Hyung Jae (Chris) Chang

Assistant Professor
Department of Computer Science
Troy University – Montgomery

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Education

The University of Texas at Dallas Aug. 2008 – Aug. 2012
Ph.D. in Computer Science
Advisor: Dr. S. Q. Zheng
GPA 3.809/4.0 overall

The University of Texas at Dallas Aug. 2008 – May 2009
M.S. in Computer Science (major in Software Engineering)
GPA 3.888/4.0 overall

University of Florida Aug. 2006 – May 2008
M.S. in Computer and Information Sciences
GPA 3.75/4.0 overall

Oklahoma State University Aug. 2003 – Dec. 2005
B.S. in Computer Science
GPA 3.672/4.0 overall; 3.7/4.0 in major

Teaching Experiences

- Associate Professor in the Department of Computer Science at Troy University – Montgomery Aug. 2020 – present
- Associate Chair in the Department of Computer Science at Troy University Aug. 2019 – present
- Assistant Professor in the Department of Computer Science at Troy University – Montgomery Aug. 2014 – July 2020
  – Courses taught
  Undergraduate Courses
  CS2250: Computer Science I: C++
  CS2255: Computer Science II: C++
  CS2265: Advanced Programming I: Java
  CS3323: Data Structures
  CS3332: Software Engineering I (TROY ONLINE)
  CS3329: Analysis of Algorithms (Summer International in Hanoi, Vietnam)
  CS4448: Operating Systems

  Graduate Courses
  CS5545: Computer Architecture
  CS5550: Operating Systems Principles
  CS6625: Specialized Study in Computer Science

CS6674: Network and Information Security
CS6676: Advanced Computer Network
CS6680: Advanced Software Engineering

- Assistant Professor in Computer Science and Engineering Department at Johnson C. Smith University Aug. 2013 – July 2014
  – Courses taught
  Undergraduate Courses
  CSC131: Computers in Society
  CSC233: Introduction to Discrete Structure
  CSC234: Data Structures and Algorithms
  CSC333: Computer Organization and Architecture
  CSC437: Software Engineering
  CSC439: Data Communications

- Visiting Assistant Professor in Computer Science and Engineering Department at Johnson C. Smith University Aug. 2012 – July 2013
  – Courses taught
  Undergraduate Courses
  CSC131: Computers in Society
  CSC333: Computer Organization and Architecture
  CSC334: Introduction to Operating System
  CSC439: Data Communications

- Teaching Assistance in Computer Science Department at the University of Texas Aug. 2009 – May 2012
  – Assisted professors to prepare for the lectures, grading homework assignments, mentoring students for course projects, and etc for the following classes:
  Undergraduate Courses
  CS 3340 Computer Architecture
  CS 2305 Discrete Mathematics for Computing
  CS 2336 Computer Science II: Java
  CS 1337 Computer Science I: Java

  Graduate Course
  CS 6390 Advanced Computer Networks

Areas of Research Interests

- Designing high speed routing/switching system
- Performance analysis for high speed network and router/switch
- Packet scheduling algorithm
- Cyber Security
- Cost-effective methodology to improve software quality & dependability
- Program analysis & assessment based on source code
- Energy distribution using smart grid

Research Experiences

- 2-Dimensional Mesh of Trees based Switch Architecture (MOTS(N) Switch)

  This study focuses on designing new Mesh of Trees based packet switch architecture and is inspired by buffered crossbar switch. Unlike conventional crossbar with or without crosspoint buffers which require complex hardware arbiters to resolve output contentions, simple arbitration processes are distributed over the buffers in the tree and this makes MOTS(N) scalable. Rather, it has simple and automatic fixed routing for cells from input ports to output ports. As variations of MOTS(N), improved version of MOTS(N) denoted as IMOTS(N) and IMOTS(N) with cut-through denoted as IMOTS-CT(N) are also proposed and studied.

- Contention-Tolerant Crossbar Packet Switches (CTC(N) Switch)

  This study focuses on designing new packet switch architecture which can tolerate output contentions automatically with less hardware components than ones in the conventional crossbar switches. CTC(N) switch can tolerate output contentions by a pipelining mechanism with buffers in the input ports. These buffers are used to decouple the scheduling task into N independent parts in such a way that N schedulers are located in N input ports, which operate independently and in parallel. As a result, CTC(N) switch is simpler and more scalable than existing crossbar switches.

