

# Curriculum Vitae

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**KC Sivaramakrishnan**

Computer Laboratory  
University of Cambridge  
[sk826@cl.cam.ac.uk](mailto:sk826@cl.cam.ac.uk)

<http://kcsrk.info>

15 JJ Thomson Avenue  
Cambridge CB3 0FD  
Tel: +44 79828 42499

## ❖ Summary

I am interested in the design and implementation of concurrent programming languages targeting scalable platforms such as many-core processors and compute clouds. My research spans programming models, compilers, static analysis, schedulers, threading systems, and memory management.

## ❖ Education

**PhD — Computer Science**

Thesis Title: [Functional Programming Abstractions for Weakly Consistent Systems](#)  
Advisor: Suresh Jagannathan

*May 2011 – Dec 2014*  
Purdue University, USA

**Master of Science — Computer Science**

*Aug 2008 – May 2011*  
Purdue University, USA

**Bachelor of Engineering — Computer Science and Engineering**

*Aug 2004 – May 2008*  
PSG College of Technology  
Anna University, India

## ❖ Experience

**Research Fellow, Royal Commission for the Exhibition of 1851**

*Oct 2015 – present*

**Research Fellow, Darwin College, Cambridge**

*Oct 2015 – present*

**Research Associate, University of Cambridge**

Advisor: Anil Madhavapeddy

*Dec 2014 – present*  
Cambridge, UK

Technical director of OCaml Labs leading the development of [Multicore OCaml](#) project. Applying programming languages and program verification to solve extreme-scale parallelism and distribution.

**Research Assistant, Purdue University**

Advisor: Suresh Jagannathan

*Aug 2008 – Dec 2014*  
West Lafayette, IN, USA

My research focused on discovering new language abstractions and developing runtime system techniques to ease programming weakly consistent systems. To this end, I have built [MultiMLton](#), a parallel and distributed extension of MLton Standard ML compiler and runtime and [Quelea](#), a shallow extension of Haskell for declarative programming over eventually consistent data stores.

**Teaching Assistant, Purdue University**

Undergraduate C Programming (CS180)  
Graduate Programming Languages (CS565)

West Lafayette, IN, USA  
*Aug 2012 – Dec 2012*  
*Aug 2011 – Dec 2011*

My tasks included designing and evaluating weekly projects, office hours for one-on-one instruction, and grading.

**Research Intern, Microsoft Research, Cambridge**

Advisors: Tim Harris, Simon Marlow, and Simon Peyton Jones

*Feb 2012 – May 2012*  
Cambridge, UK

I developed a concurrency substrate for Glasgow Haskell Compiler (GHC) to allow programmers to modularly implement user-level schedulers and concurrency libraries for Haskell threads in Haskell, without having to re-engineer critical runtime system components. The concurrency substrate is built around one-shot continuations and uses transactional memory for coordination.

**Research Intern, Samsung Information Systems America (R&D)**

Advisor: Daniel Waddington

*May 2010 – Aug 2010*  
San Jose, CA, USA

I was part of the core team that developed SNAPPLE programming language – a safe and concurrent extension of C++ targeted at many-core processors. The task involved designing language extensions for concurrency, compiler extensions for safety, and a runtime for executing large number of lightweight threads. SNAPPLE was implemented as a veneer on top of C++ using LLNL Rose source-to-source compiler.

**Intern, Advanced Numerical Research and Analysis Group**

Dec 2007 – Apr 2008

Advisor: Sankar Chnab

Hyderabad, India

As a part of the Compiler Engineering group, I ported Kaffe, an open source Java VM to an embedded microprocessor ANUPAMA and a desktop processor ABACUS. Developed a lightweight threading subsystem, and implemented a JIT backed for ABACUS.

