Hongteng Xu

CONTACT INFORMATION

Renmin University of China
Gaoling School of Artifical Intelligence
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EDUCATION

PhD in **Electrical and Computer Engineering**
Georgia Institute of Technology, August 2017
Advisor: Dr. Hongyuan Zha, Dr. Mark Davenport
Thesis: *Point process-based modeling and analysis of asynchronous event sequences*

Dual MS in **Electrical and Computer Engineering**
Georgia Tech & Shanghai Jiao Tong University, May 2013

BS in **Electronic and Information Engineering**
Tianjin University, July 2010

RESEARCH POSITIONS

Associated Professor (Tenure-Track)
Gaoling School of Artificial Intelligence, Renmin University of China 2021-present

Visiting Researcher of Electrical and Computer Engineering
Department of Electrical and Computer Engineering, Duke University 2018-2020

Senior Research Scientist
Infinia ML Inc. 2018-2020

Postdoctoral Researcher of Electrical and Computer Engineering
Department of Electrical and Computer Engineering, Duke University 2017-2018

Research Assistant of Computational Science and Engineering
College of Computing, Georgia Institute of Technology 2013-2017

Teaching Assistant of Electrical and Computer Engineering
College of Engineering, Georgia Institute of Technology 2012-2013

RESEARCH INTERESTS

Machine Learning, e.g., optimal transport theory, graph modeling and analysis, point process models, time series, deep learning, manifold learning, sparse coding;
Machine Learning Applications, e.g., data mining, healthcare, computer vision.

SELECTED RESEARCH PROJECTS

1. **Optimal Transport Theory and Structural Data Analysis**
   - Relational factorization models for graph embedding and clustering.
   - Scalable Gromov-Wasserstein learning methods for node embedding, graph partitioning and graph matching.
   - A distilled Wasserstein learning method for word embedding and topic modeling.
2. **Point Process Models and Applications**
   - Learning temporal point processes from imperfect observations.
   - Clustering of temporal point processes
   - Learning Granger causality for Hawkes processes.
   - A self-correcting attractiveness model for video trailer generation.
   - Discriminative learning of mutually-correcting processes for EHR data analysis.
   - Superposed Hawkes processes for recommendation systems.
3. **Deep Learning with Existing Models**

- Fractal dimension invariant filtering and its CNN-based implementation for middle-level vision problems, *e.g.*, curve detection.
- Quaternion sparse models and quaternion convolution neural networks (QCNNs) for color image modeling.
- Deep learning driven by optimal transports.

4. Manifold Sampling, Recovery and Synthesis

- Active manifold learning based on Gershgorin disk-driven landmarking.
- Manifold learning-based high-dimensional data synthesis.

TEACHING EXPERIENCE

Temporal Lecturer of "Computational Material Science"
Georgia Institute of Technology, Fall 2016

Teaching Assistant (Lab Lecturer) of "Introduction to Digital Signal Processing"
Georgia Institute of Technology, Spring 2013

Teaching Assistant of "Digital Image Processing"
Shanghai Jiao Tong University

INVITED TALKS & POSTERS

"Gromov-Wasserstein Factorization Model for Graph Clustering"
Invited talk on OT-TDA Workshop, July 2020.

"Modeling and Applications for Temporal Point Processes"
Tutorial on KDD'19, August 2019.

"Recent Developments in Learning Hawkes Processes"
Invited talk at IUPUI, November 2017.

"Learning Granger Causality for Hawkes Processes"
Invited poster on ITA, February 2017.

"Point Processes and Their Applications"
Invited talk at Shanghai Jiao Tong University, December 2016.

"Active Manifold Learning via Gershgorin Circle Guided Sample Selection"
Invited talk on ICRA'15, May 2015.

"Active Manifold Learning via Gershgorin Circle Guided Sample Selection"
Invited poster on Amazon Graduate Student Symposium.

