

# Kumar Madhukar

Scientist, TCS Research

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## Education

### Chennai Mathematical Institute

Chennai, India

DOCTOR OF PHILOSOPHY (Ph.D.) IN COMPUTER SCIENCE

Aug 2012 – Nov 2018

- Thesis: Scalable Safety Verification of Statechart-like Programs
- Advisors: Prof. Mandayam Srivas (Chennai Mathematical Institute), and Dr. Peter Schrammel (University of Sussex, UK, & Diffblue, Oxford)

MASTER OF SCIENCE (M.Sc.) IN COMPUTER SCIENCE, CGPA: 8.56/10.0

Aug 2006 – Jul 2008

BACHELOR OF SCIENCE (B.Sc.) IN MATHEMATICS AND COMPUTER SCIENCE, CGPA: 6.92/10.0

Aug 2003 – Jul 2006

## Work Experience

### TCS Research

Pune, India

SCIENTIST

Jul 2010 - present

- In the Software Verification and Validation group at Tata Research Development and Design Center in Pune.

SUMMER INTERN

May 2009 - Jun 2009

- As a researcher in the same group.
- Worked on modeling of Statecharts using Promela, for model checking with SPIN.

### Valuepitch Interactive IT Services

Mumbai, India

M.Sc. THESIS/PROJECT

Jan 2008 - Jun 2008

- Implemented an online reputation management tool based on Sentiment Mining.
- Thesis: Natural Languages and Not-So-Natural Processing
- Advisor: Prof. Pushpak Bhattacharya (IIT Bombay)

SUMMER INTERN

May 2007 - Jul 2007

- Built a web crawler to obtain customer/user reviews (in English) of a product or service.
- Implemented a summarizer for the reviews that preserves the underlying sentiment.

### Pinstorm Technologies

Mumbai, India

SUMMER INTERN

May 2006 - Jul 2006

- Implemented an automated bidding system for Google Adwords.
- Worked under the supervision of Dr. V Vinay (Ex-Chairman, PicoPeta Simputers).

## Selected Publications

Using Hypersafety Verification for Proving Correctness of Programming Assignments

ICSE (NIER) 2020

Jude Anil, Sumanth Prabhu, Kumar Madhukar, R. Venkatesh

Quantified Invariants via Syntax-Guided-Synthesis

CAV 2019

Grigory Fedyukovich, Sumanth Prabhu, Kumar Madhukar, Aarti Gupta

Solving Constrained Horn Clauses Using Syntax and Data

FMCAD 2018

Grigory Fedyukovich, Sumanth Prabhu, Kumar Madhukar, Aarti Gupta

Efficiently Learning Safety Proofs from Appearance as well as Behaviours

SAS 2018

Sumanth Prabhu, Kumar Madhukar, R. Venkatesh

Generalizing specific-instance interpolation proofs with SyGuS

ICSE (NIER) 2018

Muqsit Azeem, Kumar Madhukar, R. Venkatesh

### Compositional Safety Refutation Techniques

Kumar Madhukar, Peter Schrammel, Mandayam Srivas

[ATVA 2017](#)

### Accelerating Invariant Generation

Kumar Madhukar, Björn Wachter, Daniel Kroening, Matt Lewis, Mandayam Srivas

[FMCAD 2015](#)

### Verifying synchronous reactive systems using lazy abstraction

Kumar Madhukar, Mandayam Srivas, Björn Wachter, Daniel Kroening, Ravindra Metta

[DATE 2015](#)

## Miscellaneous Activities

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- Teaching, along with Prof. Mandayam Srivas, a course on *Constraint Solving and Deep Learning* at CMI, during Aug-Nov 2020.
- Taught an elective course on *Model Checking and Software Verification* at IIT Goa, during July-Nov 2019.
- Invited by Prof. Aarti Gupta for a week-long visit to her group at Princeton University in June 2019.
- Sub-reviewer: FM 2019, ATVA 2017, APSEC 2015, ATVA 2013, ATVA 2012
- Gave four guest lectures at CMI, as part of the *Model Checking and Software Verification* course, during Jan-Apr 2019.
- Member of the Curriculum Committee of CSpashshala, an education initiative of ACM India.