Kyle D. Singer

Education

PhD Student in Computer Science, Washington University in St. Louis, St. Louis, Mo — August 2017 - Present
PhD Advisor: I-Ting Angelina Lee — GPA: 4.0/4.0

- *Research Focus:* Practically and provably efficient parallel programming platforms and tools that make it easier to write parallel code for latency-sensitive server and desktop applications as well as high throughput scientific computations.

B.S. in Computer Science, University of Evansville, Evansville, IN — August 2010 - May 2013
Minor: Mathematics — GPA: 3.95/4.0
Summa Cum Laude

- *Senior Project:* Balloon Oracle, an Android application for predicting the landing zone of high-altitude balloons in real-time, as well as graphing sensor data being relayed from the balloon. Won award as outstanding senior project.
- *Study Abroad:* Ewha University Summer program in South Korea, July 2012.

Publications

Kyle Singer, Noah Goldstein, Stefan Muller, Kunal Agrawal, I-Ting Angelina Lee, Umut A. Acar. Priority Scheduling for Interactive Applications. In Proceedings of the 32nd Symposium on Parallelism in Algorithms and Architectures (SPAA'20). DOI: https://doi.org/10.1145/3350755.3400236. **Description**: *Provides theoretical bounds on and empirical evaluation of a newly proposed scheduler that prioritizes tasks based on programmer-supplied annotations.*

Stefan K. Muller*, **Kyle Singer***, Umut A. Acar, Kunal Agrawal, and I-Ting Angelina Lee. Responsive Parallelism with Futures and State. In Proceedings of the 41st Conference on Programming Language Design and Implementation (PLDI'20). DOI: https://doi.org/10.1145/3385412.3386013. **Description**: *Theoretically evaluates a type system that rules out priority inversions in task parallel code, and implements the type system in C++ and StandardML.* (*The first two authors contributed equally to this work).

Yifan Xu, **Kyle Singer**, I-Ting Angelina Lee. Parallel Race Detection with Futures. In Proceedings of the 25th Symposium on Principles and Practice of Parallel Programming (PPoPP'20). DOI: https://doi.org/10.1145/3332466.3374536**. Description**: *Proposes, theoretically analyzes, and implements the first known parallel algorithm for detecting races in programs that use futures.*

Kyle Singer, Kunal Agrawal, I-Ting Angelina Lee. Scheduling I/O Latency-Hiding Futures in Task-Parallel Platforms. In Proceedings of the 1st Symposium on Algorithmic Principles of Computer Systems (APoCS'20). DOI: https://doi.org/10.1137/1.9781611976021.11. **Description**: *Provides theoretical bounds on and empirical evaluation of a newly proposed scheduler and I/O library that hide the latency involved with performing I/O operations in task-parallel platforms.*

Kyle Singer, Yifan Xu, and I-Ting Angelina Lee. 2019. Proactive work stealing for futures. In Proceedings of the 24th Symposium on Principles and Practice of Parallel Programming (PPoPP '19). DOI: https://doi.org/10.1145/3293883.3295735. **Description**: *Proposes, implements, and theoretically analyzes a variation of work stealing that supports scheduling futures alongside fork-join parallelism in a more practical manner.*

Patents

Bruce Ianni, Davyeon Ross, Justin Bennett, Mike Ciholas, Herb Hollinger, **Kyle Singer**, and Dirk VanVorst. 2018. Transaction scheduling system for a wireless data communication network. US Patent Publication No. US9858451B2. **Description**: *Describes a system for scheduling radio transmissions in a wireless data communication network.*

Talks

Priority Scheduling for Interactive Applications

- Conference talk at SPAA'20, Online — July 2020

Responsive Parallelism with Futures and State

- Conference talk at PLDI'20, Online — June 2020

Scheduling I/O Latency-Hiding Futures in Task-Parallel Platforms

- Conference talk at APoCS'20, Salt Lake City, UT — January 2020
- Seminar talk at Washington University in St. Louis, St. Louis, MO — November 2019

Reduced I/O Latency with Futures

- Brief announcement at SPAA'19, Phoenix, AZ — June 2019

Proactive Work Stealing for Futures

- Conference talk at PPoPP'19, Washington, D.C — February 2019
- Seminar talk at Washington University in St. Louis, St. Louis, MO — December 2018

Professional Experience

Software Engineer — September 2014 – June 2017

Ciholas Inc. — Newburgh, IN

- Worked with a team to design an ultra-wideband radio network that can track locations with high precision.
- The primary developer on the dwusb_gui and the subsequent cuwb_server desktop applications used both to perform location calculations as well as to control the behavior of devices on the radio network.
- Provided on-site customer support and setup of ultra-wideband networks at locations such as CES in Las Vegas and CES Asia in Shanghai, China.
- Wrote an Android library to allow clients to interface with a USB-connected embedded ultra-wideband device that generates location data.
- Wrote firmware for ultra-wideband devices for use with the dwusb_gui and cuwb_server applications.
- Designed and implemented a transaction scheduling scheme for collecting data to perform location calculations using the two-way ranging plus snoop algorithm.
- Wrote firmware to decode and play audio in the Speex format when triggered remotely via radio.

Intern — Summer 2010-2011, Summer 2013

Magellan Health Services — Maryland Heights, MO

- Wrote SQL for a system that automated moving data from files into databases.
- Eliminated unnecessary work by designing and implementing code to automate manual logging procedures.
- Consulted on task automation procedures.
- Tested software that interfaces with Microsoft SQL Server prior to deployment.
- Assisted others with SQL related projects.

Teaching Experience

English Teacher September 2013 - February 2014
Top Academy Chungju-si, Chungcheongbuk-do, South Korea

- Instructed students in English reading, writing, speaking, and listening at a private after-school academy.

Computer Science Tutor March 2013 - May 2013
University of Evansville Evansville, IN

- Tutored an undergraduate student in CS 215, the Fundamentals of Programming II.

Physics Teacher's Assistant August 2011 - May 2013
University of Evansville Evansville, IN

- Aided undergraduate students in comprehending and applying principles of Physics in a lab setting.
- Graded undergraduate physics lab papers submitted to the University of Evansville's Physics department.

Volunteer English Tutor January 2011 - May 2013
University of Evansville ENL Fellowship Evansville, IN

- Instructed international students at the University of Evansville in the English language.
- Edited academic papers for proper grammar and use of language.

Computer Science Grader January 2012 - May 2012
University of Evansville Evansville, IN

- Graded undergraduate programming projects submitted to the University of Evansville's Computer Science department.

Volunteer Webelos Day Instructor October 2011
University of Evansville ACM Evansville, IN

- Instructed elementary students in the basics of computer science using MIT Scratch.

Leadership and Activities

Programming Contest Team Member August 2014
GlobalHack II St Louis, MO

- Over the course of two days, worked as a part of a team to build an application that could intelligently parse and group together documents, allowing domain experts to process dynamic data feeds more effectively.

Programming Contest Team Member November 2011, November 2012
University of Evansville ACM Evansville, IN

- Designed and implemented code to solve problems in a time critical environment.

High School Programming Contest Judge April 2012
University of Evansville ACM Evansville, IN

- Verified contestants' submissions through the use of various test cases.

High School Programming Contest Problem Author April 2011
University of Evansville ACM Evansville, IN

- Developed level appropriate problems for high school students to solve in a programming contest.

ACM Secretary September 2011 – May 2012
University of Evansville ACM Evansville, IN

- Assisted in the planning and organization of activities for the University of Evansville's ACM chapter.