

## KC Sivaramakrishnan

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## ❖ Summary

I am interested in applying programming language techniques to improve concurrent, parallel, distributed and operating systems.

## ❖ 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

### Assistant Professor, Indian Institute of Technology, Madras

Jan 2019 – present

### Senior Research Associate, University of Cambridge

Advisors: Alan Mycroft, Anil Madhavapeddy

Nov 2017 – Dec 2018  
Cambridge, UK

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

Oct 2015 – Oct 2018

### Research Fellow, Darwin College, Cambridge

Oct 2015 – Oct 2018

### Research Associate, University of Cambridge

Dec 2014 – Oct 2017

### Research Assistant, Purdue University

Advisor: Suresh Jagannathan

Aug 2008 – Dec 2014  
West Lafayette, IN, USA

### Teaching Assistant, Purdue University

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

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

### Research Intern, Microsoft Research, Cambridge

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

Feb 2012 – May 2012  
Cambridge, UK

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

Advisor: Daniel Waddington

May 2010 – Aug 2010  
San Jose, CA, USA

### Intern, Advanced Numerical Research and Analysis Group

Advisor: Sankar Chnab

Dec 2007 – Apr 2008  
Hyderabad, India

## ❖ Grants, Awards and Recognitions

- Class of 1991 Award for Promising Young Faculty in Computer Science and Engineering, IIT Madras, 2019.
- PI, Multicore Support for Tezos blockchain, Jun 2019, GBP 194,000.
- PI, Qilin: Scalable Concurrent Unikernels with Effect Handlers, Jan 2019, INR 500,000.
- Co-I, Feasibility of an Operating System for Interspatial Networking in a Built Environment, Centre for Digital Built Britain (CDBB), Mar 2018, £24,000.

- 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.
- 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.

## ❖ Service

- Organizer, [Dagstuhl Seminar on "Algebraic Effect Handlers go Mainstream"](#), Apr 2018.
- Organizer, [Shonan Meeting No.143 on Programming Language Support for Data-intensive Applications](#), June 2019.
- Editor, Special Issue of the Journal of Functional Programming (JFP) on the Theory and Practice of Algebraic Effects and Handlers, 2019.
- Program Committee Chair: ML Workshop 2019.
- Program Committee member: ICFP 2020, PAPOC@EuroSys 2020, OCaml Workshop 2019, PMLDC@ECOOP 2017, Off-the-beaten track (OBT) 2017, OCaml Workshop 2016, SPLASH-MARC symposium, 2013.
- External Review Committee: ICFP 2019.
- Artifact Evaluation Committee member: ICFP 2018, PLDI 2015, PPOPP/CGO 2016.
- Reviewer: PLDI 2020, ESOP 2020, JPDC 2020, LICS 2019, ECOOP 2019, TODS 2019, JFP 2018, POPL 2014, ICFP 2013, ASPLOS 2013, TLDI 2013, Concurrency and Computation: Practice and Experience 2013, Software: Practice and Experience 2012.
- Organizer for Darwin College Science Seminar Series, Oct 2015 – May 2017.
- Interviewer for Undergraduate Admissions to Computer Science, Christ's College, Cambridge, 2016, 2017 and 2018

## ❖ Edited Publications

- E1 [Algebraic Effect Handlers go Mainstream](#) *Apr 2018*  
 KC Sivaramakrishnan, Daan Leijen, Matija Pretnar, Tom Schrijvers  
*Dagstuhl Reports, Volume 8, Issue 4, 2018*

## ❖ Journal Publications

- J8 [Mergeable Replicated Data Types](#) *Oct 2019*  
 Gowtham Kaki, Swarn Priya, KC Sivaramakrishnan, Suresh Jagannathan  
*Proceedings of the ACM on Programming Languages (PACMPL), issue OOPSLA 2019*
- J7 [Safe Replication through Bounded Concurrency Verification](#) *Nov 2018*  
 Gowtham Kaki, Kapil Earanky, KC Sivaramakrishnan, Suresh Jagannathan  
*Proceedings of the ACM on Programming Languages (PACMPL), issue OOPSLA 2018*
- J6 [Concurrent System Programming with Effect Handlers](#) *Nov 2017*  
 Stephen Dolan, Spiros Eliopolous, Daniel Hillerstrm, Anil Madhavapeddy, KC Sivaramakrishnan, Leo White  
*Post-proceedings of the Symposium on Trends in Functional Programming (TFP) (accepted)*
- J5 [Eff directly in OCaml](#) *Oct 2017*  
 Oleg, Kiselyov, KC Sivaramakrishnan  
*Post-proceedings of the ML Workshop (accepted)*

- 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

- C11 **Version Control Is For Your Data Too** May 2019  
 Gowtham Kaki, KC Sivaramakrishnan, Suresh Jagannathan  
*The 3rd Summit on Advances in Programming Languages (SNAPL)*, 2019
- C10 **Bounding Data Races in Space and Time** Jun 2018  
 Stephen Dolan, KC Sivaramakrishnan, Anil Madhavapeddy  
*International Conference on Programming Language Design and Implementation (PLDI)*
- 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

