向 乔 博士

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教育经历：

2007/08 - 2014/08， 美国韦恩州立大学，计算机科学，博士
2003/09 - 2007/07， 南开大学，信息安全与经济学，双学士

工作经历：

2021 - 至今， 厦门大学，网络空间安全系，教授，南强学者
2019 - 2020， 美国耶鲁大学，计算机科学系，研究助理教授
2016 - 2019， 美国耶鲁大学，计算机科学系，博士后研究员
2014 - 2015， 加拿大麦吉尔大学，计算机科学学院，博士后研究员

研究领域：

计算机网络与存储系统，物联网，系统安全，机器学习系统

主要获奖：

2019， Facebook Research Award - Networking, 全球共 6 个项目获奖
2019， IEEE MASS 2019，最佳论文奖（1/116）
2013， 美国韦恩州立大学杰出教学奖

主持项目：

2019-至今， 共同主持，Facebook Research Award，高效可靠可编程网络控制，5 万美元
2018-至今， 主持，国家自然科学基金青年科学基金，面向地域分布式数据中心的资源优化调度系统研究，29 万
2018-2019， 主持，中国博士后科学基金面上项目，多数据中心分布式数据分析系统，5 万

学术背景：

　　长期从事计算机网络与系统领域的研究。在 Supercomputing, INFOCOM, AAAI, JSAC, TMC, TON 等国际会议/期刊上发表学术论文 40 余篇，合著专著一部。其中 CCF A 类论文 14 篇（一作/通信作者 10 篇），B 类论文 3 篇，C 类论文 3 篇（一作 3 篇，通信 2 篇），IEEE MASS 会议（CCF C 类）最佳论文奖一作 1 篇，大会特邀论文一作 2 篇，IEEE/ACM Trans. 论文 8 篇（一作/通信作者 3 篇）。先后主持国家自然科学基金青年基金 1 项，博士后基金 1 项，共同主持 Facebook Research Award 项目 1 项，总计经费约 70 万。担任 1 个国际期刊编辑，1 次国际期刊专刊客座编辑，3 次国际学术会议大会宣传主席，10 余次国际学术会议 TPC 评委。

　　主要学术成果包括：主持设计了基于软件定义网络，机器学习与可信多方安全计算的多管理域科学计算网络细粒度资源管理系统，在 CERN 大型例子对撞机数据传输与分析网络上完成初步部署，系统设计作为互联网草案提交 IETF ALTO 工作组审议；主持设计了 OpenSDC 可编程数据通路架构，拓展软件定义网络数据通路，提高移动军事网络数据通路可编程性，该架构交付美国陆军实验室与英国国防部实验室进行后续测试与标准化；主持设计了一系列用于下一代车联网的车载通信协议，多项协议被美国通用汽车公司整合入下一代车载通信系统。

专著及论文

专著

2015　1. **Qiao Xiang**, Hongwei Zhang, In-Network Processing in Wireless Sensor Networks, *Handbook of Sensor Networking: Advanced Technologies and Applications, Chapter 4*, CRC Press.

期刊论文

2020　13. **Qiao Xiang**, Haitao Yu, James Aspnes, Franck Le, Linghe Kong, Yang Richard Yang, Optimizing in the Dark: Learning Optimal Network Resource Reservation Through a Simple Request Interface, accepted to **IEEE/ACM TON**, **CCF A 类**, 影响因子, 3.597,

　　　　12. Yuwei Xu, Shuai Tong, Tiantian Zhang, Wen Sun, Xiaoyan Hu, **Qiao Xiang**, COMPASS: Directing Named Data Transmission in VANETs by Dynamic Directional Interfaces, in IEEE Access, 影响因子， 4.098,

　　　　11. Xingjian Lu, Fanxin Kong, Xue Liu, Jianwei Yin, **Qiao Xiang**, Huiqun Yu, Bulk Savings for Bulk Transfers: Minimizing Energy Cost on Inter-Data-Center Traffic, in *IEEE Transactions on Cloud Computing*, 影响因子 5.967.

