

# Wuman Luo

Email: [luowuman@mpu.edu.mo](mailto:luowuman@mpu.edu.mo)

Tel: +853-6683-8608

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## Research Interests

Artificial Intelligence and Big Data Analytics, Spatio-temporal Data Mining, Medical AI, Urban Computing, Parallel Computing

## Education

Ph.D in Computer Science and Engineering,  
Hong Kong University of Science and Technology (HKUST) 08/2008 – 01/2013

- Thesis Topic: Efficient Algorithms for Frequent Path Finding and Similarity Join in Big Multidimensional Data
- Advisor: Professor Lionel M. Ni

M.E. in Computer Software and Theory,  
University of Electronic Science and Technology of China (UESTC) 09/1997 – 04/2000

- Graduation Rank: Top 5%

B.E. in Computer Software,  
University of Electronic Science and Technology of China (UESTC) 09/1992 – 07/1996

- Graduation Rank: Top 5%

## Work History

Associate Professor,  
Faculty of Applied Sciences,  
Macao Polytechnic University 10/2019 – now

Post-doctoral Fellow,  
Dept. of Computer and Information Science, FST,  
University of Macau 06/2016 – 05/2017

Research Assistant Professor, 07/2013 – 01/2016  
Research Associate 02/2013 – 01/2016  
HKUST Fok Ying Tung Graduate School (HKUST FYTGS)

Research/Teaching Assistant,  
Dept. of Computer Science and Engineering, HKUST 08/2008 – 01/2013

Lecturer, Sch. of Computer Science and Engineering, UESTC 04/2000 – 07/2012

Visiting Scholar, Dept. of Computing Science, University of Alberta 09/2004 – 06/2005

Research Assistant, Computer Engineering Institute,  
Seismological Bureau of Sichuan Province

07/1996 – 09/1997

## Certificates

- IBM Certified Instructor on Rational Visual Modeling 05/2004
- Teacher's Qualification Certificate for Higher Education Granted by Ministry of Education of People's Republic of China 12/2001
- Ministry of Education of People's Republic of China Certified Instructor on English Textbooks of Information Science and Technology (Jointly Certified by Higher Education Division and Science & Technology Division) 08/2001
- Certificate of Putonghua Proficiency Test Grade (Rate A, Level 2) Granted by State Language Commission 05/2000

## Honors

- **2022 AI 2000 Most Influential Scholar Honorable Mention in Database** 04/2022
- **Frontrunner 5000 Top Articles in Outstanding S&T Journals of China in 2018** 11/2019
- Postgraduate Studentship, HKUST 09/2008 – 12/2012
- Annual Outstanding Instructor, Sch. of Computer Science and Engineering, UESTC 2001 – 2003, 2005 – 2007
- Second Prize of Multimedia Courseware Design of UESTC 10/2001
- Straight-A Thesis Defense for Master's Degree 2000
- Outstanding Student Scholarship, UESTC 1993-1996, 1998
- First Prize of Sichuan Province College Students Higher Mathematics Competition (Ranked First in UESTC) 1993

## Patents

1. 罗吴蔓, 谭浩宇, 陈雷, 倪明选, “基于时段的热点路径的特征识别与快速搜索方法”, 专利号: 201310248692.7, 授权公告日: 2015年12月1日。

## Publications

2. Si Shi, **Wuman Luo**, Rita Tse, Giovanni Pau. Attention-LGBM-BiLSTM: An Attention-Based Ensemble Method for Knowledge Tracing. IEEE International Conference on Teaching, Assessment, and Learning for Engineering (TALE) 2022. 2022.
3. Si Shi, Rita Tse, **Wuman Luo**, Stefano D'Addona, Giovanni Pau. Machine Learning-Driven Credit Risk: A Systemic Review. Neural Computing and Applications. 2022.
4. Lihua He, **Wuman Luo\***. 3D-ConvLSTMNet: A Deep Spatio-Temporal Model for Traffic Flow Prediction. In Proceedings of the 23th IEEE International Conference on Mobile Data Management (IEEE MDM). June, 2022.
5. Ziyue Yu, Lihua He, **Wuman Luo**, Rita Tse, Giovanni Pau. Deep Learning Hybrid Models for COVID-19 Prediction. Journal of Global Information Management (JGIM) 30.10 (2022): 1-23.

