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## Biography

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I pursued my undergraduate study in the Applied Mathematics Department at South China University of Technology and got my bachelor's degree in 2005.

After that, I continued my postgraduate study in the Computer Science Department at the same university and got my Ph. D in 2010.

I was a visiting student at the National University of Singapore in 2007-2009.

I was a Postdoc Researcher at Advanced Digital Sciences Center (University of Illinois at Urbana-Champaign's Research Center in Singapore) in 07/2013-07/2014.

## Research Interests

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My research interests focus on causal discovery, causality-related learning, and their applications to social science, bioinformatics, and industries.

## Selected Publications

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### 2022

- **Ruichu Cai**, Liting Huang, Wei Chen, Jie Qiao, Zhifeng Hao. Learning dynamic causal mechanisms from non-stationary data. *Applied Intelligence*, 2022: 1-12
- **Ruichu Cai**, Siyu Wu, Jie Qiao, Zhifeng Hao, Keli Zhang, Xi Zhang. THP: Topological Hawkes Processes for Learning Causal Structure on Event Sequences. *IEEE Transactions on Neural Networks and Learning Systems*, 2022
- **Ruichu Cai**, Zhaolong Lin, Wei Chen, Zhifeng Hao. Shared state space model for background information extraction and time series prediction. *Neurocomputing*, 2022: 468: 85-96

- **Ruichu Cai**, Fengzhu Wu, Zijian Li, Jie Qiao, Wei Chen, Yuexing Hao, Hao Gu. REST: Debiased Social Recommendation via Reconstructing Exposure Strategies. IEEE Transactions on neural networks and learning systems, 2022

## 2021

- **Ruichu Cai**, Jiawei Chen, Zijian Li, Wen Chen, Keli Zhang, Junjian Ye, Zhuozhang Li, Xiaoyan Yang, Zhenjie Zhang. Time Series Domain Adaptation via Sparse Associative Structure Alignment, AAAI 2021 [[code](#)]
- **Ruichu Cai**#, Hao Zhang#, Wen Liu#, Shenghua Gao, Zhifeng Hao. Appearance-Motion Memory Consistency Network for Video Anomaly Detection, AAAI 2021.
- Feng Xie#, **Ruichu Cai**#, Biwei Huang, Clark Glymour, Zhifeng Hao, Kun Zhang#. Generalized Independent Noise Condition for Estimating Linear Non-Gaussian Latent Variable Graphs. NeurIPS 2020 (CCF A 类)[[code](#)]

## 2020

- Feng Xie#, **Ruichu Cai**#, Biwei Huang, Clark Glymour, Zhifeng Hao, Kun Zhang#. Generalized Independent Noise Condition for Estimating Linear Non-Gaussian Latent Variable Graphs. NeurIPS 2020 (CCF A 类)[[code](#)].
- **Ruichu Cai**, Zhihao Liang, Boyan Xu, zijian li, Yao Chen and Yuexing Hao. Type Auxiliary Guiding for Code Comment Generation. ACL2020.
- **Ruichu Cai**, Jiahao Li, Zhenjie Zhang, Xiaoyan Yang, Zhifeng Hao. DACH: Domain Adaptation without Domain Information. IEEE Transactions on Neural Networks and Learning Systems, 2020:31(12):5055-5067.

## 2019 and prior

- **Ruichu Cai**, Feng Xie, Clark Glymour, Zhifeng Hao, Kun Zhang. Triad Constraints for Learning Causal Structure of Latent Variables. NeurIPS 2019 [[pdf](#)][[code](#)]
- **Ruichu Cai**, Jie Qiao, Kun Zhang, Zhenjie Zhang, Zhifeng Hao. Causal Discovery with Cascade Nonlinear Additive Noise Model. IJCAI 2019 [[pdf](#)][[code](#)]
- **Ruichu Cai**, Zijian Li, Pengfei Wei, Jie Qiao, Kun Zhang, Zhifeng Hao. Learning Disentangled Semantic Representation for Domain Adaptation. IJCAI 2019 [[pdf](#)][[code](#)]
- **Ruichu Cai**, Jie Qiao, Kun Zhang, Zhenjie Zhang, Zhifeng Hao. Causal Discovery on Discrete Data using Hidden Compact Representation. NIPS,2018.[[code](#)]
- **Ruichu Cai**, Jie Qiao, Zhenjie Zhang, Zhifeng Hao. SELF: Structural Equational Embedded Likelihood Framework for Causal Discovery. AAAI,2018.[[code](#)]

