

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 that predicts the landing zone of high-altitude balloons in real-time, can suggest a launch site based on desired landing zone, and can graph sensor data being relayed from the balloon in real-time. 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***, Noah Goldstein, 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 Intern (Part-time)

Neural Magic

- Developing offline/online scheduling algorithms to improve performance of machine learning algorithms in a software system that provides GPU-class performance on CPU hardware.

August 2021 – Present

Boston, MA (Remote)

Software Engineer Intern, Systems and Infrastructure (PhD)

Facebook

- Worked to enhance security for services that utilize an internal service management platform.

May 2021 – August 2021

Boston, MA (Remote)

Software Engineer Intern

Neural Magic

- Developed online scheduling algorithms to improve performance of machine learning algorithms on multi-socket computers in a software system that provides GPU-class performance on CPU hardware.

January 2021 – May 2021

Boston, MA (Remote)

Software Engineer

Ciholas Inc.

- 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.

September 2014 – June 2017

Newburgh, IN

- 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.

November 2011, November 2012

Evansville, IN

Programming Contest Team Member

University of Evansville ACM

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

High School Programming Contest Judge

University of Evansville ACM

April 2012
Evansville, IN

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

High School Programming Contest Problem Author

University of Evansville ACM

April 2011
Evansville, IN

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

ACM Secretary

University of Evansville ACM

September 2011 – May 2012
Evansville, IN

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