## ❖ Journal Publications

- J4 **Composable Scheduler Activations for Haskell** Jun 2016  
KC Sivaramakrishnan, Tim Harris, Simon Marlow, Simon Peyton Jones  
*Journal of Functional Programming (JFP)*
- J3 **Representation without Taxation: A Uniform, Low-Overhead, and High-Level Interface to Eventually Consistent Key-Value Stores** Mar 2016  
KC Sivaramakrishnan, Gowtham Kaki, Suresh Jagannathan  
*IEEE Data Engineering Bulletin*, 39(1): 52 – 64
- J2 **MultiMLton: A Multicore-aware Runtime for Standard ML** Nov 2014  
KC Sivaramakrishnan, Lukasz Ziarek, Suresh Jagannathan  
*Journal of Functional Programming (JFP)*, 24(6): 613 – 674
- J1 **Efficient Sessions** Feb 2013  
KC Sivaramakrishnan, Mohammad Qudeisat, Lukasz Ziarek, Karthik Nagaraj, Patrick Eugster  
*Science of Computer Programming (SCP)*, 78(2): 147 – 167  
**Invited paper**

## ❖ Conference Publications

- C9 **Continuation Passing Style for Effect Handlers** Sep 2017  
Daniel Hillerstrm, Sam Lindley, Robert Atkey, KC Sivaramakrishnan  
*International Conference on Formal Structures for Computation and Deduction (FSCD)*
- C8 **DaLi : Database as a Library** May 2017  
Gowtham Kaki, KC Sivaramakrishnan, Thomas Gazagnaire, Anil Madhavapeddy, Suresh Jagannathan  
*The 2nd Summit on Advances in Programming Languages (SNAPL)*  
**Oral Presentation**
- C7 **Declarative Programming over Eventually Consistent Data Stores** Jun 2015  
KC Sivaramakrishnan, Gowtham Kaki, Suresh Jagannathan  
*International Conference on Programming Language Design and Implementation (PLDI)*
- C6 **Rx-CML: A Prescription for Safely Relaxing Synchrony** Jan 2014  
KC Sivaramakrishnan, Lukasz Ziarek, Suresh Jagannathan  
*Symposium on Practical Aspects of Declarative Languages (PADL)*
- C5 **A Coherent and Managed Runtime for ML on the SCC** Nov 2012  
KC Sivaramakrishnan, Lukasz Ziarek, Suresh Jagannathan  
*Many-core Architecture Research Community Symposium (MARC)*  
**Best paper award**
- C4 **Eliminating Read Barriers through Procrastination and Cleanliness** Jun 2012  
KC Sivaramakrishnan, Lukasz Ziarek, Suresh Jagannathan  
*International Symposium on Memory Management (ISMM)*

- C3 [Composable Asynchronous Events](#) Jun 2011  
Lukasz Ziarek, KC Sivaramakrishnan, Suresh Jagannathan  
*International Conference on Programming Language Design and Implementation (PLDI)*
- C2 [Efficient Session Type Guided Distributed Interaction](#) June 2010  
KC Sivaramakrishnan, Karthik Nagaraj, Lukasz Ziarek, Patrick Eugster  
*International Conference on Coordination Models and Languages (COORDINATION)*
- C1 [Partial Memoization of Concurrency and Communication](#) Sep 2009  
Lukasz Ziarek, KC Sivaramakrishnan, Suresh Jagannathan  
*International Conference on Functional Programming (ICFP)*

## ❖ Workshop Publications

- W13 [A Memory Model for Multicore OCaml](#) Sep 2017  
Stephen Dolan and KC Sivaramakrishnan  
*OCaml Workshop*
- W12 [Effectively Tackling the Awkward Squad](#) Sep 2017  
Stephen Dolan, Spiros Eliopolous, Daniel Hillerstrm, Anil Madhavapeddy, KC Sivaramakrishnan, Leo White  
*OCaml Workshop*
- W11 [Mergeable Types](#) Sep 2017  
Gowtham Kaki, KC Sivaramakrishnan, Samodya Abeysiriwardane, Suresh Jagannathan  
*ML Workshop*
- W10 [Concurrent System Programming with Effect Handlers](#) Jun 2017  
Stephen Dolan, Spiros Eliopolous, Daniel Hillerstrm, Anil Madhavapeddy, KC Sivaramakrishnan, Leo White  
*Trends in Functional Programming (TFP)*
- W9 [Eff directly in OCaml](#) Mar 2017  
Oleg Kiselyov and KC Sivaramakrishnan  
*JSSST Workshop on Programming and Programming Languages*
- W8 [Lock-free programming for the masses](#) Sep 2016  
KC Sivaramakrishnan, Tho Laurent  
*OCaml Workshop*
- W7 [Compiling Links Effect Handlers to the OCaml Backend](#) Sep 2016  
Daniel Hillestrm, Sam Lindley, KC Sivaramakrishnan  
*ML Workshop*
- W6 [Eff Directly in OCaml](#) Sep 2016  
Oleg Kiselyov and KC Sivaramakrishnan  
*ML Workshop*
- W5 [Effective Concurrency with Algebraic Effects](#) Sep 2015  
Stephen Dolan, Leo White, KC Sivaramakrishnan, Jeremy Yallop and Anil Madhavapeddy  
*OCaml Workshop*
- W4 [Migrating MultiMLton to the Cloud](#) Sep 2013  
KC Sivaramakrishnan, Lukasz Ziarek, Suresh Jagannathan  
*ML Workshop*
- W3 [Scalable Lightweight Task Management Schemes for MIMD Processors](#) Apr 2011  
Daniel G. Waddington, Chen Tian, KC Sivaramakrishnan  
*Workshop on Systems for Future Multi-Core Architectures (SFMA)*

