

Mihir Jayesh Vahanwala

- Indian, Male, 15th September 2000
- <https://people.mpi-sws.org/~mvahanwa/>
- <https://github.com/Mihir-Vahanwala>
- This CV was last updated in December 2024.

FORMAL EDUCATION

Doctorate (2022-Present) Max Planck Institute for Software Systems, Saarland Informatics Campus

Graduation (2022) B.Tech in Computer Science and Engineering with Honours, IIT-Bombay (GPA 9.68/10)

Intermediate (2018) Vagad PACE Global School, 95.4% in the CBSE Intermediate Exam

Matriculation (2016) Don Bosco High School, Borivali, 96% in the Maharashtra State Board SSC Exam

RESEARCH AREAS

- I am primarily interested in solving theoretical computer-scientific problems that lie at the intersection of dynamical systems, number theory, and logic.
- I am also interested in concurrent systems, and especially in the modelling and verification of concurrent programs running under weak memory.

SELECTED PUBLICATIONS

1. V. Berthé, T. Karimov, J. Nieuwveld, J. Ouaknine, M. Vahanwala, and J. Worrell.
On the decidability of monadic second-order logic with arithmetic predicates
Proceedings of LICS 2024. **Distinguished Paper Award**.
2. P.A. Abdulla, M.F. Atig, A. Godbole, S. Krishna, and M. Vahanwala.
Fairness and Liveness under Weak Consistency
LNCS Volume 14660.
3. M. Vahanwala.
Skolem and positivity completeness of ergodic Markov chains
Information Processing Letters, 186:106481
4. M. Vahanwala.
Robust Positivity Problems for Linear Recurrence Sequences
Proceedings of FSTTCS 2023.
5. P.A. Abdulla, M.F. Atig, A. Godbole, S. Krishna, and M. Vahanwala.
Overcoming Memory Weakness with Unified Fairness
Proceedings of CAV 2023.
6. S. Akshay, H. Bazille, B. Genest, and M. Vahanwala.
On Robustness for the Skolem, Positivity and Ultimate Positivity Problems
LMCS Volume 20, Issue 2.
7. S. Akshay, H. Bazille, B. Genest, and M. Vahanwala.
On Robustness for the Skolem and Positivity Problems
Proceedings of STACS 2022.

TALKS

1. On the monadic second-order theory of arithmetic predicates
Technical Version: Invited talk at Automata Seminar, IRIF, Paris.
Poster presentation at LICS 2024, Tallinn; Workshop talk at SymDynAr, Roscoff; Invited seminar talk at CMI, Chennai.
2. Skolem and Positivity Completeness of Ergodic Markov Chains
Highlights 2023, Kassel.
3. Robust Positivity Problems for Linear Recurrence Sequences
FSTTCS 2023, Hyderabad; Highlights 2023, Kassel; Bellairs Dynamical Systems Workshop 2023, Barbados.
4. Overcoming Memory Weakness with Unified Fairness
CAV 2023, Paris; RHPL 2023, Hyderabad.
5. On Robustness for Linear Recurrence Sequences
Invited talk at STCS Seminar, TIFR Mumbai.

SELECTED IMPLEMENTATION PROJECTS

Scotland Yard: Multithreaded Game Server

- Designed as an assignment to teach students concurrency in Java, Software Systems Lab *Autumn 2021*
- Hands-on tutorial of key synchronization ideas: barriers to facilitate round by round play, mutual exclusion to protect shared data, handle threads leaving and joining the game, initialisation and termination

Rudimentary Storage Engine with LSM trees

- Course project for Databases Lab, *Spring 2021*
- Key-value store: binary tree in-memory table, layered filesystem, with log files for persistence
- Supported Bloom filters, concurrent access, snapshot consistency, and program crash consistency and periodic merging of old files along with dumping the memory table to the disk space thus freed

Languages

Programming and markup both inclusive. In decreasing order of comfort/experience: C/C++, L^AT_EX, Python, Java, BASH, SQL, MATLAB, Assembly, VHDL, HTML/CSS, Django, JavaScript

TEACHING

Courses marked * were graduate level, courses marked † were core undergraduate courses.

Universität des Saarlandes

1. Tutor, Automata, Games, and Verification*. *Winter 2024-25, ongoing.*
2. Tutor, Neural-Symbolic Computing Seminar*. *Summer 2024.*
3. Tutor, Verification.* *Winter 2023-24.*
4. Tutor, Complexity Theory.* *Winter 2022-23.*

IIT-Bombay

1. TA, Logic for Computer Science.† *Spring 2022.*
2. Head TA, Software Systems Lab.† *Autumn 2021.* **Excellence in TAship Award.**
3. TA, Linear Algebra.†. *Spring 2021.*
4. TA, Software Systems Lab.† *Autumn 2020.* **Excellence in TAship Award.**
5. Moderator, L^AT_EX boot camp. *Summer 2020.*
6. TA, Student Support Services. *Autumn 2019, Spring 2020, Spring 2022.*
 - (a) Computer Programming and Utilization.†
 - (b) Linear Algebra.†
 - (c) Introduction to Numerical Analysis.†

HOBBIES

Stand-Up Comedy

I've performed at college fests and college comedy arcades and freshman orientations, I have also done musical comedy and parodied popular songs about topics from social issues to relatable college experiences In Spring 2021, I also mentored the winning team of junior comedy enthusiasts who fearless to call out anything with their humour, in the Comedy Club's showpiece event, Laughter Riots.

Miscellaneous

I used to play chess competitively. <https://ratings.fide.com/profile/35002848> is my FIDE profile. I have a casual interest in Psychology, and my love for reading led me to the book **Thinking, Fast and Slow** by Daniel Kahneman. I've done well in my Psychology elective, and I enjoy taking opportunities to learn about the quirks and biases in human thought.