

# HANGCHEN YU

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## RESEARCH INTERESTS

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GPU Virtualization, Operating Systems, Distributed Computing & Systems

## EDUCATION

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- The University of Texas at Austin**, Austin, TX *Aug. 2015 - Present*  
*Ph.D. student in Computer Science, UTCS Systems group*
- Shanghai Jiao Tong University**, Shanghai, China *Sept. 2010 - June 2014*  
*B.S. in Information Engineering*

## EXPERIENCE

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- VMware Inc.**, Palo Alto, CA *May 2017 - Aug. 2017*  
*Performance Engineering Internship*
- Developed a log-independent tool to monitor and analyze the inter-service communications in vCenter on the fly.
  - The tool needs no modifications to service codes, and identifies optimization opportunities with clear visualizations.
- Google Inc.**, Madison, WI *May 2016 - Aug. 2016*  
*Software Engineer Internship in Cloud Storage Team*
- Designed, wrote and tested low-level modules in a distributed in-memory storage system (internal production).
- GitCafe, D.G.Z Inc.**, Shanghai, China *Dec. 2014 - June 2015*  
*Software Developer Internship*
- Implemented concurrent pushes of repository to MoPaaS cloud platform and GitCafe pages service (gitcafe.io).
  - Developed GitHub-compatible Markdown rendering engine, wikis/issues modules and reserved keyword manager.
  - Developed task scheduler to achieve workload balance and live patching of git workers.
- Shanghai Jiao Tong University**, Shanghai, China *July 2014 - June 2015*  
*Research Assistant in Institute of Wireless Communication Technologies*
- Implemented graph algorithms on Apache GraphX and added new GraphX features and modules.

## PUBLICATIONS

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- [1] Y. J. Kwon, **H. C. Yu**, S. Peter, C. J. Rossbach and E. Witchel, “**Ingens: Huge Page Support for the OS and Hypervisor**,” in *SIGOPS Oper. Syst. Rev.*, vol. 51, no. 1, pp. 83-93, Aug. 2017.
- [2] **H. C. Yu**, and C. J. Rossbach, “**Full Virtualization for GPUs Reconsidered**,” in *14th Workshop on Duplicating, Deconstructing, and Debunking (WDDD)*, 2017.
- [3] Y. J. Kwon, **H. C. Yu**, S. Peter, C. J. Rossbach and E. Witchel, “**Coordinated and Efficient Huge Page Management with Ingens**,” in *USENIX Symposium on Operating Systems Design and Implementation (OSDI)*, 2016.
- [4] C. He, **H. C. Yu**, A. B. Li, X. L. Liang, J. P. Geng and R. H. Jin, “**Sideband Radiation Level Suppression in Time-Modulated Array by Nonuniform Period Modulation**,” in *IEEE Antennas Wirel. Propag. Lett.*, vol. 14, pp. 606-609, 2015.
- [5] L. Liu, R. H. Jin, **H. C. Yu**, X. Liang, J. Geng and X. Bai, “**A Compact Ultra-Wideband Power Divider with High Isolation**,” in *IEEE Antennas and Propagation Symposium*, Memphis, TN, USA, July 6-12 2014.
- [6] Y. X. Liu, C. L. Chen, **H. C. Yu** and X. P. Guan, “**Distortion Analysis for Delay Tolerant Data Collection for High-speed Wireless Sensor and Actor Networks**,” *Intelligent Control and Automation (WCICA), 2012 10th World Congress on*, pp. 4452-4457, July 2012.

## PROJECTS

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- Multi-core Operating Systems Implementation**, Austin, TX *Aug. 2016 - Nov. 2016*
- Coded physical memory management based on Barrelfish kernel (a capability-based research OS by ETH Zürich).
  - Spawned processes by memory allocator, capability and virtual address space initializer, ELF parser and dispatcher.
  - Wrote RPC and memory server for centric memory allocation, and dynamic self-paging with page-fault handler.
  - Booted multi-cores; established User-Level Message Passing and RPC between any two processes across the cores.
  - Developed user-space network driver, ping server and UDP server to process and echo ICMP and UDP packets.

**Visual Recognition**, Austin, TX*Aug. 2016 - Nov. 2016*

- Recognized specific objects with local feature matching by nearest neighbor threshold, Lowe's test and RANSAC.
- Implemented an image recognition system for 25 object categories using deep Convolutional Neural Networks.
- Developed image-based localization for self-driving car using Bag-of-Words and Deep Neural Network models.

