

# Mihir P Mehta

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- Education**
- Ph.D., Computer Science**, University of Texas at Austin. (2014 - present)  
GPA: 3.3/4 (Spring 2018)  
**B.Tech., Computer Science and Engineering**, Indian Institute of Technology (IIT) Delhi. (2009 - 2013)  
GPA: 7.9/10  
**Exchange semester**, Ecole des Mines, Saint-Etienne. (2011)
- Professional Experience**
- Research Intern** at Oracle Corp., Belmont, CA, USA. (2018)
- 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. (2017)
- 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. (2015)
- 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)
- 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)
- Developed a binary-compatible executable model for the FAT32 file system.
  - Used the model as a basis for separation-based reasoning about filesystems and file-manipulating programs with ACL2.
  - Published papers on this work in the proceedings of ACL2-2018 and ITP-2019.
- Program verification in object-oriented languages** with Professors Isil Dillig and Thomas Dillig, CS department, UT Austin. (2014-2015)
- 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.

<b>Publications</b>	<p><b>Formalising Filesystems in the ACL2 Theorem Prover: an Application to FAT32.</b> In: <i>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</i>. Matt Kaufmann and Shilpi Goel, editors. Vol. 280, pp. 18-29, 2018. URL <a href="https://cgi.cse.unsw.edu.au/~eptcs/paper.cgi?ACL22018.2">https://cgi.cse.unsw.edu.au/~eptcs/paper.cgi?ACL22018.2</a>.</p> <p><b>Binary-Compatible Verification of Filesystems with ACL2.</b> In: <i>10th International Conference on Interactive Theorem Proving (ITP 2019) (Leibniz International Proceedings in Informatics (LIPIcs))</i>, John Harrison, John O’Leary, and Andrew Tolmach (Eds.), Vol. 141. Schloss Dagstuhl-Leibniz-Zentrum fuer Informatik, Dagstuhl, Germany, 25:1-25:18. URL <a href="https://doi.org/10.4230/LIPIcs.ITP.2019.25">https://doi.org/10.4230/LIPIcs.ITP.2019.25</a>.</p> <p><b>Separation Logic-Based Verification atop a Binary-Compatible Filesystem Model.</b> To appear in: <i>23rd Brazilian Symposium on Formal Methods (SBMF 2020)</i>.</p>
<b>Coursework (selected graduate courses)</b>	<p><u>UT Austin:</u> Automated Logical Reasoning, Introduction to Mathematical Logic, Formal Verification and Semantics, Automatic Verification of Software, Numerical Linear Algebra, Dependable Computing Sytems, Advanced Operating Systems, Recursion and Induction.</p> <p><u>IIT Delhi:</u> Compiler Design, Theory of Computation, Numerical Optimisation.</p>
<b>Teaching assistantships (UT Austin)</b>	<p><u>Graduate courses:</u></p> <p>CS386L Programming Languages (Fall 2016, Spring 2020)</p> <p>Convex Optimization (Fall 2019)</p> <p><u>Undergraduate Courses:</u></p> <p>CS439N Operating Systems (Fall 2015, Spring 2016, Fall 2020)</p> <p>CS340D Debugging and Verifying Programs (Spring 2018)</p> <p>CS392F Automated Software Design (Spring 2019) CS371G Generic Programming (Summer 2020)</p>
<b>Technical Skills</b>	<p>Theorem provers: ACL2, Agda, Coq, TLAPS.</p> <p><u>Programming languages:</u> Functional languages (OCaml, SML), logic programming languages (Prolog), hardware description languages (VHDL, Verilog).</p> <p><u>Operating systems:</u> GNU/Linux (kernel and application development).</p> <p><u>Compiler frameworks:</u> Soot (Java), LLVM (C++).</p> <p><u>Others:</u> Xilinx, Matlab, PostgreSQL.</p>
<b>Scholastic Achievements</b>	<ul style="list-style-type: none"> <li>• Awarded the UT Austin Graduate School’s Recruitment Fellowship. (2014-2017)</li> <li>• All India Rank 138 (out of 400000), Joint Entrance Examination (IIT-JEE). (2009)</li> <li>• Secured All India Rank 29 in the All India Engineering Entrance Examination (AIEEE) among 1000000 candidates. (2009)</li> <li>• Scored 99 percentile in Verbal and Analytical Reasoning, GRE. (2012)</li> </ul>
<b>Others</b>	<p><u>Languages:</u> English, French, Gujarati, Hindi.</p>