6. Ziyue Yu, Lihua He, **Wuman Luo**, Rita Tse, Giovanni Pau. Deep Learning for COVID-19 Prediction based on Blood Test (**Best Student Paper Award**). In Proceedings of the 6<sup>th</sup> International Conference on Internet of Things (IoTBDS), Big Data and Security. 2021.
7. Qing Liao, Haoyu Tan, **Wuman Luo**, Ye Ding. Diverse Mobile System for Location-Based Mobile Data. Wireless Communications and Mobile Computing. 2018(2018), 1-17.
8. Yudian Ji, Yuda Zang, **Wuman Luo**, Xibo Zhou, Ye Ding, Lionel M. Ni. Clockwise Compression for Trajectory Data Under Road Network Constraints. IEEE International Conference on Big Data (IEEE BigData), Washington D.C., USA, December, 2016.
9. Yudian Ji, Hao Liu, Xiaoying Liu, Ye Ding, **Wuman Luo**. A Comparison of Road-Network-Constrained Trajectory Compression Methods. In Proceedings of the 22nd IEEE International Conference on Parallel and Distributed Systems (IEEE ICPADS), Wuhan, China, December, 2016.
10. Xibo Zhou, **Wuman Luo\***, Haoyu Tan. MRTune: A Simulator for Performance Tuning of MapReduce Jobs with Skewed Data. In Proceedings of the 20th IEEE International Conference on Parallel and Distributed Systems (IEEE ICPADS), Hsinchu, Taiwan, December, 2014.
11. Yaobin He, Haoyu Tan, **Wuman Luo**, Shengzhong Feng, Jianping Fan. MR-DBSCAN: a Scalable MapReduce-Based DBSCAN Algorithm for Heavily Skewed Data. Frontiers of Computer Science. 8(1): 83-99 (2014).
12. Ye Ding, Jiangchuan Zheng, Haoyu Tan, **Wuman Luo**, Lionel M. Ni. Inferring Road Type in Crowdsourced Map Services. In Proceedings of the 19th International Conference on Database Systems for Advanced Applications (DASFAA), Bali, Indonesia, April, 2014.
13. Ye Ding, Haoyu Tan, **Wuman Luo**, Lionel M. Ni. Exploring the Use of Diverse Replicas for Big Location Tracking Data. In Proceedings of the 34th IEEE International Conference on Distributed Computing Systems (IEEE ICDCS), Madrid, Spain, June, 2014.
14. **Wuman Luo**, Haoyu Tan, Lei Chen, Lionel M. Ni. Finding Time Period-based Most Frequent Path in Big Trajectory Data. In Proceedings of the ACM Conference on the Management of Data (ACM SIGMOD), New York, USA, June, 2013.
15. Lionel M. Ni. Qian Zhang, Haoyu Tan, **Wuman Luo**, Xiaoxi TANG. Smart healthcare: from IoT to cloud computing. SCIENTIA SINICA Informationis 43 (4), 515-528, 2013 (**Front-runner 5000 Top Articles in Outstanding S&T Journals of China in 2018**).
16. Haoyu Tan, **Wuman Luo**, Lionel M. Ni. CloST: A Hadoop-based Storage System for Big Spatio-Temporal Data Analytics. In Proceedings of the 21st ACM International Conference on Information and Knowledge Management (ACM CIKM), 2012.
17. Huajian Mao, **Wuman Luo**, Haoyu Tan, Lionel M. Ni, Nong Xiao. Exploration of Ground Truth from Raw GPS Data. In Proceedings of the 1st ACM SIGKDD International Workshop on Urban Computing (UrbComp), 2012.
18. **Wuman Luo**, Haoyu Tan, Huajian Mao, Lionel M. Ni. Efficient Similarity Joins on Massive High-Dimensional Datasets Using MapReduce. In Proceedings of the 13th IEEE International Conference on Mobile Data Management (IEEE MDM), Bengaluru, India, July, 2012.
19. Haoyu Tan, **Wuman Luo**, Huajian Mao, Lionel M. Ni. On Packing Very Large R-trees. (short paper), in Proceedings of the 13<sup>th</sup> IEEE International Conference on Mobile Data Management (IEEE MDM), Bengaluru, India, July, 2012.
20. Yaobin He, Haoyu Tan, **Wuman Luo**, Huajian Mao, Di Ma, Shengzhong Feng, Jianping Fan. MR-DBSCAN: An Efficient Parallel Density-Based Clustering Algorithm Using MapReduce. in Proceedings of the 17th IEEE International Conference on Parallel and Distributed Systems (IEEE ICPADS), Tainan, Taiwan, December, 2011.
21. Zhang Xiong, **Wuman Luo (Corresponding Author)**, Lei Chen, Lionel M. Ni. Data Vitalization: a New Paradigm for Large-Scale Dataset Analysis. in Proceedings of the 16th IEEE International Conference on Parallel and Distributed Systems (IEEE ICPADS), Shanghai, China, December, 2010.