**Ingens: Coordinated and Efficient Huge Page Management**, Austin, TX*Nov. 2015 - May 2016*

- Implemented Linux page walker to track the access frequency of pages and utilization of memory regions.
- Optimized performance of Java HotSpot 8 by enabling huge pages to different heap generations dynamically.
- Modified Redis to aggregate frequently accessed objects into continuous memory and promoted it into huge pages.

**Compilers**, Austin, TX*Jan. 2016 - Apr. 2016*

- Wrote a recursive descent parser for Bali programming language and SaM (a simple stack machine) code generator.
- Implemented LLVM passes which analyze and optimize loops by hoisting loop-invariant codes out of the loops.
- Generated expression trees from LLVM IR and wrote cost-augmented tree grammars using iburg specification.
- Developed an x86-64 assembly code generator with register allocator for LLVM IR which supports integer arithmetic, arrays, strings, loops, and recursive function calls.

**Operating Systems and Applications**, Austin, TX*Jan. 2016 - Mar. 2016*

- Developed a lightweight x86 kernel with 64-bit long mode and basic memory management module.
- Built a simple userspace networked file system with FUSE to support transfer, cache and write-back of the files.
- Developed (ELF) program loaders with all-at-one paging, demand paging and hybrid paging with page prediction.

**Distributed Systems and Applications**, Austin, TX*Oct. 2015 - Nov. 2015*

- Implemented a distributed synchronized playlist based on the Three-Phase-Commit protocol with fault tolerance.
- Designed a chat room service in the spirit of the multi-decree fault-tolerant Paxos system.
- Developed an weakly connected consistent key-value store based on Bayou system with session guarantees.

**Social Network Recommendation and Detection**, Shanghai, China*Sept. 2014 - Feb. 2015*

- Loaded LinkedIn network into Neo4j database with Py2neo, displayed it as a force-directed graph with Node.js.
- Implemented friend recommendation and community detection algorithms with query language Cypher.

**Routing and Congestion Control in SDN**, Shanghai, China*June 2014 - Sept. 2014*

- Simulated the network on MiniNet, analyzed the status of switch buffer and triggered events.
- Designed routing control protocol based on these events, reduced the congestion and packet loss of the network.

**TEACHING**


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<i>CS 314 Data Structures, Lead weekly discussion sections, UT Austin, Teaching Assistant</i>	<i>Fall 2017</i>
<i>CS 380L Advanced Operating Systems, UT Austin, Teaching Assistant</i>	<i>Fall 2017</i>
<i>CS 329E Data Visualization, UT Austin, Teaching Assistant</i>	<i>Fall 2016</i>
<i>CS 329E Elements of Programming Languages, UT Austin, Teaching Assistant</i>	<i>Spring 2016</i>
<i>CS 331 Algorithms and Complexity, UT Austin, Teaching Assistant</i>	<i>Spring 2016</i>
<i>CS 350C Advanced Computer Architecture, UT Austin, Teaching Assistant</i>	<i>Fall 2015</i>

**TALKS & POSTERS**


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<i>Efficient and Effective GPGPU Virtualization, UT Cloud Workshop'17</i>	<i>Nov 2017</i>
<i>Full Virtualization for GPUs Reconsidered, WDDD ISCA'17</i>	<i>June 2017</i>
<i>Ingens: Coordinated and Efficient Huge Page Management, OSDI'16</i>	<i>Nov 2016</i>

**AWARDS**


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<i>SOSP Scholarship</i>	<i>2017</i>
<i>OSDI Travel Grant</i>	<i>2016</i>

**SPECIALIZED SKILLS**


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<b>Languages:</b>	Proficient in C/C++, Java, Python, Shell, Ruby, MATLAB, L <sup>A</sup> T <sub>E</sub> X Exposure to Go, Perl, C#, Scala, MySQL, MongoDB
<b>Attended Courses:</b>	CS380L Advanced Operating Systems, CS395T Multicore Operating Systems Implementation CS380D Distributed Computing, CS380C Advanced Topics in Compilers CS380V Visual Recognition, CS388G Algorithms: Techniques and Theory
<b>Hobbies:</b>	Reading, tennis, table tennis, chess, basketball