HONOR

Distinguished Program Committee Member of IJCAI-ECAI	2018
Travel Grant of NeurIPS	2017
Travel Grant of ITA	2017
Finalist of Baidu Fellowship	2016
Travel Grant of ICML	2016
Travel Grant of ICRA	2015
Travel Grant of Amazon Graduate Student Symposium	2014
Outstanding Master Thesis of Shanghai	2014
Travel Grant of ICCV	2013
National Excellent Scholarship, Shanghai Jiao Tong University	2010-2012
Courlter Fellowship, Georgia Institute of Technology	2010
Third Prize in Contemporary Mathematical Contest in Modeling, China	2009
National Scholarship, Tianjin University	2007-2009
Third Prize in Contest of Advanced Mathematics, Tianjin	2007

PROFESSIONAL ACTIVITY

Guest Editor

- IEEE Transactions on Neural Networks and Learning Systems (2019-present)
  Special Issue on Robust Learning of Spatio-Temporal Point Processes: Modeling,

Algorithm, and Applications.

Area Chair

- International Conference on Machine Learning (ICML)
- International Conference on Learning Representation (ICLR)

Reviewer (Conference)

- AAAI Conference on Artificial Intelligence (AAAI)
- Artificial Intelligence and Statistics Conference (AISTATS)
- Asian Conference on Machine Learning (ACML)
- Conference on Neural Information Processing Systems (NeurIPS)
- International Conference on Computer Vision (ICCV)
- International Conference on Computer Vision and Pattern Recognition (CVPR)
- International Conference on Information and Knowledge Management (CIKM)
- International Conference on Machine Learning (ICML)
- International Conference on Multimedia and Expo (ICME)
- International Joint Conference on Artificial Intelligence (IJCAI)

Reviewer (Journal)

- Journal of Machine Learning Research (JMLR)
- SIAM Journal on Mathematics of Data Science
- IEEE Access
- IEEE Signal Processing Letter
- IEEE Transactions on Circuits and Systems for Video Technology
- IEEE Transactions on Image Processing
- IEEE Transactions on Intelligent Transportation Systems
- IEEE Transactions on Knowledge and Data Engineering
- IEEE Transactions on Multimedia
- IEEE Transactions on Pattern Analysis and Machine Intelligence
- IEEE Transactions on Signal Processing
- Elesvier Journal of Computer Methods and Programs in Biomedicine
- Elesvier Journal of Neurocomputing
- Elesvier Journal of Signal Processing: Image Communication
- Elesvier Journal of Visual Communication and Image Representation
- EURASIP Journal on Image and Video Processing
- Springer Journal of Multidimensional Systems and Signal Process
- Springer Frontiers of Information Technology and Electronic Engineering

Organizer (Conference)

- International Workshop on Talent and Managemeent Computing, 2020
- International Conference on Internet Multimedia Computing and Service, 2018 Special session 2: Sequence analytics and its applications.
- Machine Learning TechTalk in Infinia ML Inc., 2018-2019

PUBLICATION

Journals

1. Huanjing Yue, Yan Mao, Jingyu Yang, **Hongteng Xu**, Chunping Hou, Jingyu Yang - "Recaptured Screen Image Demoiréing," IEEE Transactions on Circuit System and Video Technology (TCSVT), 2020.
2. Xu Chen, Yongfeng Zhang, **Hongteng Xu**, Zheng Qin, Hongyuan Zha - "Adversarial Distillation for Efficient Recommendation with External Knowledge," ACM Transactions on Information Systems (TOIS), 2018.
3. **Hongteng Xu**, Licheng Yu, Mark Davenport, Hongyuan Zha - "A Unified Framework for Manifold Landmarking," IEEE Transactions on Signal Processing (TSP), 2018.

