

# KYLE D. SINGER

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## 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.