22. Qiang Ye, Yuxing Huang, Andrew Reddin, Lei Wang, **Wuman Luo**. Multi-path GEM for Routing in Wireless Sensor Networks. in Proceedings of the 3rd International Conference on Wireless Algorithms, Systems, and Applications (WASA), Dallas, TX, USA, October, 2008.
23. Lionel M. Ni. **Wuman Luo**. The Age of Reform in the Era of Data Explosion: Challenges and Opportunities. Communications of CCF. 7(7): 12-20 (2011).
24. **Wuman Luo**, Chin Shu. Evolutional Hierarchical Diagram and 4+1 Abstract Modelling Structure of Highway Tolling System. Computer Engineering. 30(19): 161-163 (2004).
25. Zhengwu Xu, **Wuman Luo**, Jie Gu. Localization System Based on GSM Network. Journal of University of Electronic Science and Technology of China. 32(4): 367-370 (2003).
26. Yue Wu, **Wuman Luo\***. UML Modeling Mechanism Based on Layered Structure of Abstraction. Journal of University of Electronic Science and Technology of China. 30(2): 148-152 (2001).
27. Yue Wu, **Wuman Luo**, Shui Yu. 'Data Structure' Highlights Show. , Theory and Practice of Electronic Higher Education, University of Electronic Science and Technology of China Press. 221-224 (2000).

## Selected Projects

1. "Big Data-Driven Intelligent Computing", MPI-Funded Research Project, (No. RP/ESCA-05/2020), **Principal Investigator**, MOP\$474,500, 12/2020 – 12/2023.
2. "Big Data Computing Theory in Networked Information Space", National Basic Research Program of China (973 Program), Ministry of Science and Technology (No. 2014CB340300), RMB\$11,560,000, **Principal Participant** in Subproject "Big Data Analysis and Mining System" (No. 2014CB340304), RMB\$2,840,000, 01/2014 – 08/2018.
3. "Research on identifying and searching the most frequent paths in big trajectory data", National Natural Science Foundation of China (No. 61300031), **Project Investigator**, RMB\$280,000, 01/2014 – 12/2016.
4. "Research on RF-based technologies to track transceiver-free objects", National Natural Science Foundation of China (No. 61202377), **Principal Participant**, RMB\$260,000, 01/2013 – 12/2015.
5. "Bits over Interference: Interference Management in WLANs", National Natural Science Foundation of China (No. 61170247), **Principal Participant**, RMB\$620,000, 01/2012 – 12/2015.
6. "Demonstration Research and Application of Expressway Electronic Toll Collection System in Sichuan Province", RMB\$120,000,000. **Project Investigator** of Subproject "Technical Supervision for the Software Design", 09/1999 – 09/2003.
7. "Research of Software Development Environment", Supported by Academic Foundation of Nuclear Physics of China, **Principal Participant**, responsible for the UML abstract modeling structure and its application to a software system's visual modeling design, RMB\$100,000, 08/1999 – 03/2000.
8. "Real-Time Toll System for Sichuan Province Mobile Telecommunication", RMB\$7,000,000, **Project Investigator** of Subproject "Raw Access Files Collection and Transmission", 06/1998 – 05/1999.
9. "Demonstration Research and Application of Zigong City Earthquake Prevention and Disaster Reduction", the National Ninth Five-Year Plan Key Project, RMB\$2,000,000. **Principle Participant**, responsible for the design of the seismic geography space database and its attribute database, topological analysis and implementation of the dynamic module of seismic damage assessing and decision-making, 09/1996 – 09/1999.

10. “Sichuan Province Earthquake Prevention and Disaster Reduction Database and Earthquake & Disaster Information Quick Response System”, the National Ninth Five-Year Plan Key Project, RMB\$3,000,000. **Principle Participant**, responsible for “Overall Design for the Earthquake & Disaster Multimedia Information Quick Report and Display Subsystem”, published in “Overall Design for Sichuan Province Earthquake Prevention and Disaster Reduction Database and Earthquake & Disaster Information Quick Response System”, pp. 42-81, 07/1996 – 09/1997.