

# Mohan sai teja Dantam

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Last updated: March 30, 2026

## Curriculum Vitae

### Education

- 10/21 – 02/26 **Ph.D, LFCS, University of Edinburgh.**  
◦ Advisor: *Prof. Richard Mayr*
- 09/18 – 08/19 **MPRI (Masters in CS), ENS Paris-Saclay, Cachan.**  
◦ Advisor: *Prof. Amaury Pouly*, GPA: 14.2/20
- 07/14 – 05/18 **B.Tech CS with honors, Indian Institute of Technology, Bombay.**  
◦ Advisor: *Prof. S.Akshay*, Minor: Mathematics, GPA: 8.84/10

### Publications

#### Peer-Reviewed Publications

- [4] [M. Dantam](#), [R. Mayr](#), Finite-Memory Strategies for Almost-Sure Energy-MeanPayoff Objectives in MDPs, **ICALP, 2024**, DOI: [10.4230/LIPICS.ICALP.2024.133](#).
- [3] [M. Dantam](#), [R. Mayr](#), Approximating the Value of Energy-Parity Objectives in Simple Stochastic Games, **MFCS, 2023**, DOI: [10.4230/LIPICS.MFCS.2023.38](#).
- [2] [M. Dantam](#), [A. Pouly](#), On the decidability of reachability in continuous time linear time-invariant systems, **HSCC, 2021**, DOI: [10.1145/3447928.3456705](#).

#### Pre-Prints

- [1] \* [L. Watson](#), [E. Gan](#), [M. Dantam](#), [B. Mirzasoleiman](#), [R. Sarkar](#), Inference and interference: The role of clipping, pruning and loss landscapes in differentially private stochastic gradient descent, 2023. arXiv: [2311.06839](#).

\* Indicates contribution ordering.

### Research and Work Experience

- 02/26 - **Postdoctoral Researcher**, *Prof. Paul Goldberg*, University of Oxford.  
◦ Collaborating on path-following algorithms and the dynamics of no-regret learning algorithms.  
◦ Exploring applications to game theory and machine learning.
- 09/24 - 02/25 **Embedding R into Python**, *MLCOE TSRL*, J.P.Morgan.  
◦ Reviewed existing methods to embed R into Python  
◦ Developed API requirements and analysed drawbacks of current embeddings  
◦ Coded required python extension modules in C++ with pybind11
- 01/20 - 08/20 **Convex Invariants for Affine Programs**, *Prof. Joël Ouaknine*, MPI.  
◦ Investigated the automatic generation of polytope invariants for linear and affine dynamical systems  
◦ Proved the decidability of the existence of separating convex invariants in two-dimensional systems with a single matrix, and extended the result to certain multi-matrix cases under spectral constraints

### Teaching Assistant Experience

- **Algorithms and Data Structures (ADS)** : Tutor, Marker → 2022
  - **Algorithmic Game Theory and Applications (AGTA)** : Tutor, Marker → 2022
  - **Discrete Math and Probability (DMP)** : Marker → 2022, 2023
  - **Formal Verification (FV)** : Demonstrator, Marker → 2023
  - **Machine Learning Theory (MLT)** : Tutor → 2023 , Marker → 2022, 2023
- Tutor Responsible for clearing doubts/ solving exercises with a group (5-30) of students  
Demonstrator Helping with debugging/ doubts in a lab setting

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## Awards & Achievements

- Recipient of **EDCS** scholarship for Ph.D. 2021
- Awarded the International Scholarship for Masters in MPRI 2018
- **All India Rank 193** in **JEE Advanced** among 150,000 students 2014
- KVPY Fellowship, Government of India 2013

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## Relevant Courses

ML & AI	Machine learning theory (Edinburgh), Deep Learning Systems ( <a href="#">Open course</a> ), Reinforcement Learning & Multi-armed bandits (IIT Bombay)
Stochastic Models	Markov Chains, Queueing theory and network modelling (MPRI, IIT Bombay), Random Graphs (IIT Bombay)
Automata & Computation	Algorithmic Game Theory (Edinburgh), Game Theory (MPRI), Tree Automata, Weighted Automata (MPRI, IIT Bombay), Well Structured Transition Systems (IIT Bombay), Computational Complexity (IIT Bombay)
Miscellaneous	Abstract Interpretation: Applications to Static Analysis (MPRI, IIT Bombay)

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## Skills & Tools

- Proficient : C, C++, Python, git, bash,  $\LaTeX$
- Familiar : Pytorch, numpy, Tensorflow

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## Selected Academic Projects

- 02/2019 **Heuristic Optimization for the Low Autocorrelation Binary Sequence (LABS) Problem**, *Prof. Carola Doerr, Prof. Christoph Dürr*, MPRI.
  - Benchmarked several local search heuristics—including steepest descent, tabu search, and Kernighan-Lin—for the LABS combinatorial optimization problem
  - Conducted a comparative analysis and systematically studied the influence of initial conditions on algorithmic performance
- 2017-2018 **Treewidth-Based Methods for Data Automata**, *Prof. S.Akshay*, IIT Bombay.
  - Extended treewidth-based techniques to a class of register automata, enabling new decidability results for the emptiness problem
  - Introduced a novel graph semantics with bounded treewidth for register systems, and identified necessary restrictions for realizability
- 2018 **Verifying LCS has Non-recursive Complexity**, *Prof. S.Akshay*, IIT Bombay.
  - Presented the paper "Verifying Lossy Channel Systems has Non-Recursive Complexity" by Ph. Schnoebelen.
- 2018 **On Size-Ramsey Number of Paths**, *Prof. Nikhil Karamchandani*, IIT Bombay.
  - Investigated the size-Ramsey number of graphs and presented a proof of the linearity of size-Ramsey number of paths by Andrzej Dudek and Paweł Prałat
- 2017 **Properties of Tree Walking Automata**, *Prof. S.Akshay*, IIT Bombay.
  - Conducted an in-depth literature review on tree walking automata (TWA), and presented key results including the subsumption of TWA by bottom-up tree automata, closure properties under complementation, and the strict inclusion of deterministic TWA by their non-deterministic counterparts
- 2017 **Pseudorandom Generators and Complexity**, *Prof. Nutan Limaye*, IIT Bombay.
  - Studied foundational results in cryptographic pseudorandomness, including one-way functions and the Goldreich-Levin theorem, through the lens of computational complexity. Presented and discussed key sections from Arora and Barak's textbook
- Summer'17 **Quantitative Program Repair**, *Prof. Roopsha Samanta*, Purdue University.
  - Worked on extending the program repair to cases where specification is given as assertions and the program traces can grow arbitrarily long
  - Analyzed the benchmarks of previous work and tried to come up with a semantic distance that remains bounded for most examples
  - Also worked out bounds on number of iterations for certain types of loops. This helps in bounding the length of the program trace