**The Design Rationale for MultiMLton** *Sep 2010*  
W2 Suresh Jagannathan, Armand Navabi, KC Sivaramakrishnan, Lukasz Ziarek  
*ML Workshop*

**Lightweight Asynchrony using Parasitic Threads** *Jan 2010*  
W1 KC Sivaramakrishnan, Lukasz Ziarek, Raghavendra Prasad, Suresh Jagannathan  
*Workshop on Declarative Aspects of Multicore Programming (DAMP)*

## ❖ Technical Reports and Drafts

**Featherweight Threads for Communication** *Nov 2011*  
T1 KC Sivaramakrishnan, Lukasz Ziarek, Suresh Jagannathan  
*Purdue University Computer Science Technical Report – TR-11-018*

## ❖ Teaching/Advising

- Guest Lectures:
  - Arrows, Advanced Functional Programming, University of Cambridge, Lent 2015–16.
  - Debugging, Programming in C and C++, University of Cambridge, Michaelmas 2015–16.
- Supervisions at University of Cambridge:
  - Databases, Lent 2016–17.
  - Concurrent and Distributed Systems, Lent 2016–17.
  - Databases, Michaelmas 2016–17.
  - Concurrent and Distributed Systems, Michaelmas 2016–17.
  - Algorithms, Lent 2015–16.
  - Concurrent and Distributed Systems, Lent 2015–16.
  - Concurrent and Distributed Systems, Michaelmas 2015–16.
  - Object-oriented Programming, Michaelmas 2015–16.
- Teaching assistantships at Purdue University
  - Undergraduate C Programming (CS180), Aug 2012 – Dec 2012.
  - Graduate Programming Languages (CS565), Aug 2011 – Dec 2011.
- Projects supervised:
  - Nicolas Assouad, ENS Paris, Hardware Support for Composable Lock-free Transactions, Mar 2017 – Jun 2017.
  - Matt Harrison, University of Cambridge, Secure Decentralized Apps, Sep 2016 – present.
  - Maxime Lesourd, ENS de Lyon, Verified CPS translation of handlers, Sep 2016 – Mar 2017.
  - Philip Dexter, Binghamton University, Approximate computing for OCaml, May 2016 – Aug 2016.
  - James Wright, University of Cambridge, Mechanized semantics of Algebraic Effects in OCaml, Sep 2015 – Mar 2016.
  - Armael Gueneau, ENS de Lyon, Algebraic Effects for js\_of\_ocaml, Sep 2015 – Mar 2016.
  - Theo Laurent, ENS, Reagents for Multicore OCaml, May 2015 – Aug 2015.
  - Guillain Potron, ENS de Lyon, Semantics of Irmin branch-consistent data store, March 2015 – Aug 2015.

