

# Robert S. Utterback

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## CONTACT INFORMATION

Monmouth College  
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## FORMAL EDUCATION

- 2017**                      PhD in Computer Science  
                                Washington University in St. Louis  
                                GPA: 3.96  
                                **Dissertation Title:**  
                                Easier Parallel Programming with Provably-Efficient Runtime Schedulers  
                                **Advisors:** Kunal Agrawal and Angelina Lee
- 2012**                      BS in Mathematics and Computer Science  
                                Truman State University  
                                GPA: 4.0

## FURTHER EDUCATION

- 2019                      Machine Learning with TensorFlow on Google Cloud Specialization  
                                A 5-Course specialization by Google on Coursera:  
                                Art and Science of Machine Learning (June 2019);  
                                Feature Engineering (June 2019);  
                                How Google Does Machine Learning (May 2019);  
                                Intro to TensorFlow (May 2019);  
                                Launching into Machine Learning (May 2019);
- 2019                      Machine Learning Specialization  
                                A 4-Course specialization by the University of Washington on Coursera:  
                                Machine Learning: Clustering and Retrieval (January 2019)  
                                Machine Learning: Classification (August 2018);  
                                Machine Learning: Regression (August 2018);  
                                Machine Learning Foundations: A Case Study Approach (July 2018)
- 2016                      The Data Scientist's Toolbox (Coursera course – Johns Hopkins);  
                                R Programming (Coursera course – Johns Hopkins);  
                                Getting and Cleaning Data (Coursera course – Johns Hopkins);  
                                Exploratory Data Analysis (Coursera course – Johns Hopkins)

## PROFESSIONAL APPOINTMENTS

**2017 — present    Assistant Professor**

Department of Mathematics, Statistics, & Computer Science  
Monmouth College

## TEACHING EXPERIENCE

Spring 2020	<i>Introduction to Programming;</i> <i>Competitive Programming (new);</i> <i>Senior Capstone;</i>
Fall 2019	<i>Object-Oriented Data Structures and Algorithms (new);</i> <i>Programming Languages;</i>
Spring 2019	<i>Object-Oriented Programming;</i> <i>Operating Systems;</i> <i>Senior Capstone;</i>
Fall 2018	<i>Computer Organization and Design;</i> <i>Data Structures;</i> <i>Applied Machine Learning (new);</i>
Spring 2018	<i>Object-Oriented Programming;</i> <i>Analysis of Algorithms;</i>
Fall 2017	<i>Computer Organization and Design;</i> <i>Data Structures;</i> <i>Programming Languages;</i>
Spring 2017	<i>Analysis of Algorithms</i> (Washington University in St. Louis)
Fall 2016	<i>Parallel Algorithms</i> (Guest Lecturer)
Fall 2014	<i>Parallel Algorithms</i> (Teaching Assistant)
Summer 2014	WUSTL REU Mentor Mentored two undergraduate students in parallel algorithms
Summer 2013	WUSTL REU Mentor Mentored two undergraduate students in developing parallel data structures
Spring 2013	<i>Parallel Algorithms</i> (Teaching Assistant, weekly recitation)

## TEACHING DEVELOPMENT

August 2018	New Computer Science Faculty Teaching Workshop NSF-Funded workshop for new computer science faculty
Fall 2017 — Spring 2018	“Motivating Students” faculty reading group
2013 — 2016	WUSTL Teaching Center pedagogical workshops: Designing Inclusive STEM Materials (2016) Structuring Opportunities for Active Learning During Lectures (2016) Mentoring Undergraduate Research (2016) Teaching in Review Sessions and Office Hours (2013) Designing and Facilitating Group Work (2013)

## PROFESSIONAL SERVICE

2019	Brief Announcement Committee, PPOPP <sup>1</sup> 2020 Review and make acceptance decisions for submitted brief announcements (short submissions)
2018	Reviewer, European Symposia on Algorithms (ESA) 2019 Poster Review Committee, Tapia <sup>2</sup> 2018
2016	Artifact Evaluation Committee, PPOPP <sup>1</sup> 2017 Judge and make acceptance decisions for submitted software artifacts
2016	Reviewer, PPOPP <sup>1</sup> 2017
2013	Reviewer, Supercomputing Conference (SC) 2013

## RESEARCH INTERESTS

Parallel and high-performance computing, algorithms and data structures, scheduling, dynamic multithreading, computational complexity, data science, applied machine learning, computer science education

## FULL-LENGTH, PEER-REVIEWED PUBLICATIONS

Robert Utterback, Kunal Agrawal, I-Ting Angelina Lee, Milind Kulkarni. “Processor-Oblivious Record and Replay”. *ACM Transactions on Parallel Computing* 6 (forthcoming). 2019.

