Siqiang Luo

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Google Scholar

Academic Background

PostDoc Fellow	**Harvard University**
2019.07 - Now	School of Engineering and Applied Science, Harvard University
Advisor	Prof. Stratos Idreos
Ph.D.	**The University of Hong Kong** (HKU)
2015.07 - 2019.05	Department of Computer Science, HKU
	Recipient of Hong Kong PhD Fellowship (HKPFS)
Advisors	Prof. Ben Kao, Prof. Reynold Cheng
Thesis	Adaptive Optimization Techniques in Graph-based Applications
M.S.	**Fudan University** (FDU)
2010.09 - 2013.06	School of Computer Science, FDU
Advisor	Prof. Shuigeng Zhou.
Thesis	Distributed Systems for Keyword Search on Road Networks
B.S.	**Fudan University** (FDU)
2006.09 - 2010.06	School of Computer Science, FDU

Research Summary

I am broadly interested in large-scale data management systems. Most of my publications appear in top journals/conferences including SIGMOD, VLDB, ICDE, ICML, AAAI, TKDE, EDBT.

My Ph.D. and Postdoc research focuses on adaptive optimization in
- **Key-value stores** such as Facebook RocksDB system (SIGMOD 2020 etc.).
- **Graph systems** such as Apache Giraph and Pregel+ systems (VLDB 2021 submission).
- **Graph analytics** such as PageRanks (ICDE 2019, TKDE 2019, ICML 2020 etc.).
- **Spatial systems** such as kNN systems (VLDB 2018, ICDE 2019 etc.).

Publications

[1] **Siqiang Luo**, Subarna Chatterjee, Rafael Ketsetsides, Niv Dayan, Wilson Qin, Stratos Idreos, *"Rosetta: A Robust Space-Time Optimized Range Filter for Key-Value Stores"* , **SIGMOD** 2020. (Video)

[2] **Siqiang Luo**, *"Improved Communication Cost in Distributed PageRank Computation – A Theoretical Study"* , **ICML** 2020.

[3] **Siqiang Luo**, Ben Kao, Xiaowei Wu, Reynold Cheng, *"MPR – A Partitioning-Replication Framework for Parallel-Processing kNN Search on Road Networks"*, **ICDE** 2019 .

[4] **Siqiang Luo**, Xiaokui Xiao, Wenqing Lin, Ben Kao, *"Efficient Batch One-Hop Personalized PageRanks"*, research short paper, **ICDE** 2019 .

[5] **Siqiang Luo**, *"Distributed PageRank Computation: An Improved Theoretical Study"*, **AAAI** 2019. **(spotlight paper)**.

[6] **Siqiang Luo**, Reynold Cheng, Ben Kao, Xiaokui Xiao, Shuigeng Zhou, Jiafeng Hu. *"ROAM: A Fundamental Routing Query on Road Networks with Efficiency"*, **TKDE** 2019.

[7] **Siqiang Luo**, Xiaokui Xiao, Wenqing Lin, Ben Kao, *"Baton: Batch One-Hop Personalized PageRanks with Efficiency and Effectiveness"*, **TKDE** 2019.

[8] Yixiang Fang, Zheng Wang, Reynold Cheng, Xiaodong Li, **Siqiang Luo**, Jiafeng Hu, Xiaojun Chen, *"On Spatial-Aware Community Search"*, **TKDE** 2019.

[9] **Siqiang Luo**, Ben Kao, Guoliang Li, et al., *"TOAIN: A Throughput Optimizing Adaptive Index for Answering Dynamic kNN Queries on Road Networks"*, **VLDB** 2018.

[10] Xiang Li, Ben Kao, **Siqiang Luo**, Martin Ester, *"ROSC: Robust Spectral Clustering on Multi-scale Data"*, **WWW** 2018.

[11] **Siqiang Luo**, Jiafeng Hu, Reynold Cheng, et al., *"SEQ: Example-based Query for Spatial Objects"*, research short paper, **CIKM** 2017.

[12] Jiafeng Hu, Xiaowei Wu, Reynold Cheng, **Siqiang Luo**, Yixiang Fang, *"On Minimal Steiner Maximum-Connected Subgraph Queries"*, **TKDE** 2017.

[13] Yixiang Fang, Reynold Cheng, **Siqiang Luo**, Jiafeng Hu, and Kai Huang, *"C-Explorer: Browsing Communities in Large Graphs"*, demo track, **VLDB** 2017.

[14] Yixiang Fang, Reynold Cheng, Xiaodong Li, **Siqiang Luo**, Jiafeng Hu, *"Effective Community Search over Large Spatial Graphs"*, **VLDB** 2017.

[15] Yixiang Fang, Reynold Cheng, Yankai Chen, **Siqiang Luo**, Jiafeng Hu, *"Effective and Efficient Attributed Community Search"*, **VLDB Journal** 2017.

[16] Jiafeng Hu, Reynold Cheng, Zhipeng Huang, Yixiang Fang, **Siqiang Luo**, *"On Embedding Uncertain Graphs"*, **CIKM** 2017.

