Mao-Lin Li

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Education

- **Arizona State University** — Tempe, AZ
  Doctor of Philosophy in Computer Science — *Aug. 2016 – Present*
- **University of Pittsburgh** — Pittsburgh, PA
  Master of Science in Computer Science — *Aug. 2012 – May. 2014*
- **National Tsing Hua University** — Hsinchu, Taiwan
  Master of Science in Computer Science — *Aug. 2008 – Feb. 2011*
- **National Sun Yat-Sen University** — Kaohsiung, Taiwan
  Bachelor of Science in Computer Science — *Aug. 2004 – June. 2008*

Work Experiences

- **Research Fellow** @ Arizona State University — Tempe, AZ, Aug. 2016 – Present
- **Technical Staff** @ Knowledge System Institute — Skokie, IL, April. 2015 – May. 2016
- **Research Assistant** @ University of Pittsburgh — Pittsburgh, PA, Sep. 2012 – April. 2015
- **Research Assistant** @ National Tsing-Hua University — Hsinchu, Taiwan, July. 2008 – Feb. 2011

Honors and Awards

- *Dean's Fellowship Award at the Ira A. Fulton School of Engineering and the School of Computing, Informatics, and Decision Systems Engineering(CIDSE) in Arizona State University* — Sep. 2016 - Sep. 2020
- *SIGIR Student Travel Grant* — August 2017
- *Art & Science Graduate Fellow in University of Pittsburgh* — Jan. 2013 - May 2013
- *Outstanding Paper Award in SASIMI International Workshop* — March 2012
- *Excellent Undergraduate Project Award at National Sun Yat-Sen University* — March 2007

Skills

Programming Languages: *Proficient-* Python, MATLAB, *Familiar-* Java, C/C++, LaTeX.
Frameworks and tools: Numpy, Scipy, Pandas, Sklearn, Pymongo, Tensorflow, Git.
Operating Systems: Mac OSX, Linux, Windows.

Patent

- *Full Bus Transaction Level Modeling Approach for Fast and Accurate Contention Analysis.* **Mao-Lin Li**, Chen-Kang Lo, Li-Chun Chen, Hong-Jie Huang, Jen-Chieh Yeh, Ren-Song Tsay. (US Patent Application number: 13398083, 2013)

Selected Graduated Level Courses

Multimedia and Web Databases, Semantic Web Mining, Machine Learning, Statistical Machine Learning, Introduction to Natural Language Processing, Foundations of Artificial Intelligence, Theory of Computation.

Selected Research Experiences

- *GTT: Guiding the Tensor Train in Selecting the Decomposition Sequence (Submitted to AAAI 2020)*
  - Proposed a data-driven approach to achieve better Tensor-train decomposition ordering in high dimensional data.
  - Formalized properties: mutual information, entropy and number of variables to decide decomposition strategies.
  - Increased 20% selection quality without exhaustive searching in 15 real-world data sets

  Feb. 2019 - Present, Arizona State University
- *Matrix Factorization with Interval-Valued Data (Published in TKDE 2019)*
  - Proposed interval-valued matrix factorization techniques to achieve meaningful latent semantic analysis.
  - Designed a cosine distance based algorithm to align the interval-valued latent space.
  - Applied proposed algorithms into image classification/clustering/reconstruction and collaborative filtering applications and achieved 30% accuracy improvement in low-rank decomposition.

  Oct. 2017 - July. 2019, Arizona State University

- *DataStorm: A Data Enabled System for End-to-End Disaster Planning and Response (NSF sponsored project, published in VLDB 2019 Demo Track)*
  - Proposed a framework for simulation ensemble management with heterogeneous models.
  - Integrated hurricane, flood and human Mobility simulation models by extended Kepler actors.
  - Developed alignment manager and post synchronization manager for temporal alignment and content aggregation.

  July. 2017 - Present, Arizona State University
- *Personalized PageRank in Uncertain Graphs with Mutually Exclusive Edges (Published in SIGIR 2017)*
  - Propose an efficient Uncertain Personalized PageRank (UPPR) approach on graphs with edge uncertainties.
  - Utilized Sherman-Morrison Lemma to approximate matrix inversion efficiently in PPR computation.
  - Achieved 2 orders of performance improvement than traditional approaches with comparable accuracy.

  Dec. 2016 - Aug. 2017, Arizona State University
- *A Formal Model for Intellectual Relationships among Knowledge Workers and Knowledge Organizations (Published in DMS 2014, JVLC 2015)*
  - Developed a graph-based algorithm to evaluate relationships (cooperative/competitive) in academic social network.
  - Adapted specific edge weights to quantify the relationship within workers/organizations.
  - Applied the proposed approach in real academic platform (SMNET).