Robert Utterback, Kunal Agrawal, Jeremy Fineman, I-Ting Angelina Lee. “Efficient Race Detection with Futures”. In *Proceedings of the Symposium on Principles and Practices of Parallel Programming (PPOPP)* 2019. Acceptance rate: 19%

Kunal Agrawal, Joseph Devietti, Jeremy Fineman, I-Ting Angelina Lee, Robert Utterback, Changming Xu. “Race Detection and Reachability in Nearly Series-Parallel DAGs”. In *Proceedings of the Twenty-Ninth Annual ACM-SIAM Symposium on Discrete Algorithms* 2018. Acceptance rate: 33%

Robert Utterback, Kunal Agrawal, I-Ting Angelina Lee, Milind Kulkarni. “Processor-Oblivious Record and Replay”. In the *Proceedings of the Symposium on Principles and Practices of Parallel Programming (PPOPP)* 2017. Acceptance rate: 22%

Robert Utterback, Kunal Agrawal, Jeremy Fineman, I-Ting Angelina Lee. “Provably Good and Practically Efficient Parallel Race Detection for Fork-Join Programs”. In the *Proceedings of the Symposium on Parallelism in Algorithms and Architectures (SPAA)* 2016. Acceptance rate: 25%

Kunal Agrawal, Jeremy Fineman, Kefu Lu, Brendan Sheridan, Jim Sukha, Robert Utterback. “Provably Good Scheduling for Parallel Programs that Use Data Structures through Implicit Batching”. In the *Proceedings of the Symposium on Parallelism in Algorithms and*

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<sup>1</sup>Symposium on Principles and Practices of Parallel Programming

<sup>2</sup>ACM Richard Tapia Celebration of Diversity in Computing

*Architectures (SPAA)* 2014. Acceptance rate: 25%

## RESEARCH REPORTS

Hinck, R. S., Utterback, R., & Cooley, S. C. (August, 2019). Jammu and Kashmir Reach Back: Media Analysis of Extremist Activities in Indian and Pakistani News. Prepared for the Pentagon’s Strategic Multilayer Assessment Program: USINDOPACOM Jammu & Kashmir.

## OTHER RESEARCH ARTIFACTS

Utterback, Robert and Jouhal, Abhi. Software: Try-lock PORRidge: Adding Record and Replay Support for Try-locks. 2019. Gitlab repository. <https://gitlab.com/wustl-pctg/cilkrecord>.

Utterback, Robert and Lee, I-Ting Angelina. Software: FutureRD: Race Detection for Future-Parallel Computations. 2018. Github repository. <https://github.com/wustl-pctg/futurerd.git>.

Utterback, Robert. “Easier Parallel Programming with Provably-Efficient Runtime Schedulers” (2017). Engineering and Applied Science Theses & Dissertations. 303. [https://openscholarship.wustl.edu/eng\\_etds/303](https://openscholarship.wustl.edu/eng_etds/303)

Utterback, Robert and Lee, I-Ting Angelina. Software: PORRidge: Processor-Oblivious Record and Replay. 2016. Gitlab repository. <https://gitlab.com/wustl-pctg-pub/porridge>.

Utterback, Robert. Software: CRacer and Batchier Runtime Systems. 2015. Gitlab repository. <https://gitlab.com/wustl-pctg-pub/cracer>

Kunal Agrawal, Jeremy Fineman, Brendan Sheridan, Jim Sukha, Robert Utterback. Poster: “Provably Good Scheduling for Parallel Programs that Use Data Structures through Implicit Batching”. In the *Proceedings of the Symposium on Principles and Practices of Parallel Programming (PPoPP)* 2014. Full paper acceptance rate: 15%

## AWARDS, HONORS, AND GRANTS

November 2018	NVidia GPU Grant NVidia Corporation donated a Titan V GPU (MSRP: 3000 USD) to support research on work-stealing schedulers on GPUs.
2017	SIGPLAN PAC Student Travel Grant
2016	SPAA Student Travel Grant
2014	SPAA Student Travel Grant
2012 – 2017	WUSTL Graduate Research Assistantship Full tuition plus stipend
2012	WUSTL Summer Research NSF-funded research with Kunal Agrawal prior to graduate school

2012	Outstanding Senior in Computer Science Truman State University, Department of Math and Computer Science
2012	Departmental Honors Truman State University, Department of Math and Computer Science
2008	Truman Leadership Scholarship Merit-based full-ride scholarship plus additional leadership training