4. Weiyao Lin, Yang Zhou, **Hongteng Xu**, Junchi Yan, Mingliang Xu, Jianxin Wu, Zicheng Liu - "A Tube-and-Droplet-based Approach for Representing and Analyzing Motion Trajectories," IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2017.
5. **Hongteng Xu**, Weichang Wu, Shamim Nemati, Hongyuan Zha - "Patient Flow Prediction via Discriminative Learning of Mutually-Correcting Processes," IEEE Transactions on Knowledge and Data Engineering (TKDE), 2017. (Extended Abstract for ICDE 2017)
6. Dixin Luo, **Hongteng Xu**, Yi Zhen, Bistra Dilkina, Hongyuan Zha, Xiaokang Yang, Wenjun Zhang - "Learning Mixtures of Markov Chains from Aggregate Data with Structural Constraints," IEEE Transactions on Knowledge and Data Engineering (TKDE), 2016. (Extended Abstract for ICDE 2017)
7. Yi Xu, Licheng Yu, **Hongteng Xu**, Hao Zhang, Truong Nguyen - "Vector Sparse Representation of Color Image Using Quaternion Matrix Analysis," IEEE Transactions on Image Processing (TIP), 2015.
8. Dixin Luo, **Hongteng Xu**, Hongyuan Zha, Jun Du, Rong Xie, Xiaokang Yang, Wenjun Zhang - "You Are What You Watch and When You Watch: Inferring Household Structures From IPTV Viewing Data," IEEE Transactions on Broadcasting, 2014.
9. **Hongteng Xu**, Guangtao Zhai, Xiaolin Wu, Xiaokang Yang - "Generalized Equalization Model for Image Enhancement," IEEE Transactions on Multimedia (TMM), 2014.
10. **Hongteng Xu**, Guangtao Zhai, Xiaokang Yang - "Single Image Super-resolution with Detail Enhancement based on Local Fractal Analysis of Gradient," IEEE Transactions on Circuit Systems for Video Technology (TCSVT), 2013.
11. **Hongteng Xu**, Guangtao Zhai, Li Chen, Xiaokang Yang - "Automatic Movie Restoration Based on Wave Atom Transform and Nonparametric Model," EURASIP Journal on Advances in Signal Processing, 2012.

Conferences

1. David Dov, Serge Assaad, Shijing Si, Rui Wang, **Hongteng Xu**, Shahar Ziv Kovalsky, Jonathan Bell, Danielle Elliott Range, Jonathan Cohen, Ricardo Henao, Lawrence Carin - "Affinitention nets: kernel perspective on attention architectures for set classification with applications to medical text and images," Proceedings of the Conference on Health, Inference, and Learning (**CHIL**), 2021.
2. Yujia Xie, Yixiu Mao, Simiao Zuo, **Hongteng Xu**, Xiaojing Ye, Tuo Zhao, Hongyuan Zha - "A Hypergradient Approach to Robust Regression without Correspondence," International Conference on Learning Representations (**ICLR**), 2021.
3. **Hongteng Xu**, Dixin Luo, Lawrence Carin, Hongyuan Zha - "Learning Graphons via Structured Gromov-Wasserstein Barycenters," AAAI Conference on Artificial Intelligence (**AAAI**), 2021.
4. Wenlin Wang, **Hongteng Xu**, Ruiyi Zhang, Wenqi Wang, Piyush Rai, Lawrence Carin - "Learning to Recommend from Sparse Data via Generative User Feedback," AAAI Conference on Artificial Intelligence (**AAAI**), 2021.
5. Wenlin Wang, **Hongteng Xu**, Guoying Wang, Wenqi Wang, Lawrence Carin - "Zero-Short Recognition via Optimal Transport," IEEE Winter Conference on Applications of Computer Vision (**WACV**), 2020.
6. **Hongteng Xu**, Dixin Luo, Ricardo Henao, Svati Shah, Lawrence Carin - "Learning Autoencoders with Relational Regularization," The International Conference on Machine Learning (**ICML**), 2020.
7. Xuan Zhang, Shaofei Qin, Yi Xu, and **Hongteng Xu** - "Quaternion Product Units for Deep Learning on 3D Rotation Groups," IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2020.