- Predicting Fault-Prone Modules using Static and Dynamic Metrics

  The focus of this study is to build models to predict fault-prone modules using static and dynamic metrics rather than just static metrics as many other studies do. To make the scope of this study as broad as possible, five different tools (Logiscope, McCabe, Understand 2.0, CodeSurfer and χSuds) have been used to collect 85 static and 5 dynamic metrics for the target programs. Principal component analysis and other statistical techniques are used for the model construction. Such models are then validated by using defects collected for open source software.

Publications

- Papers in Preparation

  1. **H. J. Chang**, J. Cornelius, and M. Coote, "Advanced Banyan based Switch: *AB(N)* Switch".

- Peer-Reviewed Journal Publication

  1. J.-H. Seo, J.-S. Kim, **H. J. Chang** and H.-O. Lee, "The Hierarchical Petersen Networks: a New Interconnection Network with Fixed-Degree", *The Journal of Supercomputing*, Vol. 74, Issue 4, pp. 1636-1654, April 2018.

  2. **H. J. Chang**, G. Qu, and S. Q. Zheng, "A High-Performance Switch Architecture Based on Mesh of Trees", *International Journal of Communication Systems*, Vol. 26, Issue 12, pp. 1543-1561, December 2013.

  3. **H. J. Chang**, G. Qu, and S. Q. Zheng, "Performance of *CTC(N)* Switch Under Various Traffic Models", *Lecture Notes in Electrical Engineering (LNEE)*, Vol. 126, pp. 785-793, 2012.

4. G. Qu, **H. J. Chang**, J. Wang, Z. Fang, and S. Q. Zheng, "Contention-Tolerant Crossbar Packet Switches", *International Journal of Communication Systems*, Vol. 24, Issue 2, pp. 168-184, February 2011.

5. G. Qu, **H. J. Chang**, Z. Fang, and S. Q. Zheng, "Queueing Analysis of Multi-Layer Contention-Tolerant Crossbar Switch", *IEEE Communications Letters*, Vol. 14, Issue 10, pp. 972-974, October 2010.

- Peer-Reviewed Conference Proceedings

1. E. Ko, M. Kang, **H. J. Chang**, and D. Kim, "Graph-theory Based Simplification Technique for Efficient Biological Network Analysis", *in Proc. Of IEEE International Workshop on Big Data Security and Services in conjunction with IEEE BigDataService 2017*, San Francisco, CA, USA, April 2017.

2. H. Kim, J. Son, **H. J. Chang**, and H. Oh, "Event-driven Partial Barriers in Wireless Sensor Networks", *in Proc. Of International Conference on Computing, Networking and Communications (ICNC 2016)*, Kauai, HI, USA, February 2016.

3. J.-L. Lee, D. Kim, L. Fan, and **H. J. Chang**, "Barrier-coverage for City Block Monitoring in Bandwidth Sensitive Vehicular Adhoc Networks", *in Proc. Of the IEEE 10th International Conference on Mobile Ad-hoc and Sensor Networks (MSN 2014)*, Maui, HI, USA, December 2014.

4. D. Kim, G. R. Frye, S.-S. Kwon, **H. J. Chang**, and A. O. Tokuta, "On Combinatoric Approach to Circumvent Internet Censorship using Decoy Routers", *in Proc. Of the 2013 IEEE Military Communication Conference (MILCOM'13)*, San Diego, CA, USA, November 2013.

5. J. Zhang, Z. Fang, **H. J. Chang**, and S. Q. Zheng, "Token Based Scheduling Algorithm for Advanced *IMOTS(N)* Switch Architecture", in *Proc. of 13th ACIS International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing (SNPD) 2012*, Kyoto, Japan, August 2012.

6. **H. J. Chang**, G. Qu, and S. Q. Zheng, "Metrics for Evaluating Out-of-Order Problem in Packet Switches with Applications", in *Proc. of 2nd World Congress on Computer Science and Information Engineering (CSIE) 2011*, Changchun, China, June 2011.

7. **H. J. Chang**, G. Qu, J. Wang, and S. Q. Zheng, "Making Contention-Tolerant Crossbar Switch Scalable", in *Proc. of IEEE Global Communications Conference (Globecom) 2010*, Miami, USA, December 2010.

