

# Song Huang

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## Education

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- **University of North Texas** **Denton, TX**  
*Ph.D. in Computer Science and Engineering, GPA:4.0* *2013–2019*
- **Texas A&M University-Commerce** **Commerce, TX**  
*Master in Computer Science, GPA:4.0* *2011–2013*
- **Guangdong University of Technology** **Guangzhou, China**  
*Bachelor of Engineering in Network Engineering,* *2002–2006*

## Teaching, Fellowship and Assistantship

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- **Adjunct Professor**, Texas A&M University-Commerce (Fall 2020 - Present)
  - CSCI-340 Introduction to Database
  - CSCI-352 Introduction to Digital Forensics
  - CSCI-516 Fundamental Computing and Computer Organization
  - CSCI-525 Networking I
- **Teaching Fellow**, University of North Texas
  - CSCE 2610: Assembly Language and Computer Organization. (Fall 2018)
- **Teaching Assistant / Research Assistant**, University of North Texas (Fall 2013 – Spring 2019)
  - CSCE 1020: Program Development
  - CSCE 1030: Computer Science I
  - CSCE 2100: Foundations of Computing
  - CSCE 2610: Assembly Language and Computer Organization.
- **Graduate Assistant**, Texas A&M University-Commerce (Fall 2011 - Spring 2013)
  - CSCI 515: Fund Of Programming C/C++ (Mentor: Dr. Daniel Creider)
  - CSCI 520: Data Structures (Mentor: Dr. Daniel Creider)

## Research Interest

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- Applying Machine Learning on building reliable distributed systems.
- Workload characterization and resource management on large scale computer systems.
- Deep Learning, Reinforcement Learning and Feedback Control

## Research Projects and Experience

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- **Enhancing Dependability of Storage Systems by Failure Prediction on Cloud Platform**  
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  - Characterize workload and resource utilization on large-scale cloud computing platform.
  - Apply machine learning techniques to distinguish different types of jobs on batch mode.
  - Schedule resources on the distributed system to optimize the application runtime and resource consumption.
- **Enhancing Dependability of Storage Systems by Failure Prediction on Cloud Platform**  
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- Collected S.M.A.R.T. data of Hard Disk Drives using Linux system tools, stored the data into files.
- Applied statistical methods to analyze data and characterize health status of hard disk drives.
- Built machine learning models and predicted disk failures to proactively protect the storage systems.

### **Failure Analysis and Dependability Enhancement on Software-Defined Networks**

- *Internship at Cisco Systems, Inc (Summer 2016);*
  - Designed the project for the failure analysis and prediction on Software-Defined Network in OpenStack.
  - Extracted the data from MongoDB, visualized the network topology of Software-Defined Network.
  - Developed machine learning models to quantify criticality of entities in virtualized network.
  - The predicting results outperform the generic PageRank method developed by Google.

### **Power and energy efficiency on large-scale computer systems**

- *Internship at Los Alamos National Laboratory (Summer, Fall 2015);*
  - Ran benchmarks and collected power and energy data using Linux System tools on HPC servers.
  - Characterized and visualized the power and energy consumption, and predicted the behaviors.
  - Used the prediction results to control runtime settings to optimize power and energy consumption.