8. **Hongteng Xu** - "Gromov-Wasserstein Factorization Models for Graph Clustering," **AAAI** Conference on Artificial Intelligence, 2020.
9. Wenlin Wang, **Hongteng Xu**, Zhe Gan, Bai Li, Guoyin Wang, Liqun Chen, Qian Yang, Wenqi Wang, Lawrence Carin - "Graph-Driven Generative Models for Heterogeneous Multi-Task Learning," **AAAI** Conference on Artificial Intelligence, 2020.
10. **Hongteng Xu**, Dixin Luo, Lawrence Carin - "Scalable Gromov-Wasserstein Learning for Graph Partitioning and Matching," The Conference on Neural Information and Processing System (**NeurIPS**), 2019.
11. Zheng Zhang, Yi Xu, He Wang, Bingbing Ni, **Hongteng Xu** - "Single-Image Rain Removal via Multi-Scale Cascading Image Generation," IEEE International Conference on Image Processing (**ICIP**) 2019.
12. **Hongteng Xu**, Dixin Luo, Hongyuan Zha, Lawrence Carin - "Gromov-Wasserstein Learning for Graph Matching and Node Embedding," The International Conference on Machine Learning (**ICML**), 2019.
13. Xu Chen, Hanxiong Chen, **Hongteng Xu**, Yongfeng Zhang, Yixin Cao, Zheng Qin, Hongyuan Zha - "Personalized Fashion Recommendation with Visual Explanations based on Multimodal Attention Network," ACM SIGIR Conference on Research and Development in Information Retrievl (**SIGIR**), 2019.
14. Wenlin Wang, Zhe Gan, **Hongteng Xu**, Ruiyi Zhang, Guoyin Wang, Dinghan Shen, Changyou Chen, Lawrence Carin - "Topic-Guided Variational Auto-Encoder for Text Generation," Annual Conference of the North American Chapter of the Association for Computational Linguistics (**NAACL**), 2019.
15. **Hongteng Xu**, Wenlin Wang, Wei Liu, Lawrence Carin, - "Distilled Wasserstein Learning for Word Embedding and Topic Modeling," The Conference on Neural Information and Processing System (**NeurIPS**), 2018.
16. Xuanyu Zhu*, Yi Xu*, **Hongteng Xu***, Changjian Chen - "Quaternion Convolutional Neural Networks" European Conference on Computer Vision (**ECCV**), 2018.
17. Matthew Engelhard*, **Hongteng Xu***, Jason Oliver, Matt Hallyburton, Francis McClernon - "Predicting Smoking Events with a Time-Varying Semi-Parametric Hawkes Process Model" Machine Learning for Healthcare (**MLHC**), 2018.
18. **Hongteng Xu**, Lawrence Carin, Hongyuan Zha, - "Learning Registered Point Processes from Idiosyncratic Observations," The International Conference on Machine Learning (**ICML**), 2018.
19. He Wang, Yi Xu, Bingbing Ni, Lixue Zhuang, **Hongteng Xu**, - "Flexible Network Binarization with Layer-wise Priority," The International Conference on Image Processing (**ICIP**), 2018.
20. **Hongteng Xu**, Dixin Luo, Lawrence Carin - "Online Continuous-Time Tensor Factorization Based on Pairwise Interactive Point Processes," The Twenty-seventh International Joint Conference on Artificial Intelligence (**IJCAI**), 2018.
21. Shiyu Ning, **Hongteng Xu**, Li Song, Rong Xie, Wenjun Zhang - "Learning an Inverse Tone Mapping Network with a Generative Adversarial Regularizer," IEEE International Conference on Acoustics, Speech and Signal Processing (**ICASSP**), 2018.
22. **Hongteng Xu**, Dixin Luo, Xu Chen, Lawrence Carin - "Benefits from Superposed Hawkes Processes," The 21st International Conference on Artificial Intelligence and Statistics (**AISTATS**), 2018.
23. Shuai Xiao, **Hongteng Xu**, Junchi Yan, Mehrdad Farajtabar, Xiaokang Yang, Le Song, Hongyuan Zha - "Learning Conditional Generative Models for Temporal Point Processes," **AAAI** Conference on Artificial Intelligence, 2018.

