

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

Nov 2017 – Dec 2018

Advisors: Alan Mycroft, Anil Madhavapeddy

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

Aug 2008 – Dec 2014

Advisor: Suresh Jagannathan

West Lafayette, IN, USA

Teaching Assistant, Purdue University

West Lafayette, IN, USA

Undergraduate C Programming (CS180)

Aug 2012 – Dec 2012

Graduate Programming Languages (CS565)

Aug 2011 – Dec 2011

Research Intern, Microsoft Research, Cambridge

Feb 2012 – May 2012

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

Cambridge, UK

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

May 2010 – Aug 2010

Advisor: Daniel Waddington

San Jose, CA, USA

Intern, Advanced Numerical Research and Analysis Group

Dec 2007 – Apr 2008

Advisor: Sankar Chnab

Hyderabad, India

❖ Grants, Awards and Recognitions

- Distinguished paper award for “Retrofitting Parallelism onto OCaml” at ICFP 2020.
- Class of 1991 Award for 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.

❖ Academic 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**: PLDI 2022, PEPM 2022, TyDe 2021, GPCE 2021, PADL 2021, PaPoC 2021, 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 Chair**: ESOP 2022.
- **Artifact Evaluation Committee member**: ICFP 2018, PLDI 2015, PPOPP/CGO 2016.
- **Reviewer**: JFP 2021, 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.

❖ Institutional Service

- Board Member, Industrial Consultancy and Sponsored Research (ICSR), IIT Madras, 2021 – 2022.
- Department Vision Committee, Computer Science and Engineering, IIT Madras, 2021.
- Department Website Revamp Committee, Computer Science and Engineering, IIT Madras, 2021.
- Faculty Advisor, BTech batch, Computer Science and Engineering, IIT Madras, 2021.
- 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

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| E2 | Special Issue on the Theory and Practice of Algebraic Effects and Handlers
KC Sivaramakrishnan, Andrej Bauer (eds.)
<i>Journal of Functional Programming</i> | Jan 2021 |
| E1 | Algebraic Effect Handlers go Mainstream
KC Sivaramakrishnan, Daan Leijen, Matija Pretnar, Tom Schrijvers
<i>Dagstuhl Reports, Volume 8, Issue 4, 2018</i> | Apr 2018 |

❖ Journal Publications

- Retrofitting Parallelism onto OCaml** Aug 2020
 J9 KC Sivaramakrishnan, Stephen Dolan, Leo White, Sadiq Jaffer, Tom Kelly, Anmol Sahoo, Sudha Parimala, Atul Dhiman, Anil Madhavapeddy
Proceedings of the ACM on Programming Languages (PACMPL), issue ICFP 2020
Distinguished paper
- Mergeable Replicated Data Types** Oct 2019
 J8 Gowtham Kaki, Swarn Priya, KC Sivaramakrishnan, Suresh Jagannathan
Proceedings of the ACM on Programming Languages (PACMPL), issue OOPSLA 2019
- Safe Replication through Bounded Concurrency Verification** Nov 2018
 J7 Gowtham Kaki, Kapil Earanky, KC Sivaramakrishnan, Suresh Jagannathan
Proceedings of the ACM on Programming Languages (PACMPL), issue OOPSLA 2018
- Concurrent System Programming with Effect Handlers** Nov 2017
 J6 Stephen Dolan, Spiros Eliopoulos, Daniel Hillerstrm, Anil Madhavapeddy, KC Sivaramakrishnan, Leo White
Post-proceedings of the Symposium on Trends in Functional Programming (TFP) (accepted)
- Eff directly in OCaml** Oct 2017
 J5 Oleg, Kiselyov, KC Sivaramakrishnan
Post-proceedings of the ML Workshop (accepted)
- Composable Scheduler Activations for Haskell** Jun 2016
 J4 KC Sivaramakrishnan, Tim Harris, Simon Marlow, Simon Peyton Jones
Journal of Functional Programming (JFP)
- Representation without Taxation: A Uniform, Low-Overhead, and High-Level Interface to Eventually Consistent Key-Value Stores** Mar 2016
 J3 KC Sivaramakrishnan, Gowtham Kaki, Suresh Jagannathan
IEEE Data Engineering Bulletin, 39(1): 52 – 64
- MultiMLton: A Multicore-aware Runtime for Standard ML** Nov 2014
 J2 KC Sivaramakrishnan, Lukasz Ziarek, Suresh Jagannathan
Journal of Functional Programming (JFP), 24(6): 613 – 674
- Efficient Sessions** Feb 2013
 J1 KC Sivaramakrishnan, Mohammad Qudeisat, Lukasz Ziarek, Karthik Nagaraj, Patrick Eugster
Science of Computer Programming (SCP), 78(2): 147 – 167
Invited paper