[17] Yixiang Fang, Reynold Cheng, **Siqiang Luo**, Jiafeng Hu, *"Effective Community Search for Large Attributed Graphs"*, **VLDB** 2016.

[18] Jiafeng Hu, Xiaowei Wu, Reynold Cheng, **Siqiang Luo** and Yixiang Fang, *"Querying Minimal Steiner Maximum-Connected Subgraphs in Large Graphs"*, **CIKM** 2016.

[19] **Siqiang Luo**, Yifeng Luo, Shuigeng Zhou, Gao Cong, Jihong Guan, Zheng Yong, *"Distributed Spatial Keyword Querying on Road Networks"*, **EDBT** 2014.

[20] Diwen Zhu, Hui Ma, Xiaokui Xiao, **Siqiang Luo**, Youze Tang, Shuigeng Zhou, *"Shortest Path and Distance Queries on Road Networks: Towards Bridging Theory and Practice"*, **SIGMOD** 2013.

[21] Yifeng Luo, **Siqiang Luo**, Jihong Guan, Shuigeng Zhou, *"A RAMCloud Storage System based on HDFS: Architecture, Implementation and Evaluation"*, **Journal of Systems and Software**, 2013.

[22] **Siqiang Luo**, Yifeng Luo, Shuigeng Zhou, Gao Cong, Jihong Guan, *"DISKs: A System for Distributed Spatial Group Keyword Search on Road Networks"*, demo track, **VLDB** 2012.

[23] **Siqiang Luo**, Junping Zhang, Qian Zhang, Xiaoru Yuan, *"Multi-Operator Image Retargeting with Automatic Integration of Direct and Indirect Seam Carving"*, **Image and Vision Computing**, 2012.

In Submission

[1] **Siqiang Luo***, Zichen Zhu*, Xiaokui Xiao, Yin Yang, *"Multi-Tasks Processing in Vertex-Centric Graph Systems: Evaluations and Optimal Round-Congestion Tradeoffs"*, Submitted to **VLDB** 2021

[2] **Siqiang Luo**, Xiaowei Wu, Ben Kao, *"Radar-Push: A Distributed Algorithm for Computing PageRank with Improved Complexities"*, Submitted to **TKDE** 2020.

[3] Peng Zhu, Dawei Cheng, **Siqiang Luo**, Fangzhou Yang, Yifeng Luo, Weining Qian, Aoying Zhou, *"SI-News: Integrating Social Information for News Recommendation with Attention Graph Convolutional Network"*, Submitted to **NIPS 2020**.

[4] Peng Zhu, Dawei Cheng, **Siqiang Luo**, Fangzhou Yang, Yifeng Luo, Weining Qian, Aoying Zhou, *"SDI-NER: Employing Semantic Dependency to Recognize Chinese Named Entities with Graph Neural Network"*, Submitted to **NIPS 2020**.

[5] Mengzhen Fan, Dawei Cheng, Fangzhou Yang, Yifeng Luo*, **Siqiang Luo***, Weining Qian, Aoying Zhou, *"Fusing Global Domain Information and Local SemanticInformation to Classify Financial Documents"*, Submitted to **CIKM 2020**.

Working Papers

[1] **Siqiang Luo**, Subarna Chatterjee, Rafael Ketsetsides, Niv Dayan, Wilson Qin, Stratos Idreos, *"Optimized Range Filter for Key-Value Stores"* , in preparation for **VLDBJ** (journal extension of SIGMOD 2020 paper).

[2] **Siqiang Luo**, *"Optimized Complexity for PageRank Computation in Fully Distributed Models"* , in preparation for **JMLR** (journal extension of ICML 2020 paper).

[3] **Siqiang Luo**, Haojie Shi, Ben Kao, Xiaowei Wu, Reynold Cheng, *"Adaptive Partitioning-Replication Framework for Parallel kNN Search"*, *In preparation for* **TKDE** *(journal extension of ICDE 2019 paper).*

Patents

CN101609547B **Siqiang Luo**, Junping Zhang, *"Seamless Image Processing based on Accumulative Energy"*

