

## Felix Xiaozhu Lin

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### Research Interest

My research interest is in computer systems software. I work on the intersection of OS, compilers, and architecture. I care about emerging edge and IoT scenarios. A key theme of my research is to ensure fast, efficient, and secure data processing.

### Education

PhD Dec 2014 Rice University, Advisor: Lin Zhong  
MS July 2008 Tsinghua University  
BS July 2006 Tsinghua University

### Employment

Aug. 2014 – present Assistant Professor, School of ECE, Purdue University  
May 2012 – Dec 2012 Intern, Microsoft Research, with Suman Nath and Jie Liu  
Jun 2011 – Aug 2011 Visiting researcher, IBM Research, with Jian Li  
Jan 2011 – Apr 2011 Intern, Nokia Research, with Daniel Ashbrook and Sean White

### Honors and Awards

- [1] Google Faculty Award, 2016.
- [2] NSF CISE Research Initiation Initiative (CRII), 2015.
- [3] Best Paper Award, ACM Proc. Int. Conf. Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2014.
- [4] Reflex (2009), a pioneering project as part of my PhD thesis anticipated the heterogeneous architectures ubiquitous in today's smartphones and smart devices.

### Research Grants

In the process of being funded:

- PI (sole), "CAREER: A Trustworthy and Verifiable Software Backplane for the Cloud Edge", NSF, \$479,658.

Received:

- PI (as the only Purdue PI), "SaTC: CORE: Small: Collaborative: Guarding the Integrity of Mobile Graphical User Interfaces", NSF, 1718702, 08/01/2017 – 07/30/2020, \$250,000.

- PI (as the only Purdue PI), "CSR: Small: Collaborative Research: Efficient Exploitation of Heterogeneous Memory through OS/Compiler Support", NSF, 1619075, 09/01/2016 – 08/30/2019, \$249,548.
- PI (sole), "CRII: CSR: Rethinking Operating System Structure for Wearable Devices", NSF, 1464357, 04/01/2015 – 03/31/2017, \$175,000.
- PI (sole), "Busting Idle Anomalies on Android Wear", \$42,743, Google faculty award.
- Co-PI, "Democratizing Intelligent Buildings with Internet of Things", \$75,000, Purdue University CPS/IoT Seed Grant Program.

## Conference Proceedings and Presentations

- [1] "A First Look at Deep Learning Apps on Smartphones," Mengwei Xu, Jiawei Liu, Yuanqiang Liu, Felix Xiaozhu Lin, Yunxin Liu, and Xuanzhe Liu, in *Proc. the World Wide Web Conference (WWW)*, acceptance rate 18% (225/1247), 2019.
- [2] "VStore: Reinventing Data Stores for Video Analytics," Tiantu Xu, Luis Materon Botelho, and Felix Xiaozhu Lin, in *Proc. Eurosys Conference (EuroSys)*, acceptance rate 22% (45/207), 2019.
- [3] "StreamBox-HBM: Stream Analytics on High Bandwidth Hybrid Memory," Hongyu Miao, Myeongjae Jeon, Gennady Pekhimenko, Kathryn S. McKinley, and Felix Xiaozhu Lin, in *Proc. ACM Int. Conf. Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, acceptance rate 21% (74/350), 2019.
- [4] "Power SandBox: Power Awareness Redefined," Liwei Guo, Tiantu Xu, Mengwei Xu, Xuanzhe Liu, and Felix Xiaozhu Lin, in *Proc. Eurosys Conference (EuroSys)*, acceptance rate 16% (43/262), 2018.
- [5] "DeepCache: Principled Cache for Mobile Deep Vision," Mengwei Xu, Mengze Zhu, Yunxin Liu, Felix Xiaozhu Lin, and Xuanzhe Liu, in *Proc. ACM Int. Conf. Mobile Computing and Networking (MobiCom)*, acceptance rate 22% (42/187), 2018.
- [6] "ProfDP: A Lightweight Profiler to Guide Data Placement in Heterogeneous Memory Systems," Shasha Wen, Lucy Cherkasova, Felix Xiaozhu Lin, and Xu Liu, in *Proc. Int. Conf. on Supercomputing (ICS)*, acceptance rate 19% (36/193), 2018.
- [7] "Rethinking Resource Management in Mobile Web: Measurement, Deployment, and Runtime," invited paper, Xuanzhe Liu, Yun Ma, and Felix Xiaozhu Lin, in *Proc. IEEE Int. Conf. Distributed Computing Systems (ICDCS)*, 2018.
- [8] "StreamBox: Modern Stream Processing on a Multicore Machine," Hongyu Miao, Heejin Park, Myeongjae Jeon, Gennady Pekhimenko, Kathryn S. McKinley, and Felix Xiaozhu Lin, in *Proc. USENIX Annual Technical Conference (USENIX ATC)*, acceptance rate 21% (60/283), 2017.
- [9] "Characterizing Smartwatch Usage in The Wild," Xing Liu, Tianyu Chen, Feng Qian, Zhixiu Guo, Felix Xiaozhu Lin, Xiaofeng Wang, and Kai Chen, in *Proc. ACM Int. Conf. Mobile Systems, Applications and Services (MobiSys)*, acceptance rate 18% (34/188), 2017.
- [10] "AppHolmes: Detecting and Characterizing App Collusion among Third-Party Android Markets," Mengwei Xu, Yun Ma, Xuanzhe Liu, Felix Xiaozhu Lin, and