  July. 2014 - April. 2015, University of Pittsburgh
- *Full Bus Transaction Level Modeling Approach for Fast and Accurate Contention Analysis (Published in SASIMI 2012, **outstanding paper award**)*
  - Designed a two-phase arbiter and bus formal model to speedup multi-processor system-on-chip platform simulation.
  - Utilized finite state machine to formalize bus transaction and arbitration in MPSoC platform.
  - Achieved 20x communication speedup with 100% accuracy.

  July. 2008 - Feb. 2011, National Tsing-Hua University

Certifications

Machine Learning with TensorFlow on Google Cloud Platform Specialization *Coursera-Google Cloud Sep 2018*
Data Science Specialization *Coursera-John Hopkins University 2015*

Journal Publications

J1. *Matrix Factorization with Interval-valued Data Sets.*
Mao-Lin Li, Francesco Di Mauro, K Selçuk Candan, Maria Luisa Sapino. (Accepted in TKDE 2019)

J2. *Datastom-FE: a data- and decision-flow and coordination engine for coupled simulation ensembles.*
Hans Walter Behrens, K Selçuk Candan, Xilun Chen, Ashish Gadkari, Yash Garg, **Mao-Lin Li**, Xinsheng Li, Sicong Liu, Nicholas Martinez, Jiayong Mo, Elliot Nester, Silvestro Poccia, Manjusha Ravindranath, Maria Luisa Sapino. Proceedings of the VLDB Endowment (Demo track of VLDB 2018)

J3. *A formal model for intellectual relationships among knowledge workers and knowledge organizations.* **Mao-Lin Li**, Duncan Yung, ShiKuo Chang. Journal of Visual Languages and Computing (JVLC 2015)

J4. *Evolutionary approach for crowdsourcing quality control.*
Duncan Yung, **Mao-Lin Li**, ShiKuo Chang. Journal of Visual Languages and Computing (JVLC 2014)

J5. *Automatic generation of high-speed accurate tlm models for out-of-order pipelined bus.*
Chen-Kang Lo, **Mao-Lin Li**, Li-Chun Chen, Yi-Shan Lu, Ren-Song Tsay, Hsu-Yao Huang, Jen-Chieh Yeh. ACM Transactions on Embedded Computing Systems (TECS 2013)

J6. *A Cycle Count Accurate Timing Model for Fast Memory Simulation.* YL Lio, Li-Chun Chen, **Mao-Lin Li**, Ren-Song Tsay. 21th VLSI Design/CAD Symposium (VLSI-CAD 2013)

Conference Publications

C1. *Personalized pagerank in uncertain graphs with mutually exclusive edges.*
Jung Hyun Kim, **Mao-Lin Li**, K Selçuk Candan, Maria Luisa Sapino. Proceedings of the 40th International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR 2017)

C2. *A Formal Model for Intellectual Relationships among Knowledge Workers and Knowledge Organizations.*
Mao-Lin Li, Shi-Kuo Chang. The 20th International Conference on Distributed Multimedia Systems (DMS 2014)

C3. *A Cycle Count Accurate TLM bus modeling approach.*
Mao-Lin Li, Chen-Kang Lo, Li-Chun Chen, Jen-Chieh Yeh, Ren-Song Tsay. International Symposium on VLSI Design, Automation, and Test (VLSI-DAT 2013)

C4. *Cycle count accurate memory modeling in system level design.* Yi-Len Lo, **Mao-Lin Li**, Ren-Song Tsay. Proceedings of the 7th IEEE/ACM international conference on Hardware/software codesign and system synthesis (CODES+ISSS 2009)

Workshop Publications

W1. *Load-Adaptive Continuous Coupled-Simulation Ensembles with DataStorm and Chameleon.*
Hans Behrens, **Mao-Lin Li**, Ashish Gadkari, Yash Garg, Xilun Chun, Sicong Liu, K. Selçuk Candan. Chameleon User Meeting (Chameleon Cloud 2019)

W2. *A Formal Full Bus TLM Modeling for Fast and Accurate Contention Analysis.* **Outstanding Paper Award**
Mao-Lin Li, Chen-Kang Lo, Li-Chun Chen, Hong-Jie Huang, Jen-Chieh Yeh, Ren-Song Tsay. The 17th Workshop on Synthesis And System Integration of Mixed Information technologies (SASIMI 2012)

Professional Service

- **Paper Reviewer**: CIKM 2019,TKDE 2018/2019, KDD 2018, ICMR 2018, ASONAM 2018, DASFAA 2017, SIGMOD 2017