

Donghwan Jeon

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Objective

A fulltime software engineering position where *parallelization* can make a difference.

Keywords: parallelization, compiler, multicore, embedded systems, runtime, dynamic program analysis, profiling

Education

UNIVERSITY OF CALIFORNIA, SAN DIEGO

Ph.D. Computer Science and Engineering, 2012. (Expected)
Advisor: Michael Bedford Taylor, GPA: 3.92/4.00

SEOUL NATIONAL UNIVERSITY, SEOUL, KOREA

B.S. Computer Science and Engineering, 2001.

Research Highlights

Kremlin (Prof. Michael Taylor, UCSD)

2008 – present

- Designed, implemented, and evaluated Kremlin, a tool that helps the parallelization of a serial program. Kremlin measures the parallelism of regions (e.g. functions and loops) in a serial program and provides a short list of important regions for effective parallelization. Kremlin uses a novel dynamic program analysis called hierarchical critical path analysis to measure parallelism [PLDI 2011].
- Developed a parallel performance prediction technique without parallelizing the code. The technique classifies parallelism (e.g. ILP, DOALL, DOACROSS) and honors only exploitable parallelism for a target platform, providing practical speedup upperbound [OOPSLA 2011].
- Proposed a set of novel shadow memory techniques that collectively reduce the memory requirement of Kremlin runtime by more than 15X with less than 10% performance penalty [Under Review].

Photon MATLAB Automatic Parallelizing Compiler (Prof. Michael Taylor, UCSD)

2006 – 2008

- Constructed a complete MATLAB compiler prototype that accepts MATLAB code, performs type and shape analysis, parallelizes, and emits parallelized machine code.
- Investigated a set of new fine-grained parallelization techniques for many-core (up to 1024) tiled processors.

Industry Experience

MDS TECHNOLOGY, SEOUL, KOREA

2002 – 2005

- Worked in Velos real-time operating system team.
- Implemented MMU and IRQ / FIQ support for ARM9 processors.
- Ported Velos and wrote device drivers for ARM7/9 and PPC based targets.
- Integrated third-party products including TCP/IP network stack, file systems, and GUI.

Technical Skills

PARALLELIZATION

Measuring and classifying parallelism via dynamic program analysis
Constructing automatic parallelizing compiler
Manual parallelization: OpenMP, Cilk++, pthread

EMBEDDED SYSTEMS

RTOS design, board bring-up, device driver development, JTAG based debugging

PROGRAMMING LANGUAGE

Expert: C
Proficient: Java, python, ARM assembly
Prior Experience: C++, MATLAB, X86 assembly

HARDWARE DESIGN

Verilog RTL, place and route with Synopsi toolchain

Honors

BEST RESEARCH POSTER AWARD, UCSD RESEARCH EXPO	2011
STUDENT POSTER AWARD, PPOPP	2011
BEST EMPLOYEE OF THE YEAR, MDS TECHNOLOGY	2003

Selected Publications

- [OOPSLA 2011] “Kismet: Parallel Speedup Estimates for Serial Programs”. **Donghwan Jeon**, Saturnino Garcia, Chris Louie, Michael Bedford Taylor.
- [HOTPAR 2011] “Parkour: Parallel Speedup Estimates for Serial Programs”. **Donghwan Jeon**, Saturnino Garcia, Chris Louie, Michael Bedford Taylor.
- [PLDI 2011] “Kremlin: Rebooting and Rethinking `gprof` for the Multicore Age”. Saturnino Garcia, **Donghwan Jeon**, Chris Louie, Michael Bedford Taylor.
- [PPoPP 2010] “Kremlin: like `gprof`, but for parallelization”. **Donghwan Jeon**, Saturnino Garcia, C. Louie, S. Kota Venkata, Michael Bedford Taylor. *Received the Best Student Poster Award*
- [IISWC 2009] “SD-VBS: The San Diego Vision Benchmark Suite.” Sravanthi Kota Venkata, Ikkjin Ahn, **Donghwan Jeon**, Anshuman Gupta, Christopher Louie, and Michael Bedford Taylor.

Translating Technical Books

In my leisure time, I translated six technical books into Korean for Acorn Publishing, Korea. The list includes Kent Beck’s “Implementation Patterns”, Jon Stokes’ “Inside the Machine”, and Qing Li’s “Real-time Concepts for Embedded Systems.”