, 2012. (**Full paper**, acceptance rate  $\approx 20.3\%$ )

### Journal Papers

27. Shuochao Yao, Yiran Zhao, Aston Zhang, Huajie Shao, **Chao Zhang**, Lu Su, Tarek Abdelzaher. Deep Learning for the Internet of Things. To appear in *IEEE Computer*, 2018.
28. **Chao Zhang**, Dongming Lei, Quan Yuan, Honglei Zhuang, Lance Kaplan, Shaowen Wang, and Jiawei Han. GeoBurst+: Effective and Real-Time Local Event Detection in Geo-Tagged Tweet Streams. To appear in *ACM Transactions on Intelligent Systems and Technology (TIST)*, 2018.
29. Zhenguang Liu, Yingjie Xia, Qi Liu, Qinming He, Yanxiang Chen, **Chao Zhang**, and Roger Zimmermann. Towards Personalized Activity Level Prediction in Community Question Answering Websites. To appear in *ACM Transactions on Multimedia Computing, Communications, and Applications (TOMM)*, 2018.
30. Julie Yixuan Zhu\*, **Chao Zhang**\*, Huichu Zhang, Shi Zhi, Victor O.K. Li, Jiawei Han, and Yu Zheng. pg-Causality: Identifying Spatiotemporal Causal Pathways for Air Pollutants with Urban Big Data. *IEEE Transactions on Big Data (TBD)*, 2017.
31. Jingsong Zhang, Yinglin Wang, **Chao Zhang**, and Yongyong Shi. Mining Contiguous Sequential Generators in Biological Sequences. *Transactions on Computational Biology and Bioinformatics (TCBB)*, 13(5): 855–867, 2016.
32. Richang Hong, Luming Zhang, **Chao Zhang**, and Roger Zimmermann. Flickr Circles: Aesthetic Tendency Discovery by Multi-view Regularized Topic Modeling. *IEEE Transactions on Multimedia (TMM)*, 18(8): 1555-1567, 2016.
33. Luming Zhang, Peiguang Jing, Yuting Su, **Chao Zhang**, and Ling Shao. SnapVideo: Personalized Video Generation for a Sightseeing Trip. *IEEE Transactions on Cybernetics*, 2016.

34. Lidan Shou, Xuan Shang, Ke Chen, Gang Chen, and **Chao Zhang**. Supporting Pattern-Preserving Anonymization for Time-Series Data. *IEEE Transactions on Knowledge and Data Engineering (TKDE)*, 25(4): 877–892, 2013.

### Book Chapters

35. Quan Yuan, **Chao Zhang**, Jiawei Han. A Survey on Spatiotemporal and Semantic Data Mining. *Trends in Spatial Analysis and Modelling*, Springer, 2018.
36. **Chao Zhang**. Geographical Data Mining. *International Encyclopedia of Geography: People, the Earth, Environment and Technology*, Wiley, 2017.

### Conference Tutorials

37. Jingbo Shang, **Chao Zhang**, Jiaming Shen, Jiawei Han. Towards Multidimensional Analysis of Text Corpora. To appear in the *ACM SIGKDD Conference on Knowledge Discovery and Pattern Mining (KDD)*, 2018.
38. **Chao Zhang**, Quan Yuan, and Jiawei Han. Space and Time-Coupled Social Media Analysis. In *ACM International Conference on Information and Knowledge Management (CIKM)*, 2017.
39. **Chao Zhang**, Quan Yuan, and Jiawei Han. Bringing Semantics to Spatiotemporal Data Mining: Challenges, Methods, and Applications. In *IEEE International Conference on Data Engineering (ICDE)*, 2017.

### Demonstration Papers

40. Mengxiong Liu, Zhengchao Liu, **Chao Zhang**, Keyang Zhang, Quan Yuan, Tim Hanratty, and Jiawei Han. Urbanity: A System for Interactive Exploration of Urban Dynamics from Streaming Human Sensing Data. In *ACM International Conference on Information and Knowledge Management (CIKM)*, 2017.
41. Shi Zhi, Yicheng Sun, Jiayi Liu, **Chao Zhang**, and Jiawei Han. ClaimVerif: A Real-time Claim Verification System Using the Web and Fact Databases. In *ACM International Conference on Information and Knowledge Management (CIKM)*, 2017.
42. Wei Kang, Anthony K. H. Tung, Wei Chen, Xinyu Li, Qiyue Song, **Chao Zhang**, Feng Zhao, and Xiajuan Zhou. Trendspedia: An Internet Observatory for Analyzing and Visualizing the Evolving Web. In *IEEE International Conference on Data Engineering (ICDE)*, 2014.
43. Lidan Shou, Ke Chen, Gang Chen, **Chao Zhang**, Yi Ma, and Xian Zhang. What-You-Retrieve-Is-What-You-See: A Preliminary Cyber-Physical Search Engine. In *ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR)*, 2011.

## Awards

ACM SIGKDD Student Travel Award	2015, 2016, 2017
ECML/PKDD Best Student Paper Runner-up Award	2015
Award of Excellence in Microsoft Research Internship Program	2014
Chiang Chen Overseas Graduate Fellowship	2013

National Graduate Student Scholarship of China	2013
ACM SIGIR Student Travel Grant	2012
Huawei Graduate Student Scholarship	2012
Chiang Chen Scholarship	2011
Outstanding Bachelor Thesis Award of ZJU	2010
National Undergraduate Scholarship of China	2009

## Services

### Conference Program Committee:

ACM SIGKDD Conference on Knowledge Discovery and Pattern Mining, 2018  
International Joint Conferences on Artificial Intelligence, 2018  
Annual Meeting of the Association for Computational Linguistics, 2018  
SIAM International Conference on Data Mining, 2018  
ACM International Conference on Information and Knowledge Management, 2017

### Journal Reviewing:

IEEE Transactions on Knowledge and Data Engineering, 2016, 2017  
IEEE Transactions on Big Data, 2017  
IEEE Transactions on Mobile Computing, 2017  
IEEE Communications Magazine, 2017  
ACM Transactions on Intelligent Systems and Technology, 2015, 2016, 2017

### Conference External Reviewing:

ACM SIGKDD Conference on Knowledge Discovery and Pattern Mining, 2014, 2015, 2016  
International World Wide Web Conference, 2016, 2017  
ACM SIGMOD International Conference on Management of Data, 2016  
International Conference on Very Large Data Bases, 2014  
IEEE International Conference on Data Engineering, 2014  
International Conference on Extending Database Technology, 2015

## References

Available upon request.