❖ Conference Publications

- Retrofitting Effect Handlers to OCaml** Jun 2021
 C14 KC Sivaramakrishnan, Stephen Dolan, Leo White, Sadiq Jaffer, Tom Kelly, Anil Madhavapeddy
International Conference on Programming Language Design and Implementation (PLDI), 2021
- ConFuzz: Coverage-guided Property Fuzzing for Event-driven Programs** Jan 2021
 C13 Sumit Padhiyar, KC Sivaramakrishnan
Proceedings of the 23rd International Symposium on Practical Aspects of Declarative Languages (PADL), 2021
Distinguished paper
- Banyan: Coordination-free Distributed Transactions over Mergeable Types** Dec 2020
 C12 Shashank Shakhra Dubey, KC Sivaramakrishnan, Thomas Gazagnaire, Anil Madhavapeddy
Proceedings of the 18th Asian Symposium on Programming Languages and Systems (APLAS), 2020
- Version Control Is For Your Data Too** May 2019
 C11 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

- W16 **Certified Mergeable Replicated Data Types** Apr 2021
Vimala Soundarapandian, KC Sivaramakrishnan, Kartik Nagar
8th Workshop on Principles and Practice of Consistency for Distributed Data (PaPoC), 2021
- 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 Stephen Dolan, Spiros Eliopolous, Daniel Hillerstrm, Anil Madhavapeddy, KC Sivaramakrishnan, Leo White <i>OCaml Workshop</i>	Sep 2017
W11	Mergeable Types Gowtham Kaki, KC Sivaramakrishnan, Samodya Abeysiriwardane, Suresh Jagannathan <i>ML Workshop</i>	Sep 2017
W10	Concurrent System Programming with Effect Handlers Stephen Dolan, Spiros Eliopolous, Daniel Hillerstrm, Anil Madhavapeddy, KC Sivaramakrishnan, Leo White <i>Symposium on Trends in Functional Programming (TFP)</i>	Jun 2017
W9	Eff directly in OCaml Oleg Kiselyov and KC Sivaramakrishnan <i>JSSST Workshop on Programming and Programming Languages</i>	Mar 2017
W8	Lock-free programming for the masses KC Sivaramakrishnan, Tho Laurent <i>OCaml Workshop</i>	Sep 2016
W7	Compiling Links Effect Handlers to the OCaml Backend Daniel Hillestrm, Sam Lindley, KC Sivaramakrishnan <i>ML Workshop</i>	Sep 2016
W6	Eff Directly in OCaml Oleg Kiselyov and KC Sivaramakrishnan <i>ML Workshop</i>	Sep 2016
W5	Effective Concurrency with Algebraic Effects Stephen Dolan, Leo White, KC Sivaramakrishnan, Jeremy Yallop and Anil Madhavapeddy <i>OCaml Workshop</i>	Sep 2015
W4	Migrating MultiMLton to the Cloud KC Sivaramakrishnan, Lukasz Ziarek, Suresh Jagannathan <i>ML Workshop</i>	Sep 2013
W3	Scalable Lightweight Task Management Schemes for MIMD Processors Daniel G. Waddington, Chen Tian, KC Sivaramakrishnan <i>Workshop on Systems for Future Multi-Core Architectures (SFMA)</i>	Apr 2011
W2	The Design Rationale for MultiMLton Suresh Jagannathan, Armand Navabi, KC Sivaramakrishnan, Lukasz Ziarek <i>ML Workshop</i>	Sep 2010
W1	Lightweight Asynchrony using Parasitic Threads KC Sivaramakrishnan, Lukasz Ziarek, Raghavendra Prasad, Suresh Jagannathan <i>Workshop on Declarative Aspects of Multicore Programming (DAMP)</i>	Jan 2010