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- Yunxin Liu, in *Proc. the World Wide Web Conference (WWW)*, acceptance rate 17% (164/966), 2017.
- [11] “Understanding the Characteristics of Android Wear OS,” Renju Liu and Felix Xiaozhu Lin, in *Proc. ACM Int. Conf. Mobile Systems, Applications and Services (MobiSys)*, page 151–164, acceptance rate 16% (31/197), 2016.
- [12] “memif: Towards Programming Heterogeneous Memory Asynchronously,” Felix Xiaozhu Lin and Xu Liu, in *Proc. ACM Int. Conf. Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, page 369–383, acceptance rate 23% (53/232), 2016.
- [13] “Characterizing Emerging Heterogeneous Memory,” Du Shen, Xu Liu, and Felix Xiaozhu Lin, in *Proc. ACM SIGPLAN Int. Symposium on Memory Management (ISMM)*, 2016.
- [14] “Characterizing Smartphone Usage Patterns from Millions of Android Users,” Huoran Li, Xuanzhe Liu, Tao Xie, Kaigui Bian, Xuan Lu, Felix Xiaozhu Lin, Qiaozi Mei, and Feng Feng, in *Proc. ACM Internet Measurement Conference (IMC)*, page 459–472, 2015.
- [15] “Automated OS-level Device Runtime Power Management,” Chao Xu, Felix Xiaozhu Lin, and Lin Zhong, in *Proc. ACM Int. Conf. Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, page 239–252, acceptance rate 17% (48/287), 2015.
- [16] “K2: A Mobile Operating System for Heterogeneous Coherence Domains,” best paper award, Felix Xiaozhu Lin, Zhen Wang, and Lin Zhong, in *Proc. ACM Int. Conf. Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, acceptance rate 23% (49/217), 2014.
- [17] “SmartAds: Bringing Contextual Ads to Mobile Apps,” Suman Nath, Felix Xiaozhu Lin, Lenin Ravindranath, and Jitu Padhye, in *Proc. ACM Int. Conf. Mobile Systems, Applications and Services (MobiSys)*, page 111–124, 2013.
- [18] “Reflex: Using Low-power Processors in Smartphones without Knowing Them,” Felix Xiaozhu Lin, Zhen Wang, Robert LiKamWa, and Lin Zhong, in *Proc. ACM Int. Conf. Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, page 13–24, acceptance rate 21% (32/152), 2012.
- [19] “How far can client-only solutions go for mobile browser speed?,” Zhen Wang, Felix Xiaozhu Lin, Lin Zhong, and Mansoor Chishtie, in *Proc. the World Wide Web Conference (WWW)*, page 31–40, 2012.
- [20] “Power-efficient time-sensitive mapping in heterogeneous systems,” Cong Liu, Jian Li, Wei Huang, Juan Rubio, Evan Speight, and Felix Xiaozhu Lin, in *Proc. Int. Conf. Parallel Architectures and Compilation Techniques (PACT)*, page 23–32, 2012.
- [21] “RhythmLink: Securely Pairing I/O-Constrained Devices by Tapping,” Felix Xiaozhu Lin, Daniel Ashbrook, and Sean White, in *Proc. ACM Symp. on User Interface Software and Technology (UIST)*, page 263–272, 2011.
- [22] “Dandelion: A framework for transparently programming phone-centered wireless body sensor applications for health,” Felix Xiaozhu Lin, Ahmad Rahmati, and Lin Zhong, in *Proc. ACM Wireless Health (WirelessHealth)*, page 74–83, 2010.

