

# Divyesh Unadkat

## Education

**Ph.D. in Computer Science and Engineering (pursuing), 2015–Present**  
*Indian Institute of Technology Bombay, Mumbai.*  
CPI: 9.48/10

**B.E. in Computer Engineering, Dharmsinh Desai University, Nadiad. 2006–2010**  
Aggregate: 80.12 %

## Experience

**Scientist, TCS Research, TRDDC, Pune. Jun'21–Present**

**Researcher, TCS Research, TRDDC, Pune. Jun'10–May'21**

**Intern, TCS Research, TRDDC, Pune. Dec'09–Apr'10**

## Technical Skills

**Programming:** C++, C, Java, Python, LaTeX

**Compilers:** LLVM, Clang, GNU tool chain (GCC, GDB, Make)

**Research Tools:** Z3, CBMC, Daikon, CPAChecker, InvGen

**Development Tools:** Emacs, Vim, Eclipse

**Version Control:** Git, CVS

## Publications

- [1] Supartik Chakraborty, Ashutosh Gupta, and Divyesh Unadkat. Full-Program Induction: Verifying Array Programs sans Loop Invariants. In *International Journal on Software Tools for Technology Transfer (STTT)*, 2022 (to appear).
- [2] Supartik Chakraborty, Ashutosh Gupta, and Divyesh Unadkat. Diffy: Inductive Reasoning of Array Programs using Difference Invariants. In *Proc. of the 33rd International Conference on Computer-Aided Verification (CAV)*, pages 911–935, 2021.
- [3] Supartik Chakraborty, Ashutosh Gupta, and Divyesh Unadkat. Verifying Array Manipulating Programs with Full-Program Induction. In *Proc. of the 26th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS)*, pages 22–39, 2020.
- [4] Mohammad Afzal et. al. VeriAbs : Verification by Abstraction and Test Generation (Competition Contribution). In *Proc. of the 26th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS)*, pages 383–387, 2020.
- [5] Supratik Chakraborty, Ashutosh Gupta, and Divyesh Unadkat. Verifying Array Manipulating Programs by Tiling. In *Proc. of the 24th International Static Analysis Symposium (SAS)*, pages 428–449, 2017.
- [6] Anand Yeolekar et. al. Scaling Model Checking for Test Generation using Dynamic Inference. In *Proc. of the 6th International Conference on Software Testing, Verification and Validation (ICST)*, pages 184–191, 2013.
- [7] Anand Yeolekar and Divyesh Unadkat. Assertion Checking using Dynamic Inference. In *Proc. of the 9th Haifa Verification Conference (HVC)*, pages 199–213, 2013.

## Tools/Artifacts

**Diffy:** Figshare repository - <https://doi.org/10.6084/m9.figshare.14509467>

**Vajra:** Figshare repository - <https://doi.org/10.6084/m9.figshare.11875428.v1>

**Tiler:** Online repository - <https://bit.ly/3zNBYkn>

## Awards

**Award:** Best Verification Tool

**Institution:** International Software Verification Competition (SV-COMP) 2020

**Description:** VERIABS stood first in the ReachSafety category at SV-COMP 2020. As a part of the team, I designed and developed induction-based verification techniques for the Arrays sub-category. I implemented these techniques in the tools VAJRA [3] and TILER [5] and integrated them with VERIABS [4].

**Award:** Most Admired Sprint Thesis Talk

**Institution:** Indian Institute of Technology Bombay, Mumbai

**Description:** Runner-up, Senior Researcher Sprint Talks, RISC 2017, IIT Bombay.

**Award:** Best Speaker in Sprint Thesis Talk

**Institution:** Indian Institute of Technology Bombay, Mumbai

**Description:** Winner, Early Researcher Sprint Talks, RISC 2016, IIT Bombay.

**Award:** Eklavya Gold Medal

**Institution:** Dharmsinh Desai University, Nadiad

**Description:** Highest aggregate marks in first four semesters, CE 2008, DDU Nadiad.

## Conference Presentations

**Diffy: Verifying Array Programs using Difference Invariants:** 33rd International Conference on Computer Aided Verification (CAV), Los Angeles, USA (*Online*), July 2021

**Verifying Array Manipulating Programs with Full-Program Induction:** 26th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), Luxembourg (*Online*), March 2021

**Verifying Array Manipulating Programs by Tiling:** 24th International Static Analysis Symposium, SAS, New York, USA, August 2017

**Assertion Checking using Dynamic Inference:** 9th Haifa Verification Conference, Haifa, Israel, November 2013

## Invited Talks

**Dance of the Dragons: Induction, Difference Computation and SMT Solving:** Formal Methods Update Meeting, IIT Delhi, July 2022

**Difference Invariants for Inductive Verification:** 6th Indian SAT+SMT School (*Online*), December 2021

**Exploiting Induction and Difference Computation to Verify Array Programs:** Formal Methods Update Meeting (*Online*), July 2021

**The Full-Program Induction Technique:** 5th Indian SAT+SMT School, IIT Hyderabad (*Online*), December 2020

**Verifying Array Manipulating Programs with Full-Program Induction:** Software Engineering Research India (SERI), IIIT Hyderabad (*Online*), July 2020

**Lightening Talk: Verifying Array Manipulating Programs by Tiling:** 2nd Indian SAT+SMT School, Infosys Campus, Mysuru, December 2017

## Competition Talks

**Verifying Array Manipulating Programs by Full-Program Induction:** Research and Innovation Symposium in Computing, RISC 2019, IIT Bombay

**Verifying Array Manipulating Programs by Tiling:** Sprint Thesis Talk, Research and Innovation Symposium in Computing, RISC 2017, IIT Bombay

**Towards Precise Software Verification:** Sprint Thesis Talk, Research and Innovation Symposium in Computing, RISC 2016, IIT Bombay

## Posters

**Verifying Array Programs with Full-Program Induction:** 4th Indian SAT+SMT School, IIT Bombay, December 2019

**Executive Summary on Tiling to Verify Array Programs :** TCS Anvetion Workshop, IIT Madras Research Park, Chennai, 2018

**Verifying Array Manipulating Programs by Tiling:** Research and Innovation Symposium in Computing, RISC 2017, IIT Bombay

## Interests

**Sports:** Table Tennis, Volleyball, Football

**Recreation:** Yoga, Reading, Movies, Music

## Contact

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## Links

**Webpage:** <https://divyeshunadkat.github.io/>

**dblp:** <http://dblp.uni-trier.de/pers/hd/u/Unadkat:Divyesh>

**GitHub:** <https://github.com/divyeshunadkat/>

**LinkedIn:** <https://www.linkedin.com/in/divyeshunadkat/>