24. Xu Chen, **Hongteng Xu**, Yongfeng Zhang, Jiaxi Tang, Yixin Cao, Zheng Qin, Hongyuan Zha - "Sequential Recommendation with User Memory Networks," ACM International Conference on Web Search and Data Mining (**WSDM**), 2018.
25. Xu Chen, Yongfeng Zhang, **Hongteng Xu**, Junchi Yan, Zheng Qin - "Personalized Key Frame Recommendation," **SIGIR** Conference on Research and Development in Information Retrieval, 2017.
26. **Hongteng Xu**, Hongyuan Zha - "A Dirichlet Mixture Model of Hawkes Processes for Event Sequence Clustering," Conference on Neural Information Processing Systems (**NIPS**), 2017.
27. **Hongteng Xu**, Dixin Luo, Hongyuan Zha - "Learning Hawkes Processes from Short Doubly-Censored Event Sequences," International Conference on Machine Learning (**ICML**), 2017.
28. **Hongteng Xu**, Junchi Yan, Weiyao Lin, Hongyuan Zha - "Fractal Dimension Invariant Filtering and Its CNN-based Implementation," International Conference on Computer Vision and Pattern Recognition (**CVPR**), 2017.
29. **Hongteng Xu**, Mehrdad Farajtabar, Hongyuan Zha - "Learning Granger Causality for Hawkes Processes," International Conference on Machine Learning (**ICML**), 2016.
30. **Hongteng Xu**, Xia Ning, Hui Zhang, Junghwan Rhee, Guofei Jiang - "PInfer: Learning to Infer Concurrent Request Paths from System Kernel Events," IEEE International Conference on Autonomic Computing (**ICAC**), 2016.
31. **Hongteng Xu**, Yang Zhou, Weiyao Lin, Hongyuan Zha - "Unsupervised Trajectory Clustering via Adaptive Multi-Kernel-based Shrinkage," International Conference on Computer Vision (**ICCV**), 2015.
32. Junchi Yan, **Hongteng Xu**, Hongyuan Zha, Xiaokang Yang - "A Matrix Decomposition Perspective to Multiple Graph Matching," International Conference on Computer Vision (**ICCV**), 2015.
33. **Hongteng Xu**, Yi Zhen, Hongyuan Zha - "Trailer Generation via A Point Process-based Visual Attractiveness Model," The Twenty-fourth International Joint Conference on Artificial Intelligence (**IJCAI**), 2015.
34. Dixin Luo*, **Hongteng Xu***, Yi Zhen, Xia Ning, Hongyuan Zha, Xiaokang Yang, Wenjun Zhang. - "Multi-task Multi-dimensional Hawkes Processes for Modeling Event Sequences," The Twenty-fourth International Joint Conference on Artificial Intelligence (**IJCAI**), 2015.
35. **Hongteng Xu**, Hongyuan Zha, Ren-Cang Li, Mark A. Davenport - "Active Manifold Learning via Gershgorin Circle Guided Sample Selection," The Twenty-Ninth AAAI Conference on Artificial Intelligence (**AAAI**), 2015.
36. **Hongteng Xu***, Licheng Yu*, Dixin Luo, Hongyuan Zha, Yi Xu - "Dictionary Learning with Mutually Reinforcing Group-Graph Structures," The Twenty-Ninth AAAI Conference on Artificial Intelligence (**AAAI**), 2015.
37. **Hongteng Xu**, Hongyuan Zha, Mark A. Davenport - "Manifold Based Dynamic Texture Synthesis from Extremely Few Samples," IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2014.
38. **Hongteng Xu**, Hongyuan Zha - "Manifold based Image Synthesis from Sparse Samples," IEEE Conference on Computer Vision (**ICCV**), 2013.
39. Lichen Yu, Yi Xu, **Hongteng Xu**, Hao Zhang - "Quaternion-based Sparse Representation of Color Image," IEEE Conference on Multimedia and Expo (**ICME**), 2013.
40. **Hongteng Xu**, Dixin Luo, Xiaoming Huo, Xiaokang Yang - "World Expo Problem and Its Mixed Integer Programming Based Solution," BSI workshop of **PAKDD**, Gold Coast, Australia, 2013.

