

MINGMING GONG

Address Department of Biomedical Informatics, University of Pittsburgh
Cubicle 520c, 5607 Baum Boulevard, Pittsburgh, PA 15206

Department of Philosophy, Carnegie Mellon University
4301-H, Doherty Hall, Hamerschlag Dr, Pittsburgh, PA 15213

Email mig73@pitt.edu

Phone +14122512250

Homepage <http://mingminggong.xyz/>

EDUCATION

- **University of Technology Sydney (UTS), Sydney, Australia** 08/2012- 08/2017
Ph.D. in Analytics
Thesis: Causal and Causally-inspired Learning
Advisor: Prof. Dacheng Tao
Co-advisor: Assistant Prof. Kun Zhang (Carnegie Mellon University)
 - **Huazhong University of Science and Technology (HUST), Wuhan, China** 09/2009- 03/2012
M.Eng. in Communications and Information System
Thesis: Image Matching and Recognition based on Local Features
Advisor: Prof. Xinge You
 - **Nanjing University (NJU), Nanjing, China** 09/2005 - 06/2009
B.Sc. in Electronic Information Science and Technology
Thesis: Classification of Acoustic Emission Signals using Wavelet Transform
Advisor: Prof. Jing Yang
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RESEARCH INTERESTS

- Causal Inference: Bayesian networks, functional causal models, time series analysis
 - Machine Learning: transfer learning, deep learning, graphical models, learning theory
 - Computer Vision: pose estimation, semantic segmentation, depth estimation
 - Biomedical Informatics: big data in healthcare, imaging-genetics
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RESEARCH EXPERIENCE

- **Postdoc, University of Pittsburgh & Carnegie Mellon University** 05/2017 - present
Advisors: Assistant Prof. Kayhan Batmanghelich and Assistant Prof. Kun Zhang
 - Studied the theoretical problems in causal discovery under measurement noise and developed robust causal discovery algorithms.
 - Developing adaptive nonparametric domain transfer methods by causal generative modeling.
 - Developing large-scale statistical independence test algorithms for gene-wide association studies.
- **Research Assistant, University of Technology Sydney, Australia** 08/2012 - 08/2017
Advisors: Prof. Dacheng Tao and Assistant Prof. Kun Zhang
 - Proposed a coarse-fine neural network with multi-level supervisions for pose estimation. The proposed algorithm was the winner of several benchmark datasets. (ICCV'17)
 - Proved the identifiability of causal relation from the aggregated time series and proposed an approximate inference algorithm to discover causal relationship from aggregated data. This is the first theoretical proof on the identifiability of causal relations from aggregated data. (UAI'17)

- Proposed a novel domain adaptation algorithm with theoretical analysis to correct shift in joint distribution from a causal view. This is the first algorithm which is able to learn conditional invariant features in the presence of prior shift. (ICML'16)
 - Proved the identifiability of causal relation from the subsampled time series and proposed an algorithm to discover causal relationship from subsampled data. This is the first theoretical proof on the identifiability of causal relations from subsampled data. (ICML'15a)
 - Improved Nonnegative Matrix Factorization (NMF) by incorporating large cone constraints and proposed an algorithm which obtained better local solutions. (TNNLS'17)
- **Research Intern, Max Planck Institute for Intelligent Systems, Germany** 03/2013 - 10/2013
Advisors: Dr. Kun Zhang and Prof. Bernhard Schölkopf
 - Proposed a more practical multi-source domain adaptation algorithm from a causal perspective. (AAAI'15)
 - Proved the identifiability of causal relations from time series with hidden components and proposed an algorithm to discover causal relations from such data. This is the first theoretical proof on the identifiability of causal relations from time series with hidden components. (ICML'15b)
 - **Exchange Student, Norwegian University of Science and Technology, Norway** 09/2010 - 01/2011
Advisor: Prof. Marius Pedersen
 - Conducted performance evaluation of image quality metrics and spatial pooling algorithms for color image quality assessment. (JVCI'12)
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PUBLICATIONS

- **Preprints**

- [I4] Xiyu Yu, Tongliang Liu, **Mingming Gong**, and Dacheng Tao: Learning with Biased Complementary Labels. arXiv preprint arXiv:1711.09535 (2017).
- [I3] Huan Fu, **Mingming Gong**, Chaohui Wang, and Dacheng Tao: A Compromise Principle in Deep Monocular Depth Estimation. arXiv preprint arXiv:1708.08267 (2017).
- [I2] Xiyu Yu, Tongliang Liu, **Mingming Gong**, Kun Zhang, and Dacheng Tao: Transfer Learning with Label Noise. arXiv preprint arXiv:1707.09724 (2017).
- [I1] Kun Zhang, **Mingming Gong**, Joseph Ramsey, Kayhan Batmanghelich, Peter Spirtes, Clark Glymour, Causal Discovery in the Presence of Measurement Error: Identifiability Conditions, UAI workshop on causality, 2017

