

## Mr. Kuang, Jilong

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### EDUCATION

#### 09/2006-11/2011 University of California, Riverside (UCR), USA

- Department of Computer Science and Engineering, **Ph. D**
- Advisor: Prof. Laxmi Bhuyan
- GPA: 3.87/4.0; Major GPA: 3.95/4.0

#### 09/2002-06/2006 Beijing University of Posts & Telecommunications (BUPT), China

- School of Computer Science and Technology, **B.E**
- Overall GPA: 3.7/4.0; Major GPA: 3.9/4.0
- Rank: Top 3%, 5<sup>th</sup> out of 190

### RESEARCH INTERESTS

- **Digital Health:** HIPAA-compliant cloud platform, mobile health, activity recognition, physiological signal processing, digital diagnosis/therapeutics/biomarker, care digitalization and predictive analytics.
- **Cloud Computing and Big Data:** Scalable and secure cloud application, big data store and processing using Hadoop/MapReduce framework and Spark ecosystem.
- **Distributed Database:** Time-series data platform, adaptive indexing, in-store stream processing, real-time query engine, database system modeling.
- **Intelligent Platform:** Distributed RDF store, bulk loading of triples, SPARQL query optimization, RDFS/OWL parallel inferencing.
- **Distributed Caching:** In-memory key-value storage for large-scale datacenter, high-throughput and low-latency object caching development.
- **Operating Systems:** Microkernel-based OS development, Linux run-time environment for multicore and manycore systems, scalability and security in resource management and device driver framework.
- **Networking Systems:** High-performance network card driver development, customized TCP/IP protocol optimization, time-series traffic generation.
- **Computer Architecture:** Parallel processing/multi-threading on multicore system, NUMA memory architecture, core/cache topology, power/thermal modeling.
- **Multicore Scheduling:** Parallel-pipeline scheduling, memory/cache/core-aware scheduling, power/energy optimization, thermal management.

### RESEARCH EXPERIENCE

#### 03/2017-present Senior Staff Research Engineer at Samsung Research America (SRA)

- **Digital Health.** Build SRA's first HIPAA-compliant end-to-end digital health platform for data collection, cloud processing and health data analytics. Co-innovate with major hospitals to develop digital solutions and build services & prototypes for key disease states. Operate

real patient pilots and trials to validate our work.

**03/2014-02/2017 Staff Research Engineer at Samsung Research America (SRA)**

- **Connected and Mobile Health.** Prototyped a scalable and secure cloud application for facilitating doctor-patient interaction, monitoring and engagement. Developed Restful APIs to collect patient's data from smart phones/watches. Worked on data flow pipeline and database storage in the cloud.
- **Time-series Data Platform for IoT.** Developed an efficient and scalable time-series traffic generator. Developed a user-level network subsystem based on Linux exokernel framework. Worked on stream processing (in-store computing, indexing, storing and querying) large volume of time-series data for both SQL and NoSQL databases.
- **Intelligent Platform for Cloud.** Developed distributed RDF storage layer to store and retrieve billions of triples. Worked on parallel bulk loading for RDF triples based on MapReduce framework. Worked on SPARQL query optimization and parallel RDFS/OWL inferencing.

**11/2011-02/2014 Senior Research Engineer at Samsung Research America (SRA)**

- **Distributed Caching for Multicore servers.** Developed high throughput and low latency in-memory key-value storage system for large-scale datacenters in both Linux and L4 microkernel OS. Developed highly-optimized Intel 10G NIC driver and IP stack processing to accelerate the network subsystem.
- **OS Research for Multicore/Manycore Platforms.** Researched and prototyped L4 microkernel-based OS for future multicore/manycore systems. Built run-time environment to support scalable and secure resource management and device driver framework.