2019　10. **Qiao Xiang**, Jingxuan Zhang, Xin Wang, Yang Liu, Chin Guok, Franck Le, John MacAuley, Harvey Newman, Yang Richard Yang, Toward Fine-Grained, Privacy-Preserving, Efficient Multi-Domain Network Resource Discovery, in *IEEE Journal on Selected Areas in Communications (JSAC)*, 影响因子, 9.302, **CCF A 类**.

　　　　9. Kai Gao, **Qiao Xiang**, Xin Wang, Yang Richard Yang, Jun Bi, An Objective-Driven On-Demand Network Abstraction for Adaptive Applications, in *ACM/IEEE Transactions on Networking (ToN)*, 影响因子, 3.597, **CCF A 类**.

2018　8. **Qiao Xiang**, Xin Wang, Jingxuan Zhang, Harvey Newman, Yang Liu, Yang Richard Yang, Unicorn: Unified Resource Orchestration for Multi-Domain, Geo-Distributed Data Analytics, in *Future Generation Computer Systems (FGCS)*, 影响因子, 5.768, **CCF C 类**.

2017 7. Linghe Kong, Xi Chen, Xue Liu, **Qiao Xiang**, Yi Gao, Noam Ben Baruch, Guihai Chen AdaSharing: Adaptive Data Sharing in Collaborative Robots, in *IEEE Transactions on Industrial Electronics (TIE)*, 影响因子 7.168.

2016 6. H. Newman, M. Spiropulu, J. Balcas, J. Bendavid, T. Hendricks, D. Kcira, I. Legrand, A. Mughal, J.R. Vlimant (Caltech/HEP); P. Spentzouris, P. DeMar (Fermilab); I. Monga, C. Guok (ESnet/LBNL); K. Riley, W. Allcock, V. Vishwanath, L. Winkler (Argonne LCF); R.Y. Yang, M. Chen, G. Kai, X. Lin, **Q. Xiang**, J. Zhang (Yale) (alphabetical order except PI), Next Generation Exascale Network Integrated Architecture for HEP and Global Science, Whitepaper for US HPC Leadership.

   5. Linghe Kong, Daqiang Zhang, Zongjian He, **Qiao Xiang**, Jiafu Wan, Meixia Tao, Embracing Big Data with Compressive Sensing: A Green Approach in Industrial Wireless Networks, in *IEEE Communications Magazine*, 2016, 影响因子 10.435.

   4. Linghe Kong, **Qiao Xiang**, Xue Liu, Xiao-Yang Liu, Xiaofeng Gao, Guihai Chen, Min-You Wu, ICP: Instantaneous Clustering Protocol for Wireless Sensor Networks, *Computer Networks*, 2016, 影响因子 2.516, **CCF B 类**.

2013 3. Xiaohui Liu, Hongwei Zhang, **Qiao Xiang**, Xin Che, Xi Ju, Taming Uncertainties in Real-Time Routing for Wireless Networked Sensing and Control, *IEEE Transactions on Smart Grid (TSG)*, 4(1), pp. 288-301, March 2013, 影响因子 6.645.

2011 2. **Qiao Xiang**, Jinhong Xu, Xiaohui Liu, Hongwei Zhang, Loren J. Rittle, When In-Network Processing Meets Time: Complexity and Effects of Joint Optimization in Wireless Sensor Networks, *IEEE Transaction of Mobile Computing (TMC)*, 10(10), pp. 1488-1502, October 2011, 影响因子 3.822, **CCF A 类**.

2006 1. Yang Wang, Bo Meng, **Qiao Xiang**, Comparison on Survival Analysis of Traumatic Brain Injury Patients Treated at Normal Temperature and Mild Hypothermia, *Chinese General Practice*, December 2006.

会议论文

2021 30. Yichao Cheng, Ning Luo, Jingxuan Zhang, Timos Antetomos, Ruzica Piskac, **Qiao Xiang**, Looking for the Maximal Independent Set: A New Perspective of Stable Path Problem, accepted to **INFOCOM'21**, **CCF A 类**，通信作者.