- **Journal**

- [J5] Tongliang Liu, **Mingming Gong**, Dacheng Tao: Large Cone Non-negative Matrix Factorization. *IEEE Transactions on Neural Networks and Learning Systems (T-NNLS)* 28(9): 2129-2142. (Impact factor 6.108)
- [J4] Dawei Weng, Yunhong Wang, **Mingming Gong**, Dacheng Tao, Hui Wei, Di Huang: DERF: Distinctive Efficient Robust Features From the Biological Modeling of the P Ganglion Cells. *IEEE Transactions on Image Processing (T-IP)* 24(8): 2287-2302 (2015). (Impact factor 4.828)
- [J3] Xinge You, Qiang Li, Dacheng Tao, Weihua Ou, **Mingming Gong**: Local Metric Learning for Exemplar-Based Object Detection. *IEEE Transactions Circuits Systems Video Technology (T-CSVT)* 24(8): 1265-1276 (2014). (Impact factor 3.599)
- [J2] Xiubao Jiang, Xinge You, Yuan Yuan, **Mingming Gong**: A Method Using Long Digital Straight Segments for Fingerprint Recognition. *Neurocomputing* 77(1): 28-35 (2012). (Impact factor 3.317)
- [J1] **Mingming Gong**, Marius Pedersen: Spatial Pooling for Measuring Color Printing Quality Attributes. *J. Visual Communication and Image Representation (JVCI)* 23(5): 685-696 (2012). (Impact factor 2.164)

- **Conference**

- [C10] Ya Li, **Mingming Gong**, Xinmei Tian, Tongliang Liu, Dacheng Tao: Domain Generalization via Conditional Invariant Representations. *Proceedings of the 32th AAAI Conference on Artificial Intelligence (AAAI)*, New Orleans, Louisiana, USA, 2018. (Accepted, oral)

- [C9] Shaoli Huang, **Mingming Gong**, Dacheng Tao: A Coarse-fine Network with Multi-level Supervision for Pose Estimation. *Proceedings of International Conference on Computer Vision (ICCV)*, Venice, Italy, 2017.
- [C8] **Mingming Gong**, Kun Zhang, Bernhard Schölkopf, Clark Glymour, Dacheng Tao: Causal Discovery from Temporally Aggregated Time Series. *Proceedings of the 33rd Conference on Uncertainty in Artificial Intelligence (UAI)*, Sydney, AU, 2017.
- [C7] **Mingming Gong**, Kun Zhang, Tongliang Liu, Dacheng Tao, Clark Glymour, Bernhard Schölkopf: Domain Adaptation with Conditional Transferable Components. *Proceedings of the 33rd International Conference on Machine Learning (ICML)*, New York, USA, 2016.
- [C6] **Mingming Gong**, Kun Zhang, Bernhard Schölkopf, Dacheng Tao, Philipp Geiger: Discovering Temporal Causal Relations from Subsampled Data. *Proceedings of the 32nd International Conference on Machine Learning (ICML)*, Lille, France, 2015.
- [C5] Philipp Geiger, Kun Zhang, **Mingming Gong**, Bernhard Schölkopf, Dominik Janzing: Causal Inference by Identification of Vector Autoregressive Processes with Hidden Components. *Proceedings of the 32nd International Conference on Machine Learning (ICML)*, Lille, France, 2015.
- [C4] Kun Zhang, **Mingming Gong**, Bernhard Schölkopf: Multi-Source Domain Adaptation: A Causal View. *Proceedings of the 29th AAAI Conference on Artificial Intelligence (AAAI)*, Texas, USA, 2015.
- [C3] Quanming Yao, Xiubao Jiang, **Mingming Gong**, Xinge You, Yu Liu, Duanquan Xu: Efficient Group Learning with Hypergraph Partition in Multi-task Learning. *Proceedings of the 5th Chinese Conference on Pattern Recognition (CCPR)*, Beijing, China, 2012.
- [C2] Weihua Ou, Xinge You, Yiu-ming Cheung, Qinmu Peng, **Mingming Gong**, Xiubao Jiang: Structured sparse coding for image representation based on L1-graph. *Proceedings of the 21st International Conference on Pattern Recognition (ICPR)*, Stuttgart, Germany, 2011.
- [C1] Xiubao Jiang, Long Zhou, **Mingming Gong**, Xinge You: Long digital straight segments for fingerprint matching. *Proceedings of 9th International Conference on Machine Learning and Cybernetics (ICMLC)*, Qingdao, China, 2010.
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TEACHING