**09/2007-11/2011 Research Assistant at Computer Architecture and Embedded System Group at UCR**

- **Parallel Scheduling for Video Decoding.** Proposed an adaptive dynamic scheduling scheme for H.264/AVC decoding on cc-NUMA multicore architecture with 32 cores. This scheme uses multiple local queues to reduce thread contention and assigns tasks in a cache locality aware and load balancing fashion to optimize throughput and latency performance.
- **Power Optimization under Traffic Variation.** Proposed a traffic-aware and power-efficient Multicore system by translating traffic rate to optimal system operating level. The system can adjust the number of active cores and per-core frequency via the use of per-core DVFS, power gating and power migration techniques based on a new power model.
- **Thermal Management for Network Applications.** Proposed a predictive thermal model for generic periodic tasks and an online model update strategy using on-chip thermal sensors. Based on that, further designed, implemented and evaluated a thermal-aware scheduler for network applications running on multicore architecture.
- **Energy-efficient Scheduling for Transcoding.** Proposed an energy-efficient adaptive Highest Random Weight (HRW) hash scheduler by jointly taking into account three key factors that collectively play important roles in affecting transcoding performance on multicore servers: memory access, core/cache topology and transcoding format cost.
- **Power-efficient Scheduling for Packet Processing.** Proposed a scheduling algorithm to optimize both throughput and latency given a power budget for packet processing on multicore architectures. It addresses power-aware parallel-pipeline scheduling problem by optimally applying per-core DVFS.
- **Multicore Scheduling for Packet Processing.** Proposed a latency and throughput-aware

packet processing system for multicore architectures based on parallel-pipeline core topology. It satisfies the latency constraint and produces high throughput by exploiting fine-grained task-level parallelism.

## **PUBLICATIONS**

- Xiaoran Wang, Leonardo Jimenez Rodriguez and **Jilong Kuang**. *Modeling Topics on Open Source Apache Spark Repositories*. The 14<sup>th</sup> International Conference on Data Science (ICDATA 2018).
- Leonardo Jimenez Rodriguez, Xiaoran Wang and **Jilong Kuang**. *Insights on Apache Spark Usage by Mining Stack Overflow Questions*. The 2018 IEEE 7<sup>th</sup> International Congress on Big Data (BigData Congress 2018).
- Daniyal Liaqat, Ebrahim Nemati, Md Mahbubur Rahman and **Jilong Kuang**. *A Method for Preserving Privacy During Audio Recordings by Filtering Speech*. The 1<sup>st</sup> IEEE Life Sciences Conference (LSC 2017).
- Ebrahim Nemati, Daniyal Liaqat, Md Mahbubur Rahman and **Jilong Kuang**. *A Novel Algorithm for Activity State Recognition Using Smartwatch Data*. The IEEE-NIH 2017 Special Topics Conference on Healthcare Innovations and Point-of-Care Technologies (HI-POCT 2017).
- **Jilong Kuang**, Daniel Waddington and Changhui Lin. *Techniques for Fast and Scalable Time Series Traffic Generation*. The 2015 IEEE International Conference on Big Data (BigData 2015).
- Dung Vu, **Jilong Kuang** and Laxmi Bhuyan. *A Scalable Hash Scheduler for Decoding of Multiple H.264/AVC Streams on Multi-core*. The 2014 IEEE International Conference on Multimedia & Expo (ICME 2014).
- Ahmed Osama Fathy Atya and **Jilong Kuang**. *RUFIC: A Flexible Framework For Reliable UDP With Flow Control*. The 8<sup>th</sup> International Conference for Internet Technology and Secured Transactions (ICITST 2013).
- Daniel Waddington, Juan Colmenares, **Jilong Kuang** and Fengguang Song. *KV-Cache: A Scalable High-Performance Web-Object Cache for Manycore*. The 6<sup>th</sup> IEEE/ACM International Conference on Utility and Cloud Computing (UCC 2013).
- **Jilong Kuang**, Daniel Waddington and Chen Tian. *Towards A Scalable Microkernel Personality for Multicore Processors*. The 19<sup>th</sup> International European Conference on Parallel and Distributed Computing (Euro-Par 2013).
- Chen Tian, Daniel Waddington and **Jilong Kuang**. *A Scalable Physical Memory Allocation Scheme For L4 Microkernel*. The 36<sup>th</sup> Annual IEEE Computer Software and Applications Conference – Industry Track (COMPSAC 2012).
- Dung Vu, **Jilong Kuang** and Laxmi Bhuyan. *An Adaptive Dynamic Scheduling Scheme for H.264/AVC Decoding on Multicore Architecture*. The 2012 IEEE International Conference on Multimedia & Expo (ICME 2012).
- **Jilong Kuang**, Laxmi Bhuyan and Raymond Klefstad. *Traffic-aware Power Optimization for Network Applications on Multicore Servers*. The 49<sup>th</sup> Design Automation Conference (DAC 2010).
- **Jilong Kuang** and Laxmi Bhuyan. *Predictive Model-based Thermal Management for Network Applications*. The 7<sup>th</sup> ACM/IEEE Symposium on Architectures for Networking and Communications Systems (ANCS 2011).
- **Jilong Kuang**, Laxmi Bhuyan, Haiyong Xie and Danhua Guo. *E-AHRW: An Energy-efficient Adaptive Hash Scheduler for Stream Processing on Multi-core Servers*. The 7<sup>th</sup> ACM/IEEE Symposium on Architectures for Networking and Communications Systems (ANCS 2011).
- **Jilong Kuang**, Danhua Guo and Laxmi Bhuyan. *Power Optimization for Multimedia Transcoding on Multicore Servers*. The 6<sup>th</sup> ACM/IEEE Symposium on Architectures for Networking and Communications