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## Conference Papers under Review

- [1] “Transkernel: An Executor for Commodity Kernels on Peripheral Cores,” Liwei Guo, Shuang Zhai, Yi Qiao, and Felix Xiaozhu Lin, in ([arXiv:1811.05000](#)), 2018.
- [2] “StreamBox-TZ: A Secure IoT Analytics Engine at the Edge,” Heejin Park, Shuang Zhai, Long Lu, and Felix Xiaozhu Lin, in ([arXiv:1808.05078](#)), 2018.

## Journal Publications

- [1] “ShuffleDog: Characterizing and Adapting User-Perceived Latency of Android Apps,” Gang Huang, Mengwei Xu, Felix Xiaozhu Lin, Yunxin Liu, Yun Ma, Saumay Pushp, and Xuanzhe Liu, in *IEEE Transactions on Mobile Computing (TMC)*, vol 16, issue number 10, page 2913–2926, 2017.
- [2] “K2: A Mobile Operating System for Heterogeneous Coherence Domains,” Felix Xiaozhu Lin, Zhen Wang, and Lin Zhong, in *ACM Transactions of Computer Systems (TOCS)*, vol 33, issue number 2, page 5, 2015.

## Refereed Workshop Publications

- [1] “Decelerating Suspend and Resume in OS,” Shuang Zhai, Liwei Guo, Xiangyu Li, and Felix Xiaozhu Lin, in *Proc. ACM Int. Workshop on Mobile Computing Systems and Applications (HotMobile)*, page 31–36, acceptance rate 35% (18/52), 2017.
- [2] “Tell Your Graphics Stack That the Display Is Circular,” Hongyu Miao and Felix Xiaozhu Lin, in *Proc. ACM Int. Workshop on Mobile Computing Systems and Applications (HotMobile)*, page 57–62, acceptance rate 33% (18/55), 2016.
- [3] “Anatomizing System Activities on Interactive Wearable Devices,” Renju Liu and Felix Xiaozhu Lin, in *Proc. ACM Asia-Pacific Workshop on Systems (ApSys)*, page 18, 2015.
- [4] “Draining our Glass: An Energy and Heat Characterization of Google Glass,” Robert LiKamWa, Zhen Wang, Aaron Carroll, Felix Xiaozhu Lin, and Lin Zhong, in *Proc. ACM Asia-Pacific Workshop on Systems (ApSys)*, page 10, 2014.
- [5] “Device drivers should not do power management,” Chao Xu, Felix Xiaozhu Lin, and Lin Zhong, in *Proc. ACM Asia-Pacific Workshop on Systems (ApSys)*, page 11, 2014.
- [6] “Supporting Distributed Execution of Smartphone Workloads on Loosely Coupled Heterogeneous Processors,” Felix Xiaozhu Lin, Zhen Wang, and Lin Zhong, in *Proc. Workshop on Power-Aware Computing and Systems (HotPower)*, page 2, 2012.
- [7] “Why are Web Browsers Slow on Smartphones?,” Zhen Wang, Felix Xiaozhu Lin, Lin Zhong, and Mansoor Chishtie, in *Proc. ACM Int. Workshop on Mobile Computing Systems and Applications (HotMobile)*, page 91–96, acceptance rate 33% (16/49), 2011.