- Teaching assistant for the course “Probabilistic Graphical Models” at CMU, 01/2018 - present.
 - Teaching assistant for the course “Causality and Probability Theory” at CMU, 09/2017 - 12/2017.
 - Instructor for the summer school course “Machine Learning” at UTS, 08/2016 - 11/2016. Contents: cross-validation, the bootstrap, regression trees, classification trees, bagging, boosting, random forests.
 - Instructor for the summer school course “Computer Vision” at UTS, 08/2016 - 11/2016. Contents: image pyramids and applications, edge detection, interest points detection, local image features, feature matching and hough transform, robust model fitting and RANSAC, stereo correspondence, object recognition overview.
 - Teaching assistant for the undergraduate course “Analog Circuits” at HUST, 02/2010 - 06/2010.
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MENTORING EXPERIENCE

- Huan Fu (U Sydney) - “Deep Learning for Depth Estimation from Single Images.”
 - Xiyu Yu (U Sydney) - “Learning with Label Noise and Distribution Shift.”
 - Ya Li (UTS/USTC) - “Invariant Feature Learning in Domain Generalization: A Causal Treatment.”
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PRESENTATION EXPERIENCE

- Talk on “Discovering Temporal Causal Relations from Subsampled Data” at University of Pittsburgh, Pittsburgh, USA, May 5, 2017.
 - Talk on “Domain Adaptation with Conditional Transferable Components” at International Conference on Machine Learning 2016, New York, USA, Jun 20, 2016.
 - Talk on “Causal Inference from Low-Resolution Time series” at UTS, Sydney, Australia, Sep 17, 2014.
 - Talk on “Recent Progress on Domain Adaptation” at Empirical Inference Department, Max Planck Institute for Intelligent Systems, Tübingen, Germany, Jun 19, 2013.
 - Talk on “Spatial Pooling for Image Quality Assessment” at Norwegian University of Science and Technology, Gjøvik, Norway, Jan 19, 2011.
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INDUSTRIAL PROJECT EXPERIENCE

- **Research Assistant, University of Technology Sydney, Australia** 08/2012 - 03/2016
Advisor: Prof. Dacheng Tao
 - Developed a patent image retrieval system based on Elasticsearch and local invariant features.
 - Developed an algorithm to stitch multiple self shot photos into whole body photos for cell phones.
 - **Intern, Wuhan Landing Medical Technology co., LTD, China** 02/2012 - 07/2012
Advisors: Dr. Baochuan Pang (CTO) and Dr. Xiaorong Sun (CEO)
 - Developed an algorithm to stitch scans of cell samples for a commercial cell analysis system.
 - Developed a fast image blur estimation algorithm for auto-focus of electronic microscopies.
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AWARDS AND HONORS

- UTS President’s Scholarship, UTS, 2012 - 2016
 - Tencent Qrobot Application Development Contest, silver award, 2012
 - Outstanding Research Paper Award, HUST, 2011
 - Postgraduate Studentship, HUST, 2009 - 2011
 - National Encouraging Scholarship of China, 2007
 - People Scholarship, NJU, 2005 - 2007
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ACADEMIC SERVICES

- Conference reviewer/program committee member of
 - International Conference on Machine Learning (ICML), 2018
 - Neural Information Processing Systems (NIPS), 2016 - 17
 - Conference on Uncertainty in Artificial Intelligence (UAI), 2016 - 18
 - International Conference on Artificial Intelligence and Statistics (AISTATS), 2016 - 18
 - International Joint Conference on Artificial Intelligence (IJCAI), 2017 - 18
 - AAAI Conference on Artificial Intelligence (AAAI), 2018
 - UAI Causality Workshop: Learning, Inference, and Decision-Making, 2017
 - The ACM SIGKDD Workshop on Causal Discovery, 2016 - 17
- Journal reviewer of
 - IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)
 - IEEE Transactions on Neural Networks and Learning Systems (T-NNLS)
 - IEEE Transactions on Image Processing (T-IP)

- IEEE Transactions on Cybernetics (T-CYB)
 - IEEE Transactions on Big Data (T-BD)
 - IEEE Transactions on Knowledge and Data Engineering (T-KDE)
 - IEEE Transactions on Emerging Topics in Computational Intelligence (T-ETCI)
 - ACM Transactions on Knowledge Discovery from Data (T-KDD)
 - ACM Transactions on Intelligent Systems and Technology (T-IST)
 - Computer Vision and Image Understanding (CVIU)
 - Pattern Recognition (PR)
 - Neurocomputing (NEUCOM)
 - Journal of Visual Communications and Image Representation (JVCI)
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