8. G. Qu, **H. J. Chang**, J. Wang, Z. Fang, and S. Q. Zheng, "Designing Fully Distributed Scheduling Algorithms for Contention-Tolerant Crossbar Switches", in *Proc. of IEEE High Performance Switching and Routing (HPSR) 2010*, Richardson, USA, June 2010.

9. G. Qu, **H. J. Chang**, J. Wang, Z. Fang, and S. Q. Zheng, "Contention-Tolerant Crossbar Packet Switches without and with Speedup", in *Proc. of IEEE International Conference on Communications (ICC)2010*, Cape Town, South Africa, May 2010.

- Conference Paper Presentations

  1. "Graph-theory Based Simplification Technique for Efficient Biological Network Analysis" in the *IEEE International Workshop on Big Data Security and Services* in April 2017.

  2. "Barrier-coverage for City Block Monitoring in Bandwidth Sensitive Vehicular Adhoc Networks" *in the IEEE 10th International Conference on Mobile Ad-Hoc and Sensor Networks* in December 2014.

  3. "Making Contention-Tolerant Crossbar Switch Scalable" in *IEEE Global Communication Conference* in December 2010.

- Non Peer-Reviewed Technical Reports

  1. G. Qu, **H. J. Chang**, J. Wang, Z. Fang, and S. Q. Zheng, "Contention-Tolerant Crossbar Packet Switches without and with Speedup", UTDCS-33-09, June 2009.

Services (after August 2014 at Troy University)

- Services to the University

  1. Served on a focus group for a short Canvas source that provides an introduction to advising for faculty and staff advisors Sep. 2018 – March 2018

  2. Participated in Lee High School Senior Night to represent the College of Arts & Sciences and the Department of Computer Science held at Troy University-Montgomery Nov. 2017

  3. Participated in focus group (representing College of Arts & Sciences) for developing a short Canvas course that provides an introduction to advising for faculty and staff advisors Sep. 2017, Nov. 2017

  4. Gave a talk about Troy University and the Department of Computer Science at Montgomery Chamber of Commerce Cyber Forum March 2017

  5. Regular book recommendation to Rosa Parks library for the future computer science related book purchases Aug. 2014 – present

  6. Attended at the Dragon Boat Festival to represent Troy University Aug. 2014

- Services to the College

  1. Attended training session for "Student Planning/Student Self-Service Advising Training" Oct. 2015

  2. Attended Open House event at Montgomery campus for prospective students to represent The Department of Computer Science and the College of Arts and Sciences Nov. 2014, July, 2016

- Services to the Department

  1. Search Committee in Computer Science Department Sep. 2016 – present

2. Comprehensive Exam Committee Chair in Computer Science Department Sep. 2016 – present
3. Student advising (undergraduate and graduate students) T1/2015 – present
4. Comprehensive Exam Committee in Computer Science Department Oct. 2015 – present
5. In charge of Comprehensive Exam held at Montgomery campus April 2015 – present
6. Writing recommendation letters for students Aug. 2015 – present
7. Contributed for CS Newsletter (editing and participating) T2/2014, T3/2015, T1/2015
8. Reviewed students' thesis T2/2014, T1/2015, T3/2015
9. Trying to build relationships with local businesses (some of our students were hired from these connections) August 2015 – present

- Services to the Community

1. Technical Program Committee Member for IEEE 23rd International Workshop on Computer-Aided Modeling and Design of Communication Links and Networks (CAMAD 2018) March 2018 – present
2. Reviewer for the Journal of Concurrency and Computation: Practice and Experience (Wiley) Dec. 2017
3. Invited as a guest speaker to have a presentation about Computer Science Major to Korean high school students at the Evergreen Presbyterian Church in Montgomery Sep. 2017
4. Reviewer for the 1st International Conference on Electronics, Materials Engineering and Nano Technology 2017 April 2017
5. Technical Program Committee Member for The International Conference on Wireless Networks and Mobile Communications (WINCOM'17) (WINCOM'18) Dec. 2016 – Nov. 2017, March 28 – present
6. Technical Program Committee (TPC) member for The 7th IEEE Annual Computing and Communication Workshop and Conference (CCWC 2017) June 2016 – Jan. 2017
7. Technical Program Committee (TPC) member for IEEE Global Communications Conference 2015 Workshop on Security, Privacy, and Forensics in Wireless Mobile Ad Hoc Networks and Wireless Sensor Networks (SPFMSNET) Dec. 2015
8. Reviewer for IEEE International Conference on Communications (ICC 2015) Oct. 2014
9. Reviewer for 33rd IEEE International Performance Computing and Communications Conference (IPCCC 2014) Sep. 2014
10. Reviewer for International Journal of Communication Systems Mar. 2012 – present

