Kartik Nagar

PERSONAL PARTICULARS
Assistant Professor,
Department of Computer Science and Engineering,
Indian Institute of Technology Madras,
Chennai, India.
Email: nagark@cse.iitm.ac.in, kartik.n.nagar@gmail.com

EMPLOYMENT

IIT Madras **Jan 2020 - present**
Assistant Professor

Purdue University **Aug 2016 - Dec 2019**
Postdoctoral Research Associate
Mentor : Suresh Jagannathan

EDUCATION

Indian Institute of Science, Bangalore **Aug 2012 - June 2016**
Ph.D. Computer Science, Department of CSA, IISc.

- Thesis : Precise Analysis of Private and Shared caches for tight WCET Estimates.
- Advisor : Y.N. Srikant

Indian Institute of Science, Bangalore **Aug 2010 - July 2012**
M.E. Computer Science, Department of CSA, IISc.

- Thesis : Cache analysis for multi-level data caches.
- Advisor : Y.N. Srikant

Dhirubhai Ambani Institute of Information and Communication Technology, Gandhinagar **Aug 2006 - July 2010**
B.Tech. Information and Communication Technology, DAIICT.

RESEARCH INTERESTS
Automated Formal Verification, Program Analysis, Programming Languages, Formal Methods, Concurrent and Distributed Systems, Real-time Systems.

PUBLICATIONS

Journal Papers

- [**OOPSLA**] CLOTHO: Directed Test Generation for Weakly Consistent Database Systems.
  Kia Rahmani, Kartik Nagar, Benjamin Delaware and Suresh Jagannathan.
  PACMPL 3(OOPSLA), 117:1-117:28, 2019.
- [**POPL**] Alone Together: Compositional Reasoning and Inference for Weak Isolation.
  Gowtham Kaki, Kartik Nagar, Mahsa Najafzadeh and Suresh Jagannathan.
  Symposium on Principles of Programming Languages, 2018.
- [**TECS**] Refining Cache Behaviour Prediction using Cache Miss Paths.
  Kartik Nagar and Y.N. Srikant.
  ACM Transactions on Embedded Computing Systems 16(4), 103:1-103:26, 2017

- [**TECS**] Fast and Precise Worst Case Interference Placement for Shared Cache Analysis.
  Kartik Nagar and Y.N. Srikant.
  ACM Transactions on Embedded Computing Systems 15(3), 45:1-45:26, 2016.

Conference Papers

- [**PLDI**] Certified Mergeable Replicated Data Types.
  Vimala Soundarapandian, Adharsh Kamath, Kartik Nagar and KC Sivaramakrishnan. ACM SIGPLAN Conference on Programming Language Design and Implementation, 2022.
- [**DISC**] Brief Announcement: Automating and Mechanising Cutoff Proofs for Parameterized Verification of Distributed Protocols.
  Shreesha Bhat and Kartik Nagar.
  International Symposium on Distributed Computing, 2021.
- [**PLDI**] Repairing Serializability Bugs in Distributed Database Programs via Automated Schema Refactoring.
  Kia Rahmani, Kartik Nagar, Benjamin Delaware and Suresh Jagannathan.
  ACM SIGPLAN Conference on Programming Language Design and Implementation, 2021.
- [**CAV**] Semantics, Specification and Bounded Verification of Concurrent Libraries in Replicated Systems.
  Kartik Nagar, Prasita Mukherjee and Suresh Jagannathan.
  International Conference on Computer-Aided Verification, 2020.
- [**CAV**] Automated Parametrized Verification of CRDTs.
  Kartik Nagar and Suresh Jagannathan.
  International Conference on Computer-Aided Verification, 2019.
- [**CONCUR**] Automated Detection of Serializability Violations under Weak Consistency.
  Kartik Nagar and Suresh Jagannathan.
  International Conference on Concurrency Theory, 2018.
- [**VMCAI**] Path-sensitive Cache Analysis using Cache Miss Paths.
  Kartik Nagar and Y.N. Srikant.
  International Conference on Verification, Model Checking, and Abstract Interpretation, 2015.
- [**RTAS**] Precise Shared Cache Analysis using Optimal Interference Placement.
  Kartik Nagar and Y.N. Srikant.
  IEEE Real Time and Embedded Technology and Applications Symposium, 2014.
- [**MEMOCODE**] Interdependent Cache Analyses for better precision and safety.
  Kartik Nagar and Y.N. Srikant.
  ACM/IEEE International Conference on Formal Methods and Models for Codesign, 2012.

Workshop Papers

- [**PaPoC**] Certified Mergeable Replicated Data Types.
  Vimala S, KC Sivaramakrishnan and Kartik Nagar.
  Workshop on Principles and Practice of Consistency for Distributed Data, 2021.

PROFESSIONAL ACTIVITIES

- PC: VSTTE 2022, WCET (International Workshop on Worst Case Execution Time Analysis) 2017, 2018, 2019

- Reviewer: ESOP 18, POPL 19, PLDI 19, PLDI 21, Journal of ACM, Journal of Systems Architecture, IEEE Transcations on Computers, Science of Computer Programming, Journal of Logical and Algebraic Methods in Programming

TALKS

- *Certified Mergeable Replicated Data Types*
  - Microsoft Research India, Online, May 2022.
  - Cambium Seminar Series, INRIA, Online, June 2022.
- *Semantics, Specification and Bounded Verification of Concurrent Libraries in Replicated Systems*, International Conference on Computer-Aided Verification (CAV), 2020, Online, July 2020.
- *Automated Parametrized Verification of CRDTs*, International Conference on Computer-Aided Verification (CAV), 2019, New York, USA, July 2019.
- *Automated Detection of Serializability Violations under Weak Consistency.*, International Conference on Concurrency Theory (CONCUR) 2018, Beijing, China, September 2018.
- *Path sensitive cache analysis using cache miss paths*, International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI) 2015, Mumbai, India, January 2015.
- *Precise shared cache analysis using optimal interference placement*, IEEE Real Time and Embedded Technology and Applications Symposium (RTAS), Berlin, Germany, April 2014.
- *A Comprehensive cache analysis for multi-level caches*, IMPECS-CSA Workshop on Program Analysis, Indian Institute of Science, Bangalore, September 2012.
- *Interdependent cache analyses for better precision and safety*, ACM/IEEE International Conference on Formal Methods and Models for Codesign (MEMOCODE) Arlington, Virginia, USA, July 2012.

AWARDS AND HONORS

- Awarded Microsoft Research India PhD fellowship, 2013.
- Secured an all India rank of 19 in Graduate Aptitude Test in Engineering (GATE) 2010.
- Gold medal for best academic performance in B.Tech., DAIICT, Gandhinagar, 2011.

SKILLS

Languages : English, Gujarati (Native), Hindi.
Programming and Tools: C, Java, C++, Z3, Dafny, Coq, F*, LLVM, LaTeX, Shell programming.