Curriculum Vitae

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Gowtham Kaki

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❖ Research Interests

Programming Languages, Formal Methods, Distributed Systems, Databases, Software Security, Automated Reasoning, and Neuro-symbolic AI.

❖ Education

PhD — Computer Science *Aug 2019*
Purdue University, USA

Thesis: **Automatic Reasoning Techniques for Non-Serializable Data-Intensive Applications**
Advisor: Suresh Jagannathan

Master of Science — Computer Science *May 2016*
Purdue University, USA

Bachelor of Engineering (Hons.) — Computer Science *Jul 2009*
BITS Pilani, India

❖ Experience

Assistant Professor, University of Colorado - Boulder *Aug 2020 – present*

Post-Doctoral Researcher, Purdue University *Jan 2020 – Jul 2020*

Visiting Assistant Professor, Purdue University *Aug 2019 – Dec 2019*

Research and Teaching Assistant, Purdue University *Aug 2011 – Apr 2018*

Research Intern, Microsoft Research, India *May 2014 – Aug 2014, &*
Advisor: G Ramalingam *Jun 2015 – Aug 2015*

Software Engineer, Yahoo!, India *Jul 2009 – Jul 2011*

❖ Major Recognitions

- Amazon Research Award, 2023.
- Google PhD Fellowship 2018
- Maurice H. Halstead Memorial Award, Purdue University, 2019.
- BITS Pilani Alumni Association (BITSAA) "30 under 30", 2018.

❖ Journal Publications

J4 **Verifying Indistinguishability of Privacy-Preserving Protocols** *Oct 2023*
Kirby Linvill, Gowtham Kaki, and Eric Wustrow
Proceedings of the ACM on Programming Languages (PACMPL), issue OOPSLA 2023

J3 **Historia: Refuting Callback Reachability with Message-History Logics** *Oct 2023*
Shawn Meier, Sergio Mover, Gowtham Kaki, and Bor-Yuh Evan Chang
Proceedings of the ACM on Programming Languages (PACMPL), issue OOPSLA 2023

J2 **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

Safe Replication through Bounded Concurrency Verification		*Nov 2018*
J1	Gowtham Kaki, Kapil Earanky, KC Sivaramakrishnan, Suresh Jagannathan	
	Proceedings of the ACM on Programming Languages (PACMPL), issue OOPSLA 2018	

Alone Together: Compositional Reasoning and Inference for Weak Isolation *Jan 2018*
J0 Gowtham Kaki, Kartik Nagar, Mahsa Najafzadeh, Suresh Jagannathan
Proceedings of the ACM on Programming Languages (PACMPL), issue POPL 2018

Representation without Taxation: A Uniform, Low-Overhead, and High-Level Interface to Eventually Consistent Key-Value Stores *Mar 2016*
J-1 KC Sivaramakrishnan, Gowtham Kaki, Suresh Jagannathan
IEEE Data Engineering Bulletin, 39(1): 52 – 64

❖ Conference Publications[1]

RunTime-Assisted Convergence in Replicated Data Types *June 2022*
C5 Gowtham Kaki, Prasanth Prahladan, Nicholas Lewchenko
International Conference on Programming Language Design and Implementation (PLDI 2022)

Version Control Is For Your Data Too *May 2019*
C4 Gowtham Kaki, KC Sivaramakrishnan, Suresh Jagannathan
Summit on Advances in Programming Languages (SNAPL 2019)

Safe Transferable Regions *Jul 2018*
C3 Gowtham Kaki, G Ramalingam
European Conference on Object-Oriented Programming (ECOOP 2018)

Declarative Programming over Eventually Consistent Data Stores *Jun 2015*
C2 KC Sivaramakrishnan, Gowtham Kaki, Suresh Jagannathan
International Conference on Programming Language Design and Implementation (PLDI 2015)

A Relational Framework for Higher-Order Shape Analysis *Sep 2014*
C1 Gowtham Kaki, Suresh Jagannathan
International Conference on Functional Programming (ICFP 2014)

Novel adaptive scheduling algorithm for computational grid *Jan 2010*
C0 Sunita Bansal, Gowtham Kaki, Chittaranjan Hota
Internet Multimedia Services Architecture and Applications (IMSAA'09)

❖ Workshop Publications & Tech Reports

Analyzing the Effectiveness of Large Language Models on Text-to-SQL Synthesis *Dec 2023*
W5 Richard Roberson, Gowtham Kaki, and Ashutosh Trivedi
arXiv:2401.12379

Distributed Consensus Algorithms as Replicated State Applications *April 2023*
W4 Nicholas Lewchenko and Gowtham Kaki
Principles and Practice of Consistency for Distributed Data (PaPoC 2023)

Bolt-On Convergence in Mergeable Replicated Data Types *April 2022*
W3 Gowtham Kaki, Prasanth Prahladan, Nicholas Lewchenko
Principles and Practice of Consistency for Distributed Data (PaPoC 2022)

Fine-grained distributed consistency guarantees with effect orchestration *Apr 2018*
W2 Kia Rahmani, Gowtham Kaki, Suresh Jagannathan
Principles and Practice of Consistency for Distributed Data (PaPoC 2018)

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[1]Journal publications J2-J4 are also published in the corresponding conference proceedings. They are not repeated.