❖ Technical Reports and Drafts

T1	Featherweight Threads for Communication KC Sivaramakrishnan, Lukasz Ziarek, Suresh Jagannathan <i>Purdue University Computer Science Technical Report – TR-11-018</i>	Nov 2011
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❖ Teaching

- Lecturer:

- Programs and Proofs, IIT Madras, Spring '20, Spring '21.
- Paradigms of Programming, IIT Madras, Monsoon '19, Monsoon '20.
- Guest Lectures:
 - Arrows, Advanced Functional Programming, University of Cambridge, Lent '16.
 - Debugging, Programming in C and C++, University of Cambridge, Michaelmas '15.
- Supervisions at University of Cambridge:
 - Databases, Michaelmas '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.

❖ Advising

- PhD Students
 - Sai Venkata Krishnan, 2021 – present
 - Vimala Soundarapandian, 2020 – present
 - Sheera Shamsu, 2019 – present
- Master's Students
 - Deepali Ande, MS, 2020 – present
 - Sumit Padhiyar, MS, 2019 – 2021
 - Shashank Shekhar Dubey, MS, 2019 – 2021
 - Atul Dhiman, MTech, 2019 – 2020
- Undergraduate Students
 - Anirudh Sunder Raj, Dual Degree Project, 2020 – present
 - Arnhav Datar, UGRC, 2021
 - Matevz Polijanc, Part II, University of Cambridge, 2017 – 2018
 - Charlie Crisp, Part II, University of Cambridge, 2017 – 2018
 - Henry Mercer, Part II, University of Cambridge, 2017 – 2018
 - Matt Harrison, Part II, University of Cambridge, 2016 – 2017
 - James Wright, Part II, University of Cambridge, 2015 – 2016
- Project Staff
 - Sudha Parimala, RSDE, IITM, 2019 – 2021
 - Shubham Kumar, RSDE, IITM, 2019 – 2021
 - Shakthi Kannan, RSDE, IITM, 2020 – 2021
 - Shubhendra Singhal, RSDE, IITM, 2020 – 2021
 - Anmol Sahoo, RSDE, IITM, 2019 – 2020
- Interns

- Aadharsh Kamath, NITK, 2021
- Shagun Goel, Stanford University, 2020
- Pratap Singh, Harvard University, 2019
- Nicolas Assouad, ENS Paris, 2017
- Maxime Lesourd, ENS Lyon, 2017
- Philip Dexter, Binghampton University, 2016
- Armael Gueneau, ENS Lyon, 2016
- Theo Laurent, ENS Lyon, 2015
- Guillain Potron, ENS Lyon, 2015

❖ References

Suresh Jagannathan

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Department of Computer Science
Purdue University
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West Lafayette, IN 47906, USA
suresh@cs.purdue.edu

Jan Vitek

Professor of Computer Science
College of Computer & Information Science
Northeastern University
440 Huntinton Av
Boston, MA 02115, USA
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Anil Madhavapeddy

University Lecturer
Computer Laboratory
University of Cambridge
15 JJ Thomson Av
Cambridge, CB3 0FD, UK
anil.madhavapeddy@cl.cam.ac.uk

Simon Peyton Jones

Principal Researcher
Programming Principles and Tools
Microsoft Research Ltd
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Cambridge CB1 2FB, UK
simonpj@microsoft.com