Full Research Experience

July. 2019 - Now	Postdoctoral Fellow & Teaching Fellow
	Harvard University, US
Project	Range Filter in Key-Value Stores.
Working with	Prof. Stratos Idreos
Jan. 2019 - Apr. 2019	Visiting Researcher
	AI Theory Group, University of Cambridge, UK
Project	Distributed Algorithms for PageRank Computation.
Working with	Prof. Thomas Sauerwald
Jul. 2015 - May. 2019	PhD Researcher
	Database Group, The University of Hong Kong, China
Thesis	Adaptive Optimization Techniques in Graph-based Applications.
Working with	Prof. Ben Kao, Prof. Reynold Cheng
Jun. 2017 - Sep. 2017	Research Assistant
	Database Group, Nanyang Technological University, Singapore
Project	Parallel Algorithms for Personalized PageRanks for Billion-edge Social Networks.
Working with	Prof. Xiaokui Xiao
Jul. 2016 - Aug. 2016	Research Assistant
	Database Group, Tsinghua University, China
Project	Automatic Index Confiugrations for Optimizing Location-based Systems.
Working with	Prof. Guoliang Li
Sep. 2011 - Jun. 2012	Research Assistant
	Database Group, Nanyang Technological University, Singapore
Project	Efficient Shortest Path Queries with Theoretical Guarantees.
Working with	Prof. Xiaokui Xiao
Jun. 2009 - Sep. 2010	Research Assistant
	Database Group, Shanghai Key Lab of Intelligent Information Processing, China
Project	Distributed Keyword Search on Graph Data with Hadoop.
Advisor	Prof. Shuigeng Zhou
Jan. 2008 - Jun. 2009	Research Assistant
	Machine Learning Group, Shanghai Key Lab of Intelligent Information Processing, China
Project	Content-aware Image Resizing.
Working with	Prof. Junping Zhang

Industrial Experience

Aug. 2013 - May. 2015	**Full-Stack Research&Developer Engineer**
Company	Works Applications Co., Ltd, Shanghai
Project	Developed a number of modules of an ERP system known as AI Works (referenced here), such as:

- Magic-Paste: analyze the pasted content (e.g., a webpage) for auto-completion.
- Flexible-Report-System: allow the user to manage the style of a report by drag-and-drop.

Jul. 2012 - Sep. 2012	**Software Development Engineer Intern**

Company	Microsoft, Beijing
Jul. 2009 - Sep. 2009	**Data Engineer Intern**
Company	Shanda Games Limited, Shanghai

Selected Awards

Dec. 2015	Hong Kong PhD Fellowship (a prestigious award for fresh PhDs)
Jul. 2013	Outstanding Graduates of Shanghai (top 5%)
Oct. 2012	Intel Fellowship (5 out of 3,000 students)
Nov. 2012	National Scholarship (top scholarship in China)
Nov. 2012	Tung OOCL Award (5 out of 600 students)
May. 2010	1st Prize scholarship for fresh graduate student
May. 2010	Wang-Dao Scholar (top 1% of Fudan students)
May. 2008	National Scholarship for Encouragement
Oct. 2005	1st Prize of National Mathematical Olympiad in Senior
Oct. 2004	1st Prize of National Mathematical Olympiad in Senior

Teaching Experience

Teaching Fellow	CS265 (Big Data Systems), Harvard University, 2020 Spring
Teaching Fellow	CS165 (Database Systems), Harvard University, 2019 Fall
Teaching Assistant	CCST 9047 (The Age of Big Data.), The University of Hong Kong, 2017
Teaching Assistant	CCST 9047 (The Age of Big Data.), The University of Hong Kong, 2016
Teaching Assistant	COMP 2396 (Object-oriented Programming.), The University of Hong Kong, 2015
Teaching Assistant	C Programming, Fudan University, 2012

Professional Activities

Reproducibility Committee	SIGMOD 2019
Program Committee	WISE 2019, WISE 2020, ACM TURC (SIGMOD China) 2020
Invited Reviewers	(1) VLDB Journal; (2) TKDE; (3) Geoinformatica; (4) IEEE Access; (5) IEEE Transactions on Big Data; (6) Transactions on Spatial Algorithms and Systems
External Reviewers	IEEE TKDE, SIGMOD 16,17,18; VLDB 13,16,17,18; ICDE 16,17,18,19,21; KDD 17,18,19,20; EDBT 13,16; CIKM 17; DASFAA 18; BigData 15; WAIM 13
Summer Schools	VLDB 2010, VLDB 2011

Selected Talks

June. 2020	SIGMOD 2020
Title	Rosetta: A Robust Space-Time Optimized Range Filter for Key-Value Stores
Dec. 2019	Fudan University
Title	One Design Does Not Fit All – Adaptive Optimization Techniques in Data Management
Mar. 2019	Emmanuel College, University of Cambridge, United Kingdom
Title	Distributed PageRank Computation with Improved Complexities
Apr. 2019	ICDE2019@Macau, China
Title	MPR : A Partitioning-Replication Framework for Multi-Processing kNN Search on Road Networks
Jan. 2019	AAAI2019@Honolulu, United States
Title	Distributed PageRank Computation: An Improved Theoretical Study
Jan. 2019	University of Cambridge, United Kingdom
Title	Adaptive Approaches for Performance Optimization in Graph-based Applications
Aug. 2018	VLDB2018@Brazil
Title	TOAIN: A Throughput Optimization Adaptive Index for Answering kNN Queries on Road Networks

July. 2018 Summer Intern Day @ University of Hong Kong, Hong Kong, China
Title Throughput Optimization Indexing for kNN Systems

Selected Projects

2008-2010 Content-Aware Image Resizing
Student PI, Wangdao Research Program, Fudan Univeristy

2017 Novel Applications of Big Transportation Data
Student PI, Pilot Scheme Program on International Experience, the University of Hong Kong