

Mihir P Mehta

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Education	Ph.D., Computer Science (2014 - 2021) University of Texas at Austin GPA: 3.3/4 B.Tech., Computer Science and Engineering (2009 - 2013) Indian Institute of Technology (IIT) Delhi GPA: 7.9/10 Exchange semester , Ecole des Mines, Saint-Etienne (2011)
Professional Experience	Research Intern at Oracle Corp., Belmont, CA, USA. (14 May-10 Aug 2018) <ul style="list-style-type: none">• Completed a code proof to certify the correctness of a highly optimised assembly language program.• Contributed to a timing analysis of this program, to ensure the avoidance of race conditions.• Studied the potential use of the TLAPS theorem prover for distributed systems, and created some preliminary internal documentation. Research Intern at Apple Computer, Inc., Austin, TX, USA. (30 May-18 Aug 2017) <ul style="list-style-type: none">• Used model checking tools towards verifying Apple's hardware microarchitectures• Developed proofs of correctness of hardware components with respect to specifications, with code changes where necessary. Research Intern at Intel Corporation, Austin, TX, USA. (15 Jun-25 Aug 2015) <ul style="list-style-type: none">• Built a Pintool to dynamically analyse executables.• Augmented the analysis with fine-grained information obtained from static analysis techniques. Software Engineer at Samsung Research Institute, Noida, India. (2013-2014) <ul style="list-style-type: none">• Optimised the Linux kernel for Samsung's Android devices.• Improved core components of the Linux virtual memory subsystem.
Research Experience	Filesystem modelling for FAT32 with Professor William R. Cook, CS department, UT Austin. (2016-present) <ul style="list-style-type: none">• Developed a binary-compatible executable model for the FAT32 file system.• Used the model as a basis for separation-based reasoning about filesystems and filesystem clients with the ACL2 theorem prover.• Used the separation logic framework as a basis for reasoning about concurrent filesystem clients under an oracle model of nondeterminism. Program verification in object-oriented languages with Professors Isil Dillig and Thomas Dillig, CS department, UT Austin. (2014-2015) <ul style="list-style-type: none">• Developed a prototype verifier based on Hoare logic and weakest pre-conditions.• Used the Soot compiler framework to generate verification conditions and the Z3 theorem prover to discharge them.• Generated example inputs demonstrating bugs in several test programs. Algorithms for bisimilarity with Professor S Arun Kumar, CSE Department, IIT Delhi (2012-2013)

- Conceptualised and implemented a toolkit for verifying bisimilarity and other properties of timed automata and labelled transition systems.
- Improved an algorithm for generating a zone graph from a timed automaton.

Publications

Mihir Parang Mehta. **Formalising Filesystems in the ACL2 Theorem Prover: an Application to FAT32**. In: *Proceedings of the 15th International Workshop on the ACL2 Theorem Prover and Its Applications, Austin, Texas, USA, November 5-6, 2018. Electronic Proceedings in Theoretical Computer Science*. Matt Kaufmann and Shilpi Goel, editors. Vol. 280, pp. 18-29, 2018. Full text: <https://cgi.cse.unsw.edu.au/~eptcs/paper.cgi?ACL22018.2>.

Mihir Parang Mehta, William R. Cook. **Binary-Compatible Verification of Filesystems with ACL2**. In: *10th International Conference on Interactive Theorem Proving (ITP 2019) (Leibniz International Proceedings in Informatics (LIPIcs))*, John Harrison, John O’Leary, and Andrew Tolmach (Eds.), Vol. 141. Schloss Dagstuhl-Leibniz-Zentrum fuer Informatik, Dagstuhl, Germany, 25:1-25:18. Full text: <https://doi.org/10.4230/LIPIcs.ITP.2019.25>.

Mihir Parang Mehta, William R. Cook. **Separation Logic-Based Verification atop a Binary-Compatible Filesystem Model**. To appear in: *23rd Brazilian Symposium on Formal Methods (SBMF 2020)*. Preprint: <https://hal.archives-ouvertes.fr/hal-02956858>.

Coursework (selected graduate courses)

UT Austin: Automated Logical Reasoning, Introduction to Mathematical Logic, Formal Verification and Semantics, Automatic Verification of Software, Numerical Linear Algebra, Dependable Computing Systems, Advanced Operating Systems, Recursion and Induction.
IIT Delhi: Compiler Design, Theory of Computation, Numerical Optimisation.

Teaching assistantships (UT Austin)

Graduate courses:
CS386L Programming Languages (Fall 2016, Spring 2020)
Convex Optimization (Fall 2019)
Undergraduate Courses:
CS439N Operating Systems (Fall 2015, Spring 2016, Fall 2020)
CS340D Debugging and Verifying Programs (Spring 2018)
CS392F Automated Software Design (Spring 2019)
CS371G Generic Programming (Summer 2020)

Technical Skills

Theorem provers: ACL2, Agda, Coq, TLAPS.
Programming languages: Functional languages (OCaml, SML), logic programming languages (Prolog), hardware description languages (VHDL, Verilog).
Operating systems: GNU/Linux (kernel and application development).
Compiler frameworks: Soot (Java), LLVM (C++).
Others: Xilinx, Matlab, PostgreSQL.

Scholastic Achievements

- Awarded the UT Austin Graduate School’s Recruitment Fellowship. (2014-2017)
- All India Rank 138 (out of 400000), Joint Entrance Examination (IIT-JEE). (2009)
- Secured All India Rank 29 in the All India Engineering Entrance Examination (AIEEE) among 1000000 candidates. (2009)
- Scored 99 percentile in Verbal and Analytical Reasoning, GRE. (2012)

Others

Languages: English, French, Gujarati, Hindi.