- **Ruichu cai**, Zhenjie Zhang, Zhifeng Hao, Marianne Winslett. Sophisticated Merging over Random Partitions: A Scalable and Robust Causal Discovery Approach. IEEE Transactions on Neural Networks and Learning Systems, 2017
- **Ruichu Cai**, Zijie Lu, Li Wang, Zhenjie Zhang. DITIR: Distributed Index for High Throughput Trajectory Insertion and Real-time Temporal Range Query, PVLDB, 2017 10 (12) : [\[video\]](#)
- **Ruichu Cai**, Mei Liu, Yong Hu, Brittany L. Melton, Michael E. Matheny, Hua Xu, Lian Duan, Lemuel R. Waitman. Identification of adverse drug-drug interactions through causal association rule discovery from spontaneous adverse event reports. Artificial Intelligence in Medicine 76 (2017) 7–15
- **Ruichu Cai**, Zhenjie Zhang, Zhifeng Hao, Marianne Winslett. Understanding Social Causalities Behind Human Action Sequences. IEEE Transactions on Neural Networks and Learning Systems. 2017, 28 (8) : 1801-1813.
- **Ruichu Cai**, Zhenjie Zhang, Srinivasan Parthasarathy, Anthony K. H. Tung, Zhifeng Hao, Wen Zhang. Multi-Domain Manifold Learning for Drug-Target Interaction Prediction. 2016 SIAM International Conference on Data Mining.
- **Ruichu Cai**, Zhifeng Hao, Marianne Winslett, Xiaokui Xiao, Yin Yang, Zhenjie Zhang, Shuigeng Zhou. Deterministic Identification of Specific Individuals from GWAS Results[J]. Bioinformatics, 2015
- **Ruichu Cai**, Zhenjie Zhang, A K H Tung, et al. A general framework of hierarchical clustering and its applications[J]. Information Sciences, 2014: 272, 29-48
- Mei Liu, **Ruichu Cai** (co-first author), Yong Hu, Michael E Matheny, Jingchun Sun, Jun Hu, Hua Xu. Determining molecular predictors of adverse drug reactions with causality analysis based on structure learning, Journal of the American Medical Informatics Association, 2013
- **Ruichu Cai**, Zhenjie Zhang, Zhifeng Hao. SADA: A General Framework to Support Robust Causation Discovery, ICML 2013
- **Ruichu Cai**, Zhenjie Zhang, Zhifeng Hao. Causal Gene Identification Using Combinatorial V-Structure Search, Neural Networks. 2013;43:63-71
- **Ruichu Cai**, Zhifeng Hao, Wen Wen, Lijuan Wang. Regularized Gaussian Mixture Model Based Discretization for Gene Expression Data Association Mining, Applied Intelligence. 2013; 39:607–613
- **Ruichu Cai**, Zhenjie Zhang, Zhifeng Hao. BASSUM: A Bayesian semi-supervised method for classification feature selection, Pattern Recognition. 2011;44(4):811-820(SCI:711BV)[[bibtex](#)]
- **Ruichu Cai**, Tung K.H. Anthony, Zhifeng Hao, Zhenjie Zhang. What is Unequal among the Equals? Ranking Equivalent Rules from Gene Expression Data. IEEE Transactions on Knowledge and Data Engineering. 2011;23(11):1735-1747(SCI:824CX)[[bibtex](#)]
- **Ruichu Cai**, Zhifeng Hao, Xiaowei Yang, Han Huang. A New Hybrid Method for Gene Selection. Pattern Analysis and Application. 2010;14(1):1-8.(SCI)[[bibtex](#)]