2020 29. **Qiao Xiang**, Jensen Zhang, Franck Le, Yang Richard Yang, Toward Programmable Interdomain Routing , in *2020 ACM/IRTF Applied Networking Research Workshop 2020 (ANRW'20)*.

   28. Danny Alex Lachos Perez, Christian Esteve Rothenberg, **Qiao Xiang**, Yang Richard Yang, Börje Ohlman, Sabine Randriamasy, Luis M. Contreras, Kai Gao, Multi-Domain Information

Exposure using ALTO: The Good, the Bad and the Solution, in *2020 ACM/IRTF Applied Networking Research Workshop 2020 (**ANRW'20**)*.

27. Danny Alex Lachos Perez, **Qiao Xiang**, Christian Esteve Rothenberg, Sabine Randriamasy, Luis M. Contreras, Börje Ohlman, Towards Deep Network & Application Integration: Possibilities, Challenges, and Research Directions, in *ACM SIGCOMM 2020 Workshop on Network Application Integration/CoDesign (**NAI'20**)*.

26. **Qiao Xiang**, Jensen Zhang, Kai Gao, Yeon-sup Lim, Franck Le, Geng Li, Yang Richard Yang, Toward Optimal Software-Defined Interdomain Routing, in *the 39th Annual IEEE International Conference on Computer Communications (**INFOCOM'20**)*. Acceptance rate: $19.8\% = 268/1354$, **CCF A 类**.

2019 25. Tony Wang, **Qiao Xiang**, Jeremy Tucker, Vinod Mishra, Yang Richard Yang, Dandelion: A Novel, High-Level Programming System for Software Defined Coalitions with Local State Sharing, in *the 38th AFCEA/IEEE Military Communications Conference (**MILCOM'19**)*, 高分论文 (review scores: 5, 5, 5, 3)，军事通讯旗舰会议.

24. Xi Chen, **Qiao Xiang**, Linghe Kong, Xue Liu, RadioLoc: Learning Vehicle Locations with FM Signal in All-Terrain Environments, in *2019 IEEE International Conference on Mobile Ad-Hoc and Smart Systems (**MASS'19**)*, 共同第一作者，**Best Paper Award (最佳论文奖)**, 1 out of 116 submissions, **CCF C 类**.

23. Danny Alex Lachos Perez, Christian Esteve Rothenberg, **Qiao Xiang**, Yang Richard Yang, Börje Ohlman, Sabine Randriamasy, Farni Boten, Luis M. Contreras, Supporting Multi-Domain Use cases with ALTO, in *2019 ACM/IRTF Applied Networking Research Workshop (**ANRW'19**)*.

22. **Qiao Xiang**, Linghe Kong, Xi Chen, Zhe Wang, Lei Rao, Xue Liu, GreenBroker: Optimal Electric Vehicle Park-and-Charge Control via Vehicle-to-Infrastructure Communication, 大会特邀论文 **Invited Paper**, in *2019 IEEE International Black Sea Conference on Communications and Networking* (**BlackSeaCom'19**),

21. **Qiao Xiang**, Haitao Yu, James Aspnes, Franck Le, Linghe Kong, Yang Richard Yang, Optimizing in the Dark: Learning an Optimal Solution Through a Simple Request Interface, in *2019 AAAI Conference on Artificial Intelligence (**AAAI'19**)*, Acceptance rate: 4.7% (oral) /16.2%, **CCF A 类**.

2018 20. **Qiao Xiang**, Jingxuan Zhang, Xin Wang, Yang Liu, Chin Guok, Franck Le, John MacAuley, Harvey Newman, Yang Richard Yang, Fine-Grained, Multi-Domain Network Resource Abstraction as a Fundamental Primitive to Enable High-Performance, Collaborative Data Sciences, in *2018 ACM/IEEE International Conference for High Performance Computing, Net-*

*working, Storage, and Analysis (**Supercomputing'18**)*, Acceptance rate: 20%, **CCF A 类**.