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## Master's and PhD Thesis Students Currently Being Supervised

Hongyu Miao	PhD, started 2015	Runtime system for data analytics
Liwei Guo	PhD, started 2016	OS security
Heejin Park	PhD, started 2016	OS security
Tiantu Xu	PhD, started 2016	Runtime system for data analytics
Shuang Zhai	Master, started 2017	Dynamic binary translation

## Master's Thesis Supervision Completed

- Michael Glapa (co-chaired with Prof. Saurabh Bagchi), Sept 2018. Thesis title “Malicious Reconfiguration of Executing Program in FPGA and its Defense”
- Ravi Gupta (co-chaired with Prof. Saurabh Bagchi), May 2016. Thesis title “Digital signal processors as HPC accelerator and performance tuning via static analysis and machine learning”

## Undergraduate Supervision Completed

- Luis Fernando Materon Botelho, “Large-Scale Video Analytics with Artificial Intelligence”, ECE496, 2018.
- Joven Garces, “Characterization and Optimization of Massively Parallel Merge Algorithms”, ECE496, 2018.
- Yi Qiao, “Understanding Suspend/Resume Path of Linux Device Drivers”, Purdue Undergraduate Summer Research Fellowship, 2018.
- Victor Pan, “Sort vs. Hash Join on Knights Landing Architecture”, Purdue Undergraduate Summer Research Fellowship, 2018.
- Xiangyu Li, “Decelerating Suspend and Resume”, ECE496, 2016.

## Courses In Charge Of

All course survey reports with student comments are available upon request.

### **ECE 368: Data Structures** (undergraduate)

SEMESTER	STUDENTS	COURSE RATING	INSTRUCTOR RATING
Fall 2014	60	4.2/5	4.3/5
Fall 2015	67	4.6/5	4.6/5
Fall 2016	69	4.2/5	4.5/5
Fall 2017	83	4.4/5	4.3/5
Fall 2018	96	4.1/5	4.2/5

### **ECE 695 Operating Systems Design and Implementation** (graduate)

SEMESTER	STUDENTS	COURSE RATING	INSTRUCTOR RATING
Spring 2015	32	4.2/5	4.3/5
Spring 2016	19	4.5/5	4.6/5
Spring 2017	15	4.8/5	4.8/5
Spring 2018	8	4.3/5	4.9/5

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## **Courses Developed**

ECE 695 Operating Systems Design and Implementation

## **Professional Society Activities**

### **ACM**

**Activity:** Reviewer, ACM Transactions on Mobile Computing;  
TPC Member, ISMM, 2019;  
External Review Committee Member, ASPLOS, 2019;  
Student Travel Grant Chair, HotMobile, 2019;  
TPC Member, HotMobile, 2019;  
Publication Co-chair, ASPLOS, 2018;  
TPC Member, WearSys, 2017;  
External Review Committee Member, MobiSys, 2017;  
Web chair & TPC Member, ISLPED, 2016;  
External Review Committee Member, ASPLOS, 2016;  
TPC Member, Workshop on Mobile Gaming, 2015;  
TPC Member, ISLPED, 2015;  
TPC Member, HotPower, 2015;  
External Review Committee Member, ASPLOS, 2015;

### **IEEE**

**Activity:** PC Member, ICDCS, 2018;  
PC Member, SECON, 2016;  
PC Member, SECON, 2015

## **Outreach Activities**

Faculty advisor, Purdue Mechatronics Club  
Judge, Purdue EXPO Scholarship, 2018  
Judge, Spark Challenge, 2018  
Faculty advisor, Purdue SURF, 2017  
Faculty advisor, Purdue SURF, 2016