Systems (ANCS 2010).

- **Jilong Kuang** and Laxmi Bhuyan. *LATA: A Latency and Throughput-Aware Packet Processing System*. The 47<sup>th</sup> Design Automation Conference (DAC 2010).
- **Jilong Kuang** and Laxmi Bhuyan. *Optimizing Throughput and Latency under Given Power Budget for Network Packet Processing*. The 29<sup>th</sup> IEEE Conference on Computer Communications (INFOCOM 2010).

## **PATENTS**

- **Jilong Kuang**, Daniel Waddington and Chen Tian. *Quota-based Adaptive Resource Balancing in a Scalable Heap Allocator for Multithreaded Applications*. (Samsung Electronics Co., Ltd., US 20140282589)
- **Jilong Kuang**, Daniel Waddington and Juan Colmenares. *Caching Architecture for Packet-form In-memory Object Caching*. (Samsung Electronics Co., Ltd., US 20140337459)

## **PROFESSIONAL ACTIVITIES**

- Reviewed papers for UCC 2015 (The 8<sup>th</sup> IEEE/ACM International Conference on Utility and Cloud Computing)
- Reviewed papers for ISORC 2015 (The 18<sup>th</sup> IEEE Symposium On Real-time Computing)
- Reviewed papers for UCC 2014 (The 7<sup>th</sup> IEEE/ACM International Conference on Utility and Cloud Computing)
- Reviewed papers for NPC 2014 (The 11<sup>th</sup> IFIP International Conference on Network and Parallel Computing)
- Reviewed papers for ICC 2014 (The 2014 IEEE International Conference on Communications)
- Reviewed papers for INFOCOM 2013 (The 32<sup>nd</sup> IEEE International Conference on Computer Communications)
- Reviewed papers for ISSRE 2012 (The 23<sup>rd</sup> IEEE International Symposium on Software Reliability Engineering)
- External reviewer for DAC 2012 (The 49<sup>th</sup> Design Automation Conference)
- External reviewer for DAC 2011 (The 48<sup>th</sup> Design Automation Conference)
- Reviewed papers for HPCA 2010 (The 16<sup>th</sup> IEEE International Symposium on High-Performance Computer Architecture)
- Reviewed papers for ANCS 2010 (The 6<sup>th</sup> ACM/IEEE Symposium on Architecture for Networking and Communications Systems)
- Reviewed papers for TPDS (IEEE Transactions on Parallel and Distributed Systems)
- Reviewed papers for TC (IEEE Transactions on Computers)
- Reviewed papers for ToN (IEEE/ACM Transactions on Networking)
- Reviewed papers for Parallel Computing (ELSEVIER Journal)
- Reviewed papers for Computer Networks (ELSEVIER Journal)
- Reviewed papers for IJAC (International Journal of Automation and Computing)
- Reviewed papers for Sensors (MDPI Open Access Journal)
- Reviewed papers for China Communications
- ACM member

## **SKILLS**

- **Languages:** English (fluent), Spanish (fluent) and Chinese (native)
- **Programming:** C/C++, Java, Web, Bash Scripting, SQL, Big Data, Hadoop, MapReduce, Spark

### **HONORS & AWARDS**

- Samsung Best Paper Awards Gold Medal, 2013
- Samsung Outstanding Achievement Award, 2012
- Student Travel Grant Award, ANCS 2010 and ANCS 2011
- President of Chinese Students & Scholars Association at UCR, 2007-2010
- Dean's Distinguished Fellowship Award, UCR, 2006-2008
- Excellent Undergraduate Thesis Award, BUPT, 2006
- Top Grade Scholarship, BUPT, 2002-2006