41. **Hongteng Xu**, Guangtao Zhai, Xiaokang Yang - "No Reference Measurement of Contrast Distortion and Optimal Contrast Enhancement," IEEE Conference on Pattern Recognition (**ICPR**), Tsukuba, Japan, 2012.
42. Licheng Yu, **Hongteng Xu**, Yi Xu, Xiaokang Yang - "Robust Single Image Super-resolution based on Gradient Enhancement", Asia-Pacific Signal and Information Processing Association, Hollywood, USA, 2012.
43. **Hongteng Xu**, Guangtao Zhai - "ECG Data Compression Based on Wave Atom Transform," Workshop on Multimedia Signal Processing (**MMSP**), Hangzhou, China, 2011.

$*$ means equal contribution.

Workshops

1. Dixin Luo, **Hongteng Xu**, Lawrence Carin - "Fused Gromov-Wasserstein Alignment for Hawkes Processes," NeurIPS Workshop on Learning with Temporal Point Processes, 2019.
2. Wenlin Wang, **Hongteng Xu**, Guoyin Wang, Wenqi Wang and Lawrence Carin - "Improving Zero-Shot Learning via Optimal Transport," NeurIPS Workshop on Optimal Transport for Machine Learning, 2019.
3. Wenlin Wang, **Hongteng Xu**, Zhe Gan, Bai Li, Guoyin Wang, Liqun Chen, Qian Yang, Wenqi Wang, Lawrence Carin - "Graph-Driven Generative Models for Heterogeneous Multi-Task Learning," NeurIPS Workshop on Graph Representation Learning, 2019.
4. Dixin Luo, **Hongteng Xu**, Lawrence Carin - "Adversarial Self-Paced Learning for Mixture Models of Hawkes Processes," ICML Workshop on Time Series, 2019.
5. **Hongteng Xu**, Weichang Wu, Shamim Nemati, Hongyuan Zha - "Patient Flow Prediction via Discriminative Learning of Mutually-Correcting Processes," TKDE Session of ICDE, 2017
6. Dixin Luo, **Hongteng Xu**, Yi Zhen, Bistra Dilkina, Hongyuan Zha, Xiaokang Yang, Wenjun Zhang - "Learning Mixtures of Markov Chains from Aggregate Data with Structural Constraints," TKDE Session of ICDE, 2017

Patents

1. "System and method for profiling requests in service systems". Issued date: Jun 14, 2016. Patent issuer and number: us US9367821 B2.
2. "An IPTV User Behavior Analysis Method Based on Watching Records". Issued date: Apr 13, 2016. Patent issuer and number: cn ZL 2013 1 0032682.X.
3. "An Image Enhancement Method Based on Generalized Equalization Model". Issued date: Mar 5, 2014. Patent issuer and number: cn ZL 2011 1 0367151.7.
4. "An Automatic Movie Contrast-Tone Enhancement System". Issued date: Nov 20, 2013. Patent issuer and number: cn ZL 2011 1 0304673.2.
5. "A Movie Automatic Restoration System Based on Wave Atom and Nonparametric Model". Issued date: Sep 25, 2013. Patent issuer and number: cn ZL 2011 1 0304655.4.
6. "An Image/Video Super-resolution and Enhancement Method Based on Fractal Analysis". Issued date: Aug 2, 2012. Patent issuer and number: cn ZL 2012 1 0273937.7.

INDUSTRIAL INTERNSHIP EXPERIENCE

Intern (Neural network truncation)
GE Global Research Center, America, Summer 2016-Fall 2016
Mentor: Dr. Ser Nam Lim, Dr. Xiao Bian
Intern (Image captioning)
Amazon 126 Lab, America, Summer 2015-Fall 2015

Mentor: Mr. Sathish Thoppay Egambaram, Dr. Ambrish Tyagi
Intern (Analyzing kernel event traces in distributed systems)
NEC Lab, America, Summer 2014-Fall 2014
Mentor: Dr. Hui Zhang, Dr. Xia Ning
Intern (Image stitching and panorama)
Qualcomm Shanghai Branch, Summer 2012-Fall 2012
Mentor: Dr. Fan Lin