

HANGCHEN YU

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RESEARCH INTERESTS

Virtualization, Hypervisor, GPU, Operating Systems, Distributed Computing & Systems

EDUCATION

- 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

- Microsoft Research**, Redmond, WA *May 2018 - Aug. 2018*
Research Internship
- Virtualized Intel Processor Trace for Hyper-V on SkyLake and post-SkyLake (e.g. IceLake) CPUs.
 - Developed the *first* extensible processor supervisor feature state management (i.e. XSAVES support) for Hyper-V.
 - The code change is promised to be checked-in to the production.
- 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 requires no modifications to service codes, and leverages the generic information such as system calls.
 - Visualized the results in the forms of responsive graphs and charts, and identified the optimization opportunities.
- 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 (which serves AlphaGo) to detect and repair inconsistencies and corruptions in data blocks and locks.
- 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

- [1] **H. C. Yu**, A. Akshintala and C. J. Rossbach, “**Efficient and Effective GPGPU Virtualization with Trillium**,” submitted to *Eurosys 2018*.
- [2] 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.
- [3] **H. C. Yu**, and C. J. Rossbach, “**Full Virtualization for GPUs Reconsidered**,” in *14th Workshop on Duplicating, Deconstructing, and Debunking (WDDD)*, 2017.
- [4] 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.
- [5] 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.
- [6] 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.
- [7] 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.

SELECTED PROJECTS

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.

TEACHING

<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

<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

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

SPECIALIZED SKILLS

Languages:	Proficient in C/C++, Java, Python, Shell, Ruby, MATLAB, L ^A T _E X Exposure to Go, Perl, C#, Scala, MySQL, MongoDB
Hobbies:	Reading, tennis, table tennis, chess, basketball