W1 **Mergeable Types** *Sep 2017*
Gowtham Kaki, KC Sivaramakrishnan, Samodya Abeysiriwardane, Suresh Jagannathan
ML Workshop (ML 2017)

W0 **DaLi : Database as a Library** *May 2017*
Gowtham Kaki, KC Sivaramakrishnan, Thomas Gazagnaire, Anil Madhavapeddy, Suresh Jagannathan
Summit on Advances in Programming Languages (SNAPL 2017)
Oral Presentation

W-1 **A Lightweight Symbolic Execution Framework for Ruby-on-Rails** *Jun 2016*
Gowtham Kaki
PLDI Student Research Competition (PLDI SRC 2016)

W-2 **Safe Memory Regions for Big Data Processing** *Jan 2016*
Gowtham Kaki, G Ramalingam, Kapil Vaswani, Dimitrios Vytiniotis
Microsoft Tech Report

❖ Teaching

- CU Boulder

  - Principles of Programming Langauges (CSCI3155), Spring'21 & '22, Fall'23
  - Distributed Systems Verification (CSCI7000), Spring'21 & '24
  - Foundations of Programming Langauges (CSCI5535), Fall'21 & Fall'24
  - Principles of Functional Programming (CSCI7000), Spring'23

- Purdue

  - Software Engineering (CS307), Fall 2019

❖ Talks & Invited Lectures

Consensus via Convergence and Monotonicity: A Novel Approach to Verifying Distributed Systems
ACM DARE Summer School, TU Darmstadt. *Sep 2024*

Verifying Indistinguishability of Privacy-Preserving Protocols
Dagstuhl Seminar on Formal Methods in Distributed Systems *Mar 2023*

Mergeable Replicated Data Types
University of Minnesota, Twin Cities *Nov 2020*
OOPSLA 2019, Athens *Oct 2019*

MRDTs: Data Structures for Truly Decentralized Internet *Nov 2022*
IIT Madras, India

Bolt-On Convergence in Replicated Data Types *Apr 2022*
PaPoC 2022, Remote

Automatic Reasoning in the Absence of Serializability *Jul 2019*
Phd Defense, Purdue University

Relational Reasoning for Mergeable Replicated Data Types *Jul 2019*
Shonan Seminar on Programming Language Support for Data-Intensive Applications, Japan

Version Control Is For Your Data Too *May 2019*
SNAPL 2019, Brown University

Safe Replication through Bounded Concurrency Verification
OOPSLA 2018, Boston *Nov 2018*
Purdue PL (PurPL) Seminar *Nov 2018*
Mid-West PL Summit, University of Wisconsin, Madison *Oct 2018*

Safe Transferable Regions   *Jul 2018*
  ECOOP 2018, Amsterdam

Alone Together: Compositional Reasoning and Inference under Weak Isolation
  POPL 2018, Los Angeles   *Jan 2018*
  Mid-West PL Summit, Indiana University, Bloomington   *Dec 2017*

Mergeable Types
  ML Workshop 2017, Oxford, UK   *Sep 2017*
  Purdue PL (PurPL) Seminar   *Aug 2017*

Quelea: Declarative Programming under Eventual Consistency
  PLDI 2015, Portland   *Jun 2015*
  Mid-West Verification, University of Illinois, Urbana-Champaign   *Oct 2015*
  Microsoft Research India Intern Day, Bangalore   *Jul 2015*

Catalyst: A Relational Framework for Higher-Order Shape Analysis
  Dagstuhl Seminar on Verification Tools for Functional Programs, Dagstuhl, Germany   *Apr 2016*
  Mid-West Verification, University of Missouri, Columbia   *Oct 2014*
  ICFP 2014, Gothenburg, Sweden   *Sep 2014*

❖ Research Grants

- PI, Developing AI agents to Support Teaching Staff in Large Programming Classes, CU Boulder IRT seed grant 2022.

- Co-PI, Verified Probabilistic Programming for Hybrid Systems, NSF Formal Methods in the Field (FMitF) 2024.

❖ Service

- CS Dept., Graduate Committee (GradComm) Member, 2020-2021, 2024-current

- Program Committee (PC) Member: POPL'25, ATVA'24, PLDI'23, OOPSLA'23, OOPSLA'22, ML'20

- Referee, TOPLAS 2022

- Artifact Evaluation Committee (AEC) Member: PLDI'16, ICFP'17, ICFP'18, ECOOP'19, and PLDI'19

- Organizer, Purdue PL (PurPL) Reading Group, Oct 2013 – Dec 2016.

- Expert Advisor, GradRight Inc., Oct 2018 – Aug 2019

- Student Volunteer, PLDI'16