W15 [Handlers.js](#) Apr 2018  
Daniel Hillerstrm, Sam Lindley, Robert Atkey, KC Sivaramakrishnan, Jeremy Yallop  
*Programming Technology for the Future Web (ProWeb), 2019*

W14 [An Architecture for Interspatial Communication](#) Apr 2018  
Anil Madhavapeddy, KC Sivaramakrishnan, Gemma Gordon, Thomas Gazagnaire  
*Hot Topics in Pervasive Mobile and Online Social Networking (HotPOST), 2018*

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  
*Symposium on 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)*

- W2 **The Design Rationale for MultiMLton** Sep 2010  
 Suresh Jagannathan, Armand Navabi, KC Sivaramakrishnan, Lukasz Ziarek  
*ML Workshop*
- W1 **Lightweight Asynchrony using Parasitic Threads** Jan 2010  
 KC Sivaramakrishnan, Lukasz Ziarek, Raghavendra Prasad, Suresh Jagannathan  
*Workshop on Declarative Aspects of Multicore Programming (DAMP)*

## ❖ Technical Reports and Drafts

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

## ❖ Teaching/Advising

- Lecturer:
  - Programs and Proofs, IIT Madras, Spring '20
  - Paradigms of Programming, IIT Madras, Monsoon '19
- Guest Lectures:
  - Arrows, Advanced Functional Programming, University of Cambridge, Lent '16.
  - Debugging, Programming in C and C++, University of Cambridge, Michelmas '15.
- Supervisions at University of Cambridge:
  - Databases, Michelmas '18, Lent '17, Michaelmas '17, Lent '16.
  - Concurrent and Distributed Systems, Lent '17, Michaelmas '17, Lent '16, Michaelmas '16, Lent '15.
  - Algorithms, Lent '15.
  - 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:
  - Simon Fowler, University of Edinburgh, `cmm_of_wasm`: An ahead-of-time compiler for WebAssembly, May 2018 – July 2018.
  - Matevz Polijanc, University of Cambridge, A Reactive Programming model in OCaml, Oct 2017 – Mar 2018.
  - Charlie Crisp, University of Cambridge, A Blockchain in Pure OCaml, Oct 2017 – Mar 2018.
  - Henry Mercer, University of Cambridge, Systematic Concurrency Testing for Multicore OCaml, Oct 2017 – Mar 2018.
  - 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, Binghampton 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

<b>Mergeable Replicated Data Types</b> Department Seminar	May 2019 Massachusetts Institute of Technology
<b>Retrofitting a Concurrent GC onto OCaml</b> GLASS Seminar	Oct 2018 University of Glasgow
<b>Concurrent System Programming with Effect Handlers</b> Department Seminar	Oct 2018 University of Sussex
<b>State of Multicore OCaml</b> Multicore Meeting	Jun 2018 INRIA Gallium, Paris
<b>Bounding Data Races in Space and Time</b> Department Seminar	Feb 2018 Computer Science and Engineering, IIT Madras
<b>Tutorial: Concurrent Programming with Effect Handlers</b> CUFP @ ICFP 2017	Sep 2017 Oxford, UK
<b>A deep dive into Multicore OCaml Garbage Collector</b> System Research Group Seminar	Jul 2017 Computer Laboratory, University of Cambridge
<b>Multicore OCaml GC</b> JaneStreet Group	Jun 2017 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	<i>Apr 2015</i> Cambridge, UK
<b>Functional Programming Abstractions for Weakly Consistent Systems</b> PhD Defense	<i>Dec 2014</i> Purdue University
<b>Functional Abstractions for Practical and Scalable Concurrent Programming</b> Invited Lecture	<i>Mar 2014</i> Microsoft Research, Cambridge, UK
<b>Rx-CML: A Prescription for Safely Relaxing Synchrony</b> PADL 2014	<i>Jan 2014</i> San Diego, CA
<b>Migrating MultiMLton to the Cloud</b> ML Workshop 2013	<i>Sep 2013</i> Boston, MA
<b>A Coherent and Managed Runtime for ML on the SCC</b> MARC 2012	<i>Nov 2012</i> RWTH Aachen
<b>Eliminating Read Barriers through Procrastination and Cleanliness</b> ISMM 2012, Beijing Wrestling Wednesdays, Microsoft Research, Cambridge	<i>Jun 2012</i> <i>May 2012</i>
<b>Lightweight Concurrency in GHC</b> Wrestling Wednesdays	<i>May 2012</i> Microsoft Research, Cambridge
<b>Efficient Session Type guided Distributed Interaction</b> COORDINATION 2012	<i>Jun 2012</i> CWI Amsterdam