- **Ruichu Cai**, Zhifeng Hao. Kernel Based Gene Expression Pattern Discovery and Its Application on Cancer Classification. Neurocomputing. 2010; 73(13-15):2562-2570(SCI) [bibtex]
- **Ruichu Cai**, Zhifeng Hao, Xiaowei Yang, Wen Wen. An efficient gene selection algorithm based on mutual information. Neurocomputing. 2009; 72(4-6):991-999.(SCI)[bibtex]
- Wei Chen, **Ruichu Cai**\*, Kun Zhang\*, Zhifeng Hao. Causal Discovery in Linear Non-Gaussian Acyclic Model with Multiple Latent Confounders. IEEE Transactions on Neural Networks and Learning Systems, 2021
- Zijian Li, **Ruichu Cai**\*, Hongwei Ng, Marianne Winslett, Tom Z. J. Fu, Boyan Xu, Xiaoyan Yang, Zhenjie Zhang. Causal Mechanism Transfer Network for Time Series Domain Adaptation in Mechanical Systems[J]. ACM Transactions on Intelligent Systems and Technology, 2021
- Zhifeng Hao, Di Lv, Zijian Li, **Ruichu Cai**\*, Wen Wen, Boyan Xu. Semi-Supervised Disentangled Framework for Transferable Named Entity Recognition. Neural Networks, 2020 (SCI — 区) [code]
- Zhenjie Zhang, Yin Yang, **Ruichu Cai**, etc. Kernel-Based Skyline Cardinality Estimation, SIGMOD conference. 2009: 509-522 (EI) [bibtex]
- **Ruichu Cai**, Zhifeng Hao, Wen Wen. A Novel Gene Ranking Algorithm Based on Random Subspace Method. International Joint Conference on Neural Networks. 2007:219-223 (EI)[bibtex]
- Zhifeng Hao, **Ruichu Cai**, Han Huang. An Adaptive Parameter Control strategy for ACO. International Conference on Machine Learning and Cybernetics. 2006: 203-206 (EI)

## Professional Activities

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- Senior PC: AAAI 2019-2021, IJCAI 2019-2021
- PC: AAAI 2015-2019, IJCAI 2018-2019, NIPS 2016-2018, ICML 2015-2018, AISTATS 2016-2019, ICLR 2018-2019 SIGKDD Workshop on Causal Discovery 2016-2018
- Publication Co-Chair: APWEB 2015
- Reviewer: TNNLS, TKDE, TIST, Neural Network, Pattern Recognition, Bioinformatics, Neurocomputing, Information Sciences, National Science Review, Plos ONE, Science China-Information Sciences

## Funding

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- Causal discovery on high dimensional data and applications (09/2019-12/2020), supported by Huawei

- Causality related network embedding (06/2020-06/2021), supported by Wechat
- Public user profile based causal recommendation (05/2017-05/2019), supported by Vipshop
- Research on Causal Mechanism and Methods of Nonstationary Social Network User Behaviors (01/2019-12/2022), supported by Natural Science Foundation of China :
- Causal Discovery on High Dimensional Data: Theory and Applications (01/2015-12/2018), supported by Guangdong Natural Science Funds for Distinguished Young Scholar:
- Causal Inference on High Dimensional Incomplete Observational Data and Its Applications (finished), supported by Natural Science Foundation of China
- Public Opinion Mining System For Enterprise Decision (finished) , supported by Science and Technology Plan Project of Guangzhou City
- Research on Causal Inference Based Disease-Causal Gene Discovery (finished), supported by Natural Science Foundation of China

## Links

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- Github: <https://github.com/DMIRLAB-Group/>
- Homepage: <https://dmir.gdut.edu.cn/>