19. **Qiao Xiang**, Franck Le, Yeon-sup Lim, Vinod K. Mishra, Christopher Williams, Yang Richard Yang, Hongwei Zhang, OpenSDC: A Novel, Generic Datapath for Software Defined Coalitions, in *the 37th AFCEA/IEEE Military Communications Conference (**MILCOM'18**)*, 满分论文 (review scores: 5, 5, 5)，军事通信旗舰会议.

18. **Qiao Xiang**, Chin Guok, Franck Le, John MacAuley, Harvey Newman, Yang Richard Yang, SFP: Toward Interdomain Routing for SDN Networks, in *Proceedings of the 2018 ACM SIGCOMM Conference(**SIGCOMM'18**)*, 短文, **CCF A 类**.

17. **Qiao Xiang**, Jingxuan Zhang, Xin Wang, Yang Liu, Chin Guok, Franck Le, John MacAuley, Harvey Newman, Yang Richard Yang, Fine-Grained, Multi-Domain Network Resource Abstraction as a Fundamental Primitive to Enable High-Performance, Collaborative Data Sciences, in *Proceedings of the 2018 ACM SIGCOMM Conference(**SIGCOMM'18**)*, 短文, **CCF A 类**.

2017 16. **Qiao Xiang**, Xin Wang, Jingxuan Zhang, Harvey Newman, Yang Liu, Yang Richard Yang, Unicorn: Unified Resource Orchestration for Multi-Domain, Geo-Distributed Data Analytics, in *2017 INDIS Workshop*.

15. **Qiao Xiang**, Jingxuan Zhang, Kai Gao, Shenshen Chen, Harvey Newman, Justas Balcas, Yang Richard Yang, ExaO: Multi-Resource Orchestration for Multi-Domain Geo-Distributed Data Analytics (position paper), in *ITA Workshop on Distributed Analytics InfraStructure and Algorithms for Multi-Organization Federations (**DAIS'17**)*.

14. Kai Gao, **Qiao Xiang**, Xin Wang, Yang Richard Yang, Jun Bi, NOVA: Towards On-Demand Equivalent Network View Abstraction for Network Optimization, *the 25th IEEE/ACM International Symposium on Quality of Service (**IWQoS'17**)*, Acceptance rate: 19.9%, **CCF B 类**.

2016 13. Fanxin Kong, **Qiao Xiang**, Qinglong Wang, Xue Liu, On-line Event-Driven Scheduling for Electric Vehicle Charging via Park-and-Charge, *the 37th IEEE Real-Time Systems Symposium (**RTSS'16**)*, Acceptance rate: 23%, **CCF A 类**.

12. Kai Gao, Chen Gu, **Qiao Xiang**, Xin Wang, Yang Richard Yang, Jun Bi, RSAP: An On-Demand, Minimal Equivalent Routing State Abstraction Protocol, *the 24th IEEE International Conference on Network Protocols (**ICNP'16**)*, 短文, top 30% of all submitted full papers, **CCF B 类**.

11. Kai Gao, Chen Gu, **Qiao Xiang**, Yang Richard Yang, Jun Bi, FAST: Enabling Simplified Programming Abstraction for Complex State-Dependent SDN Programming, *ACM SIGCOMM 2016*, 短文, **CCF A 类**.

10. Xi Chen, Lei Rao, **Qiao Xiang**, Xue Liu, Fan Bai, DRIVING: Distributed Scheduling for Video Streaming in Vehicular Wi-Fi Systems, in *the 24th ACM Multimedia Conference (**MM'16**)*, Acceptance rate: $20\% = 52/260$, **CCF A 类**.

9. **Qiao Xiang**, Linghe Kong, Xue Liu, Jingdong Xu, Wei Wang, Auc2Reserve: A Differentially Private Auction for Electric Vehicle Fast Charging Reservation, **大会特邀论文 Invited Paper**, *the 22th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (**RTCSA'16**)*, **CCF C 类**.