Services and Volunteering Experiences (before August 2014)

- CS/IS program Coordinator for School Reaffirmation by SACS (Southern Association of Colleges and Schools Commission on College) Aug. 2013 – July 2014
- Philip O. Berry Advisory Board Oct. 2013 – July 2014
- STEM College Faculty Development Committee Jan. 2013 – July 2014
- Referee service for the 5th Annual International Conference on Combinatorial Optimization And Application Aug. 2011
- Student volunteer for the 11th International Conference on High Performance Switching and Routing (HPSR 2010) June 2010
- Conference Webmaster, SAC 2010 May 2009 – Mar. 2010
  – Develop and maintain a website for the Software Engineering Track at the 25 Annual ACM Symposium on Applied Computing (http://paris.utdallas.edu/sacse10/) by using HTML.
- External Reviewer for 2009 IEEE Conference on Information Reuse and Integration Aug. 2009
- Conference Webmaster, SSIRI 2009 June 2008 – July 2009
  – Develop and maintain a website for the third IEEE International Conference on Secure Software Integration and Reliability Improvement (http://paris.utdallas.edu/ssiri09) by using HTML, CSS and JAVA script.
- Founding Member of the IEEE Computer Society Student Chapter at UTD May 2009
- Web developer, University of Florida, Gainesville, FL Dec. 2007 – June 2008
  – Designed and developed a website (http://fycs.ifas.ufl.edu/housing) for Family, Youth and Community Sciences Department with Dr. Hyun-Jeong Lee by using HTML language and JAVA script.
- Webmaster in UTD Korean Student Association June 2009 – Aug. 2010
- Poster Presentation Mar. 2010
  – Project (title: Contention-Tolerant Crossbar (CTC(N)) Switch) was selected for poster presentation on Graduate Research Day at UTD
- Webmaster in Korean Baptist Church in Gainesville 2006 – 2007
- Director, Korean Student Association at Oklahoma State University 2004 – 2005
  – Planned and coordinated many events for Korean society
- Teacher in Korean School 2003 – 2004
  – Taught Korean to young Korean children living in the U.S.
- A member of choir in Korean Baptist Church in Stillwater 2003 – 2005

Professional Memberships

- Member of IEEE (Institute of Electrical and Electronics Engineers) 2009 – present
- Member of ACM (Association for Computing Machinery) 2009 – present
- Member of KSEA (Korean-American Scientists and Engineers Association) 2009 – present

Honors, Award and Grants

- Proposal was submitted to Association of American Colleges and Universities (AACU) for "Teaching to Increase Diversity and Equity in STEM (TIDES)" on 02/18/2014. (in charge of proposal designing, writing and budgeting ($255,116)); Project Title: Redesigning/Reforming Gateway courses to Broaden Participation of Students in Computer Science and Engineering. – Non funded May 2014
- NSF HBCU-UP Mini Grant Award ($2728) from Johnson C. Smith University (Project Title: Remote AC Controlling System using Networked Microcontrollers) Oct. 14, 2013
- NSF HBCU-UP Mini Grant Award ($2000) from Johnson C. Smith University (Project Title: High Performance Switch Architecture) Mar. 08, 2013
- NSF Travel Grant Award (Software Engineering Educators Symposium: SEES) Nov. 12, 2012
- Teaching Assistantship Aug. 2009 – May 2012
- The University of Texas at Dallas Korean Student Association Scholarship Spring 2009
- Tektronix Scholarship at The University of Texas at Dallas Fall 2008, Spring 2009
- President's Honor Roll at Oklahoma State University Summer 2005
- Dean's Honor Roll at Oklahoma State University Fall 2003, Fall 2004, Spring 2005