

# LIU, YANG

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## EDUCATION

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### Shanghai University, Shanghai

*Nov. 2021 - Present*

Assistant Professor in the School of Computer Engineering and Science.

### ByteDance, Shanghai

*Mar. 2021 - Nov. 2021*

Back-End Research & Develop in Toutiao Computing Engine.

### The Chinese University of Hong Kong, Hong Kong

*Aug. 2016 - Mar. 2021*

Information Engineering Ph.D, supervised by Prof. Wing Cheong LAU.

### Shanghai Jiao Tong University, Shanghai

Bachelor degree in Computer Science.

*Sept. 2013 - Jul. 2016*

Mathematics and Physics Science, University's Honor Program.

*Sept. 2010 - Jul. 2013*

## RESEARCH INTERESTS

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- Resource Management for Big Data Processing Systems
- Design, Implementation, Performance Optimization for Cloud-based Services
- Online Learning Algorithms with the Bandit Setting

## PROJECTS AND FOUNDINGS

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- National Natural Science Foundation of China (project #62202284b), Online Resource Optimization for Stream Processing Systems, 2023.01 - 2025.12.
- Shanghai Pujiang Program (project #22PJ1404000), Online Resource Optimization for Real-Time Systems, 2022.10 - 2024.09.
- Shanghai Leading Talents (Overseas), 2022.

## PROJECT EXPERIENCE

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### Online Job Scheduling on a Cluster of Heterogeneous Servers

*Jan. 2017 - Aug. 2018*

- Approximate online scheduling problem into online convex optimization framework.
- Treat the job completion requirement as a long-term constraint.
- Achieve sub-linear regret bound and dynamic fit, which can reduce 34% completion time in the numerical simulation.

### Cloud Configuration Optimization for Recurring Data-Intensive Jobs

*Dec. 2017 - Dec. 2019*

- Unearth the cheapest cloud configuration with a low search cost.
- Modify the Gaussian-Process UCB algorithm to unearth the optimal configuration under time-varying pricing of the cloud service.
- Implement the system for Spark applications in Kubernetes platform.
- Achieve a 2X-speedup and 20.9% cost-savings in Kubernetes implementation.

### Maximizing Flow-network Throughput in Stream Processing Systems

*Jun. 2019 - Present*

- Formulate the flow-network throughput as a concave function. Adjust the resource allocation of Operators to achieve the maximum throughput.
- Combine online optimization and UCB algorithm to do dynamic resource allocation.
- Implement the system for Flink applications in Kubernetes platform.

## Setup the CUHK IE DIC cluster and System Maintenance

*Jan. 2017 - Mar. 2021*

- Setup the Hortonworks cluster and do system maintenance among 28 servers.
- Teaching assistant in big data system/programming courses(IERG4300/IERG4330).
- Help students setup Hadoop, Spark and Kubernetes clusters in the public clouds.
- Organize large-scale evaluations of our implemented scheduling schemes in Hadoop.

## EXTRACURRICULAR ACTIVITIES

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- 2015 National College Swimming Championships, Shanghai, China
- 2019 Standard Chartered Hong Kong Marathon

## PUBLICATIONS

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1. **Yang Liu**, Huanle Xu and Wing Cheong Lau, "Online Job Scheduling with Resource Packing on a Cluster of Heterogeneous Servers", IEEE INFOCOM 2019.
2. Huanle Xu, **Yang Liu**, Wing Cheong Lau, Jun Guo and Alex X. Liu, "Efficient Online Resource Allocation in Heterogeneous Clusters with Machine Variability", IEEE INFOCOM 2019.
3. **Yang Liu**, Huanle Xu and Wing Cheong Lau, "Accordia: Adaptive Cloud Configuration Optimization for Recurring Data-Intensive Applications", IEEE ICDCS 2020. (The work was also presented as a poster in ACM SoCC 2019.)
4. Huanle Xu, **Yang Liu**, Wing Cheong Lau, "Combinatorial Multi-Armed Bandits with Concave Rewards and Fairness Constraints", IJCAI 2020.
5. Huanle Xu\*, **Yang Liu**\*, Wing Cheong Lau, Tiantong Zeng, Jun Guo and Alex X. Liu, "Online Resource Allocation with Machine Variability: A Bandit Perspective". IEEE Transaction on Networking 2020 (co-first author).
6. Tong Andrew Wu, **Yang Liu**, Huanle Xu, Wing Cheong Lau and Angela Zhang, "Missing Data Recovery in Large Power Systems Using Network Embedding", IEEE Transactions on Smart Grid 2020.
7. Huanle Xu\*, **Yang Liu**\*, and Wing Cheong Lau, "Optimal Job Scheduling with Resource Packing on Heterogeneous Servers". IEEE Transaction on Networking 2021 (co-first author).
8. **Yang Liu**, Huanle Xu and Wing Cheong Lau, "Cloud Configuration Optimization for Recurring Batch-Processing Applications". under second-round review in IEEE TPDS 2022.
9. **Yang Liu**, Huanle Xu and Wing Cheong Lau, "Online Resource Optimization for Elastic Stream Processing with Regret Guarantee". ACM ICPP 2022.
10. Huanle Xu, Jinhan Xu, **Yang Liu**, Wing Cheong Lau, Yuqiu Zhang, Liyun Tang, "DollyMR: Multi Resource Scheduling with Task Cloning in Heterogeneous Clusters", ACM ICPP 2022.