8. Xi Chen, Linghe Kong, Xue Liu, Lei Rao, Fan Bai, **Qiao Xiang**, How Cars Talk Louder, Clearer and Fairer: Optimizing the Communication Performance of Connected Vehicles via Online Synchronous Control, *the 35th Annual IEEE International Conference on Computer Communications (**INFOCOM'16**)*, Acceptance rate: $18.25\% = 300/1644$, **CCF A 类**.

2015 7. **Qiao Xiang**, Fanxin Kong, Xue Liu, Xi Chen, Linghe Kong, Lei Rao, Auc2Charge: An Online Auction Framework for Electric Vehicle Park-and-Charge, *the sixth International Conference on Future Energy Systems (**ACM eEnergy'15**)*, Acceptance rate: $22.8\% = 16/70$，**智能电网旗舰会议**。

6. **Qiao Xiang**, Hongwei Zhang, Jianping Wang, Guoliang Xing, Shan Lin, Xue Liu, On Optimal Diversity in Network-Coding-Based Routing in Wireless Networks, *the 34th Annual IEEE International Conference on Computer Communications (**INFOCOM'15**)*, Acceptance rate: $19\% = 316/1640$, **CCF A 类**.

5. **Qiao Xiang**, Xi Chen, Linghe Kong, Lei Rao, Xue Liu, Data Preference Matters: A New Perspective of Safety Data Dissemination in Vehicular Ad Hoc Networks, *the 34th Annual IEEE International Conference on Computer Communications (**INFOCOM'15**)* Acceptance rate: $19\% = 316/1640$, **CCF A 类**.

2012 4. **Qiao Xiang**, Hongwei Zhang, QoS-Aware In-Network Processing for Mission-Critical Wireless Cyber-Physical Systems, *Doctoral Colloquium on the 10th ACM Conference on Embedded Networked Sensor Systems (DC SenSys'12)*.

3. Xiaohui Liu, Hongwei Zhang, **Qiao Xiang**, Xin Che, Xi Ju, Taming Uncertainties in Real-Time Routing for Wireless Networked Sensing and Control, *the 13th ACM International Symposium on Mobile Ad Hoc Networking and Computing (**MobiHoc'12**)*, Acceptance rate: $20\% = 24/120$, **CCF B 类**.

2011 2. Xiaohui Liu, Hongwei Zhang, **Qiao Xiang**, Towards Predictable Real-Time Routing for Wireless Networked Sensing and Control, *the Cyber-Physical-Systems (CPS) Week Workshop on Real-Time Wireless for Industrial Applications (RealWin'11)*.

2009 1. **Qiao Xiang**, Jinhong Xu, Xiaohui Liu, Hongwei Zhang, Loren J. Rittle, When In-Network

Processing Meets Time: Complexity and Effects of Joint Optimization in Wireless Sensor Networks, *the 30th IEEE Real-Time Systems Symposium (**RTSS'09**)*, Acceptance Rate: $< 20\%$, **CCF A 类**.

学位论文及技术报告

2020 4. Shenshen Chen, Geng Li, Kerim Gokarslan, Bin Li, **Qiao Xiang**, Haitao Yu, Franck Le, Yang Richard Yang, Ying Zhang, Carbide: Highly Reliable Networks Through Real-Time Multiple Control Plane Composition, 耶鲁大学计算机系技术报告, *YALEU/DCS/TR1552*, Yale University.

2014 3. In-Network Processing for Mission-Critical Wireless Networked Sensing and Control: A Real-Time, Efficiency, and Resiliency Perspective, 博士论文, Wayne State University.

2011 2. When In-Network Processing Meets Time: Complexity and Effects of Joint Optimization in Wireless Sensor Networks, 硕士论文, Wayne State University.

2009 1. **Qiao Xiang**, QoS-Assured In-Network Processing in Wireless Cyber-Physical Systems: A Survey, 技术报告, *Dependable Networking and Computing Group*, Wayne State University.