

Computer Engineering Ph.D. specializing in Software Engineering and Data Analysis with hands-on experience in Data Mining, Statistical Learning, Feature Engineering, Linux Operating System, Optimization, Computer Architecture, and Parallel Computing seeking a full-time position.

Education

- **Ph.D. in Electrical and Computer Engineering**, University of California, Santa Barbara, United States [09/2011 – 03/2016]
Dissertation: Test Data Analytics: Exploration of Hidden Patterns for Test Cost Reduction and Silicon Characterization
- **M.S. in Electrical Engineering**, National Tsing Hua University, Hsinchu, Taiwan [09/2006 – 07/2008]
Thesis: Area and Test Cost Reduction for HOY Wireless Test System Using System-Level Design Techniques
- **B.S. in Electrical Engineering**, National Tsing Hua University, Hsinchu, Taiwan [09/2002 – 06/2006]

Projects

- **Learning from Production Test Data**
 - Outstanding problem solving skills and proficient in data mining and feature engineering.
 - Strong hands-on experience with **processing big data**, learning from 10M+ samples with 1K features.
 - Developed a framework for characterizing systematic variations & failures using data from automobile electronic devices.
 - Proposed methodologies for customer return screening, achieving up to **65% detection rate** with 10ppm yield loss rate.
 - Implemented a toolbox dedicated to test data analytics using object-oriented design techniques in Python and Matlab.
- **Hidden Pattern Exploration**
 - Hands-on experience with statistical learning techniques for analyzing test data of semiconductor manufacturing.
 - Proposed a methodology to predict spatial variations for **real-time test applications** (processing 200+ test items in 1s).
 - Developed an algorithm to identify correlated test items for removal based on inter-test-item correlations.
- **Android Operating System Exploration**
 - Hands-on knowledge of operating system internals and Linux/Unix programming concepts.
 - Experienced in **Linux kernel tracing and debugging** for the modules such as file system and device driver.
 - 8% performance improvement for the JIT compiler in Android Dalvik VM through code cache flush (garbage collection).
- **Embedded Multimedia System Development**
 - Understanding with computer architecture, embedded systems architecture, and real-time programming techniques.
 - Designed an ARM-based embedded system with Linux kernel and customized FPGA hardware.
 - Implemented a **Linux device driver** for controlling a customized MP3 decoder hardware in real-time.
- **System Specification Optimization and Prototype Integration**
 - Modeled a client-server wireless test system in electronic system level for event-driven simulation using SystemC.
 - Utilized simulated annealing technique for circuits **area and test-cost optimization**, achieving up to 50% improvement.
 - Performed multi-threaded **software and hardware co-simulation** through inter-process communication (IPC).
 - Responsible for leading the final system integration and public prototype demonstration.
- **Convex Optimization Solver Parallelization**
 - Experienced in **parallel programming** on the Triton Shared Computing Cluster (TSCC) using OpenMP and MPI.
 - Parallelized an open source solver (SeDuMi) using Intel Cilk++ on a multi-core system, achieving 26% speedup.

Work Experience

- **Process Variation Characterization**, graduate intern, GlobalFoundries, Malta, NY [06/2015 – 08/2015]
 - Experienced in writing SQL queries for automatically collecting data from remote database.
 - Implemented Python scripts for parsing 10M+ lines of test data of different products.
 - Built a framework for predicting spatial process variation by limited samples, achieving **<5% relative errors**.
- **Test Time Reduction**, graduate intern, Texas Instruments, Dallas, TX [06/2012 – 09/2012, 06/2013 – 09/2013]
 - Developed machine learning methodology for data analysis using Matlab and Python (NumPy and scikit-learn).
 - Setup BLAS and LAPACK libraries for numerical software applications in a Linux mainframe.
 - Developed a test time reduction framework for an analog product by eliminating statistically predictable and time-costly test items (47% out of the total), achieving up to **55% test time saving**.
- **Research Assistant**, Industrial Technology Research Institute (ITRI), Taiwan [11/2009 – 07/2011]
 - Learned collaborative work skills, experience and knowledge of system-level design/modeling and embedded systems.
 - Implemented a **real-time** (30+ fps) fisheye image calibration and stitching function in an embedded visual servo platform.
 - Designed a **power-aware** SoC architecture with integrated DRAM design using TSV-based 3-D stacking techniques.

Selected Publications

- C.-K. Hsu, P. Sarson, and K.-T. Cheng, “Variation and Failure Characterization Through Pattern Classification of Test Data From Multiple Test Stages,” submitted to *IEEE International Test Conference (ITC)*, 2016.
- F. Lin, C.-K. Hsu, and A. Busetto, and K.-T. Cheng, “Pairwise Proximity-Based Features for Test Escape Screening,” in *IEEE International Conference on Computer-Aided Design (ICCAD)*, 2015.
- F. Lin, C.-K. Hsu, and K.-T. Cheng, “Feature Engineering With Canonical Analysis for Effective Statistical Tests Screening Test Escapes”, in *IEEE International Test Conference (ITC)*, 2014.
- C.-K. Hsu, F. Lin, K.-T. Cheng, W. Zhang, X. Li, J. Carulli, and K. Butler, “Test Data Analytics — Exploring Spatial and Test-Item Correlations in Production Test Data,” in *IEEE International Test Conference (ITC)*, 2013.

Technical Skills

- Languages: C, C++, Python, Verilog, SystemC (TLM), sh/bash scripting, SQL
- Tools: Git, GNU toolchain (gcc, gdb, make, etc.), Matlab, ModelSim, Calibre (DRC & LVS), NC Sim, HSPICE, Xilinx ISE

Honors and Awards

- ECE Dissertation Fellowship, University of California, Santa Barbara, 2015
- Graduate Student Researcher (GSR) Fellowship, Semiconductor Research Corporation (SRC), 2013 – 2016
- Government Fellowship for Studying Abroad, Ministry of Education, Taiwan, 2011 – 2012

Reference

- Dr. Kwang-Ting (Tim) Cheng timcheng@ece.ucsb.edu
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- Dr. Kenneth Butler kenb@ti.com
DFT and Product Engineer, Texas Instruments
- Dr. Cheng-Wen Wu cww@ee.nthu.edu.tw
Senior Vice President of Academic Affairs, National Tsing Hua University