

# YUAN, BINHANG

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**PROFILE**

I am a postdoc research scientist in the system group, ETH Zurich, advised by Dr. Ce Zhang. Before that, I get my Ph.D. degree in Computer Science Department Rice University advised by Dr. Chris Jermaine.

My main research focuses are distributed machine learning and database system for machine learning.

**EXPERIENCE**

**Postdoc Research Scientist, ETH Zurich, Switzerland**

**2021/05 - Present**

System group, supervised by Dr. Ce Zhang

**EDUCATION**

**Rice University, Houston, TX, USA**

**2016/08 - 2020/12**

Ph.D., computer science, supervised by Dr. Chris Jermaine

**Rice University, Houston, TX, USA**

**2013/08 - 2016/05**

M.S., computer science, supervised by Dr. Ron Goldman

**Fudan University, Shanghai, China**

**2009/09 - 2013/07**

B.S., Computer Science, GPA: 3.73/4.00

**AWARDS**

**2020 SIGMOD Research Highlight Award**

**2019 VLDB Best Paper Honorable Mention Award**

**2011, 2012 Chinese National Scholarship**

**SELECTED PUBLICATIONS**

- **Binhang Yuan\***, Yongjun He\*, Jared Quincy Davis, Tianyi Zhang, Tri Dao, Beidi Chen, Percy Liang, Christopher Re, and Ce Zhang. "Decentralized Training of Foundation Models in Heterogeneous Environments." To appear in Advances in Neural Information Processing Systems 35 (2022). (NeurIPS 2022)
- Jue Wang\*, **Binhang Yuan\***, Luka Rimanic\*, Yongjun He, Tri Dao, Beidi Chen, Christopher Re, and Ce Zhang. "Fine-tuning Language Models over Slow Networks using Activation Compression with Guarantees." To appear in Advances in Neural Information Processing Systems 35 (2022). (NeurIPS 2022)
- Rui Pan, Yiming Lei, Jialong Li, Zhiqiang Xie, **Binhang Yuan**, and Yiting Xia. "Efficient Flow Scheduling in Distributed Deep Learning Training with Echelon Formation." To appear in Proceedings of the twenty first ACM Workshop on Hot Topics in Networks (2022). (HotNets 2022)
- Xiangru Lian, **Binhang Yuan**, Xuefeng Zhu, Yulong Wang, Yongjun He, Honghuan Wu, Lei Sun, Haodong Lyu, Chengjun Liu, Xing Dong, Yiqiao Liao, Mingnan Luo, Congfei Zhang, Jingru Xie, Haonan Li, Lei Chen, Renjie Huang, Jianying Lin, Chengchun Shu, Xuezhong Qiu, Zhishan Liu, Dongying Kong, Lei Yuan, Hai Yu, Sen Yang, Ce Zhang, and Ji Liu. "Persia: An Open, Hybrid System Scaling Deep Learning-based Recommenders up to 100 Trillion Parameters." In Proceedings of the 28th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, pp. 3288-3298. 2022 (SIGKDD 2022)
- Lijie Xu, Shuang Qiu, **Binhang Yuan**, Jiawei Jiang, Cedric Renggli, Shaoduo Gan, Kaan Kara, Guoliang Li, Ji Liu, Wentao Wu, Jieping Ye, and Ce Zhang. "In-Database Machine Learning with CorgiPile: Stochastic Gradient Descent

without Full Data Shuffle.” In Proceedings of the 2022 International Conference on Management of Data, pp. 1286-1300. 2022. (SIGMOD 2022)

- **Binhang Yuan**, Cameron R. Wolfe, Chen Dun, Yuxin Tang, Anastasios Kyrillidis, and Chris Jermaine. “Distributed Learning of Deep Neural Networks using Independent Subnet Training.” In Proceedings of the VLDB Endowment, 15(8). (VLDB 2022)
- Shaoduo Gan, Xiangru Lian, Rui Wang, Jianbin Chang, Chengjun Liu, Hongmei Shi, Shengzhuo Zhang, Xianghong Li, Tengxu Sun, Jiawei Jiang, **Binhang Yuan**, Sen Yang, Ji Liu, and Ce Zhang. “BAGUA: Scaling up Distributed Learning with System Relaxations.” In Proceedings of the VLDB Endowment, 15(4). (VLDB 2022)
- Shangyu Luo, Dimitrije Jankov, **Binhang Yuan**, and Chris Jermaine. “Automatic Optimization of Matrix Implementations for Distributed Machine Learning and Linear Algebra.” In Proceedings of the 2021 International Conference on Management of Data(pp. 1222-1234). ACM. (SIGMOD 2021)
- **Binhang Yuan**, Dimitrije Jankov, Jia Zou, Yuxin Tang, Daniel Bourgeois, and Chris Jermaine. “Tensor Relational Algebra for Machine Learning System Design.” In Proceedings of the VLDB Endowment, 14(8), 1338-1350 (VLDB 2021)
- Jia Zou, Pratik Barhate, Amitabh Das, Arun Iyengar, **Binhang Yuan**, Dimitrije Jankov, and Chris Jermaine. “Lachesis: Automatic Partitioning for UDF-Centric Analytics.” In Proceedings of the VLDB Endowment, 14(8), 1262-1275 (VLDB 2021)
- Dimitrije Jankov, **Binhang Yuan**, Shangyu Luo, and Chris Jermaine. “Distributed Numerical and Machine Learning Computations via Two-Phase Execution of Aggregated Join Trees.” In Proceeding of VLDB Endowment, 14(7), 1228-1240. (VLDB 2021)
- Dimitrije Jankov, Shangyu Luo, **Binhang Yuan**, Zhuhua Cai, Jia Zou, Chris Jermaine, and Zekai J Gao. “Declarative recursive computation on an RDBMS: or, why you should use a database for distributed machine learning.” In Proceedings of the VLDB Endowment, 12(7), 822-835. (VLDB 2019)
- Jia Zou, R Matthew Barnett, Tania Lorigo-Botran, Shangyu Luo, Carlos Monroy, Sourav Sikdar, Kia Teymourian, **Binhang Yuan**, and Chris Jermaine. “PlinyCompute: A platform for high-performance, distributed, data-intensive tool development.” In Proceedings of the 2018 International Conference on Management of Data(pp. 1189-1204). ACM. (SIGMOD 2018)
- **Binhang Yuan**, Vijayaraghavan Murali, and Chris Jermaine. “Abridging source code.” In Proceedings of the ACM on Programming Languages 1.OOPSLA (2017): 58. (OOPSLA 2017)
- Bo Yan, **Binhang Yuan**, and Bo Yang. “Effective video retargeting with jittery assessment”. In IEEE Transactions on Multimedia, Vol. 16, Issue 1, pp. 272-277, Jan. 2014. (TMM 2014)

## ACADEMIC SERVICE

- Conference reviewer: AAAI: 2020, 2021; ICLR: 2022, 2023; ICML: 2021, 2022; NeurIPS: 2020, 2021, 2022
- Journal reviewer: IEEE Access: 2020; IEEE TKDE: 2022, 2023; JMLR: 2023; PVLDB: 2023

## OTHER EXPERIENCE

**Research Intern, Microsoft Research Asia, Beijing, China**

**2017/07 - 2017/12**

**SDE Intern, Tableau Software, Seattle, WA, USA**

**2016/05 - 2016/08**

**SDE Intern, Isilon EMC2, Santa Clara, CA, USA**

**2015/05 - 2015/08**