## ❖ Talks

**A deep dive into Multicore OCaml Garbage Collector** *Jul 2017*  
System Research Group Seminar Computer Laboratory, University of Cambridge

**Multicore OCaml GC** *Jun 2017*  
JaneStreet Group New York, NYC

<b>Composable lock-free programming for Multicore OCaml</b> ABCD Meeting	Nov 2016 University of Edinburgh
<b>Practical Algebraic Effect Handlers in Multicore OCaml</b> LFCS Seminar	Nov 2016 University of Edinburgh
<b>Effective Concurrency and Parallelism in Multicore OCaml</b> PL Seminar	Nov 2016 Indian Institute of Technology, Madras
<b>Effective Concurrency and Parallelism in Multicore OCaml</b> PL Seminar	Nov 2016 Indian Institute of Technology, Bombay
<b>Effective parallelism with Reagents</b> Facebook Faculty Summit	Sep 2016 London, UK
<b>Multicore OCaml and Programming with Reagents</b> LDN Functionals	Aug 2016 Jane Street UK, London
<b>Effect handlers in Multicore OCaml</b> Dagstuhl Seminar	Mar 2016 Dagstuhl, Germany
<b>Arrows and Reagents</b> Invited Lecture, Advanced Functional Programming	Mar 2016 Cambridge, UK
<b>Concurrent and Multicore OCaml: A deep dive</b> Facebook Tech Talk	Jan 2016 Menlo Park, CA
<b>OCaml Platform: Update</b> OCaml Consortium Meeting	Nov 2015 Paris, France
<b>Multicore OCaml: Update</b> OCaml Developer's Meeting	Nov 2015 Paris, France
<b>Silence is Golden: Controlling Communication and Coordination in Distributed Databases</b> Darwin College Science Seminar	Oct 2015 Cambridge, UK
<b>Effective Concurrency with Algebraic Effects</b> OCaml Workshop 2015	Sep 2015 Vancouver, Canada
<b>Quelea: Declarative Programming over Eventually Consistent Data Stores</b> Computer Laboratory, University of Cambridge	Apr 2015 Cambridge, UK
<b>Functional Programming Abstractions for Weakly Consistent Systems</b> PhD Defense	Dec 2014 Purdue University
<b>Functional Abstractions for Practical and Scalable Concurrent Programming</b> Invited Lecture	Mar 2014 Microsoft Research, Cambridge, UK
<b>Rx-CML: A Prescription for Safely Relaxing Synchrony</b> PADL 2014	Jan 2014 San Diego, CA
<b>Migrating MultiMLton to the Cloud</b> ML Workshop 2013	Sep 2013 Boston, MA
<b>A Coherent and Managed Runtime for ML on the SCC</b> MARC 2012	Nov 2012 RWTH Aachen
<b>Eliminating Read Barriers through Procrastination and Cleanliness</b> ISMM 2012, Beijing Wrestling Wednesdays, Microsoft Research, Cambridge	Jun 2012 May 2012
<b>Lightweight Concurrency in GHC</b> Wrestling Wednesdays	May 2012 Microsoft Research, Cambridge
<b>Efficient Session Type guided Distributed Interaction</b> COORDINATION 2012	Jun 2012 CWI Amsterdam

## ❖ Service

- Organizer, [Dagstuhl Seminar on "Algebraic Effect Handlers go Mainstream"](#), Apr 2018.
- Program Committee member: PMLDC@ECOOP 2017, Off-the-beaten track (OBT) 2017, OCaml Workshop 2016, SPLASH-MARC symposium, 2013.
- Artifact Evaluation Committee member: PLDI 2015, PPOPP/CGO 2016.
- Reviewer: ECOOP, TODS, JFP, POPL, ICFP, ASPLOS, TLDI, Concurrency and Computation: Practice and Experience, Software: Practice and Experience.
- Organizer for Darwin College Science Seminar Series, Oct 2015 – May 2017.

## ❖ Awards and Recognitions

- Research Fellowship, Royal Commission for the Exhibition of 1851, 2015–2018, £102,000.
- Research Fellowship, Darwin College, Cambridge, 2015–2018, £900.
- Maurice H. Halstead Memorial Award for outstanding research in Software Engineering, Purdue University, 2014, \$4,000.
- Best paper award at Many-core Architecture Research Symposium at RWTH-Aachen, 2012, \$1,000.
- Invited paper in Science of Computer Programming, Vol. 78, Iss. 2 (Feb 2013).
- Glasgow Haskell Compiler (GHC) Committer.
- SIGPLAN PAC travel grant for PLDI 2012 and POPL 2014, \$1,500 each.
- NSF travel grant for ICFP 2013, \$2,000.