## TECHNICAL TALKS

September 2019	“Fast Race Detection for Parallel Programs” Monmouth College Faculty Colloquium
February 2019	“Efficient Race Detection with Futures” Symposium on Principles and Practices of Parallel Programming (PPoPP) 2019
February 2017	“Processor-Oblivious Record and Replay” Symposium on Principles and Practices of Parallel Programming (PPoPP) 2017
2016	“Provably good and practically efficient parallel race detection” Symposium on Parallelism in Algorithms and Architectures (SPAA) 2016
2016	“Parallel Divide and Conquer Algorithms” Guest lecture for CSE 341: Parallel Algorithms (WUSTL)
2016	“Luby’s Algorithm for Maximal Independent Set” Guest lecture for CSE 341: Parallel Algorithms (WUSTL)
2015	“Detecting Race Conditions in Parallel” WUSTL Doctoral Student Seminar
2014	“Detecting Race Conditions in Parallel” WUSTL Doctoral Student Seminar
2013	“Implicitly Batching Parallel Data Structure Operations” WUSTL Doctoral Student Seminar

## CONFERENCE ACTIVITY/PARTICIPATION

June 2019	Virtual Residency Introductory/Intermediate Workshop A workshop aimed at training people to become “research computing facilitators,” who deploy and manage cyber-infrastructure and work with researchers to improve their research productivity via computational resources. Virtual attendee.
April 2019	Conference of Undergraduate Research & Scholarship (Monmouth College) 1 student (Abhi Jouhal) presented research in a poster session (general audience)
April 2019	Consortium for Computing Sciences in Colleges Conference (Central Plains) St. Charles Community College 1 student (Abhi Jouhal) presented parallel computing research in a poster contest (computer science audience) 5 students participated in a programming contest
February 2019	Principles and Practice of Parallel Programming 2019 (Washington, D.C.) Presented my paper, “Efficient Race Detection with Futures.”
August 2018	New Computer Science Faculty Teaching Workshop

(University of California, San Diego)

This workshop focused on educating new faculty to teach computer science effectively and efficiently.

## RESEARCH EXPERIENCE

2012 — 2017

Research assistant

Washington University in St. Louis

Parallel Computing Technologies Group

St. Louis, MO

Advisors: Kunal Agrawal and Angelina Lee

**Projects:** Designed and developed several runtime systems to ease parallel programming.

*Batcher* is a runtime scheduler that allows programmers to write batched data structures but use them as traditional concurrent data structures by implicitly grouping data structure operations and scheduling them efficiently.

*CRacer* is a runtime system and instrumentation tool to detect determinacy races in Cilk Plus programs. It is asymptotically optimal and efficient in practice.

*PORRidge* is a record and replay system designed to handle critical sections in fork-join programs. It is processor-oblivious, i.e. recording may use more or less cores than replay, and is nearly asymptotically optimal for both recording and replaying.

Spring 2015

Research Intern

Huawei

Santa Clara, CA

Researched techniques for applying the actor programming model

Built a C pre-processor to handle actor model syntax and applied to a distributed computing framework

Summer 2014

WUSTL REU Mentor

Goal: develop a special batched order-maintenance data structures

Mentored two undergraduate students

Part of the NSF-funded REU program at WUSTL

Summer 2013

WUSTL REU Mentor

Goal: develop batched data structures for use with *Batcher*

Mentored two undergraduate students

Part of the NSF-funded REU program at WUSTL

## MONMOUTH COLLEGE SERVICE

2019

Proposed new course: Competitive Programming

2019-2020

Member of Computer Science Faculty Search Committee

2019-2020

Member of Electrical Engineering Faculty Search Committee

2019-2020	Co-chair of New Faculty Orientation Committee
2018-2019	Co-developer of new Data Science major and minor Developed introductory data science course and applied machine learning course Co-developer of major Computer Science curriculum update
2018-2019	Member of Computer Science Faculty Search Committee
2018-Present	Member of New Faculty Orientation Committee
2018-Present	Member of Campus Technology Futures Group
2017-Present	Assisted in administering department capstone course

## NONACADEMIC WORK

2011	Software Engineering Intern Cerner Corporation Developed unit testing and continuous integration framework
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## PROFESSIONAL MEMBERSHIPS OR AFFILIATIONS

### ACM

Member

## REFERENCES

### **Logan Mayfield**

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Monmouth College  
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### **Kunal Agrawal**

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### **Angelina Lee**

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### **Ben Moseley**

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