## **Selected Publications**

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- **Song Huang**, Shuwen Liang, Song Fu, Weisong Shi, Devesh Tiwari, and Hsing-bung Chen, "Characterizing Disk Health Degradation and Proactively Protecting Against Disk Failures for Reliable Storage Systems", submitted to The 16th IEEE International Conference on Automatic Computing (ICAC), June 2019
- **Song Huang**, Song Fu, Scott. Pakin and Michael. Lang, "Characterizing Power and Energy Efficiency of A Data-Centric HPC Runtime and Applications". Published in book: *High Performance Parallel Computing*, November 2018.
- Shuwen Liang, Zhi Qiao, Jacob Hochstetler, **Song Huang**, Song Fu, Weisong Shi, Devesh Tiwari, Hsing-bung Chen, Bradley Settlemyer, and David Montoya, "Reliability Characterization of Solid State Drives in a Scalable Production Datacenter", in Proceedings of IEEE Big Data Conference (BigData) 2018.
- **Song Huang**, "Research on Power Saving and Energy Efficiency for Data-Centric Computing on Production HPC Systems", in Proceedings of *IEEE International Green and Sustainable Computing Conference (IGSC)*, October, 2017
- **Song Huang**, S. Fu, W. Shi and D. Tiwari, "Proactive Disk Failure Management and Data Protection for Highly Available Storage Systems", *ACM Symposium on High-Performance Parallel and Distributed Computing (HPDC), extended abstract*, July 2017
- **Song Huang**, Song Fu, Scott Pakin and Michael Lang, "Characterizing Power and Energy Efficiency of Legion Runtime and Applications: An Early Experience", *IEEE International Green and Sustainable Computing Conference (IGSC)*, November 2016.
- **Song Huang**, Zhiang Deng, Song Fu, "Quantifying Entity Criticality for Fault Impact Analysis and Dependability Enhancement in Software-Defined Networks", *35th IEEE International Performance Computing and Communications Conference(IPCCC). Las Vegas, December 2016.*
- **Song Huang**, Song Fu, Quan Zhang, Weisong Shi, "Characterizing Disk Failures with Quantified Disk Degradation Signatures: An Early Experience", in *Proceedings of IEEE International Symposium on Workload Characterization (IISWC)*, October 2015.
- **Song Huang**, Song Fu, Nathan DeBardleben, Qiang Guan, and Chengzhong Xu, "Differentiated Failure Remediation with Action Selection for Resilient Computing", in *Proceedings of the 21st IEEE/IFIP International Symposium on Dependable Computing (PRDC)*, November 2015.
- **Song Huang**, Michael Lang, Scott Pakin, and Song Fu, "Measurement and Characterization of Haswell Power and Energy Consumption", in *Proceedings of the 3rd International Workshop on Energy Efficient Supercomputing (E2SC '15), in conjunction of IEEE/ACM International Conference for High Performance Computing, Networking, Storage and Analysis (SC)*, November,

2015.

- Xiajun Wang, **Song Huang**, Song Fu and Krishna Kavi, "Characterizing Workload of Web Applications on Virtualized Servers", *Big Data Benchmarks, Performance Optimization, and Emerging Hardware*, pp 98-108, Springer, November 2014.

## Services

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Technical Program Committee.....

International Conference on Green Communications, Computing and Technologies (GREEN) 2018

International Conference on Green Communications, Computing and Technologies (GREEN) 2019

Technical Reviews.....

TDSC; ICCD'19; IGSC'18; NAS2018; IGSC17; ICCCN 2017; ICPADS 2016; IGSC16; ICPP-2016; SELSE 2016; BodyNets 2015; Bodynets2014

## Industrial Work Experience

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- **Big Data Developer** **Allstate Insurance Company**  
*August 2019 – Present* *Irving, TX*
  - ETL. Extract data from data warehouses to Hadoop Platform, and transform data into desired format. Load data to different environments for user accesses.
  - Matching. Match data from different sources using IBM Bulk Cross Matching, and Big Match Environment.
  - Data Analysis. Analyze complex data to provide deep knowledge and business insight on the data.
  - Production support. Setup CICD pipeline, load data into different environments, and trouble shootings.
- **IT Team Lead** **Guangdong Century Jiahua Trading Co., Ltd**  
*July 2008–December 2010* *Guangzhou, China*

Led a team to develop and maintain the network and website publishing system.

  - Coordinated software development team to develop a website publishing system.
  - Specified the requirements, designed the software, conducted integrated testing and deployment.
- **Software Developer** **Guangzhou TWO Information Technology Co., Ltd**  
*July 2006–July 2008* *Guangzhou, China*

Developed ERP software for construction management.

  - Developed Enterprise Resource Planning (ERP) software for release (iTWO).
  - Requirement analysis (communicated with clients), software design (High level and low level).
  - Software implementation (coding and documentation), and testing (unit and integrated testing).

## Activities and Awards

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- IEEE Travel Grant for the 16th IEEE International Conference on Autonomic Computing(ICAC'2019)
- ACM Travel Grant for High-Performance Parallel and Distributed Computing (HPDC'2017)
- Student Volunteer at IEEE/ACM Super Computing conference (SC'2015)
- College of Engineering Travel Grant, UNT, November 2015 / December 2016 / June 2017
- College of Engineering Graduate Student Scholarship, UNT, 2014 – 2015
- Toulouse Graduate School: Graduate Assistantship Teaching Scholarship, UNT, 2013-2014
- CyberQ Consulting Company: CMM3 Completion Certificate, March 2008
- Guangdong University of Technology: Outstanding Study Performance / Outstanding Student, 2002-2005