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Updated on 28 May 2025

Pranshu Gaba

Curriculum Vitae

Research Interests

General formal methods, game theory, logic, computer science, discrete mathematics

Specific reactive synthesis, finitary objectives, stochastic games, Markov decision processes

Education

Sep 2020 - ongoing **PhD in Theoretical Computer Science**
Tata Institute of Fundamental Research, Mumbai, India
Advisor: Dr. Shibashis Guha
GPA: 7.9/10
Relevant courses: Logic, Automata, and Games; Automata, Verification, and Infinite Games; Descriptive Complexity; Computational Complexity; Algebra and Computation; Algebraic Automata Theory.

Aug 2016 - July 2020 **Bachelor of Science (Research) with Mathematics major**
Indian Institute of Science, Bangalore, India
GPA: 7.9/10
Relevant courses: Automata Theory and Computability; Introduction to Scalable Systems; Game Theory; Graph Theory; Combinatorics; Topology; Measure Theory.

Conference Proceedings

[c4] Laurent Doyen, Pranshu Gaba and Shibashis Guha, "Expectation in Stochastic Games with Prefix-independent Objectives" in *International Conference on Concurrency Theory*, August 2025, (to appear).

[c3] Pranshu Gaba and Shibashis Guha, "Optimising Expectation with Guarantees for Window Mean Payoff in Markov Decision Processes" in *International Conference on Autonomous Agents and Multiagent Systems*, May 2025, (to appear).

[c2] Pranshu Gaba and Arnab Sur, "Recognising numbers" in *Logic and its Applications*, April 2025, pp. 126-137. doi: 10.1007/978-3-031-89610-1_9.

[c1] Laurent Doyen, Pranshu Gaba, and Shibashis Guha, "Stochastic Window Mean-Payoff Games" in *Foundations of Software Science and Computation Structures*, April 2024, pp. 34-54. doi: 10.1007/978-3-031-57228-9.

Journal Publications

[j1] Laurent Doyen, Pranshu Gaba, and Shibashis Guha, "Stochastic Window Mean-Payoff Games" in *Logical Methods in Computer Science*, June 2025, (to appear).

Awards

2025
- Best student paper award at ICLA for "Recognizing Numbers" with Arnab Sur

Talks

2025
- Stochastic Window Mean-payoff Games at ACM ARCS 2025 (lightning talk)
- Recognizing numbers at ICLA 2025
- Student seminar talks at TIFR:
  - The Canadian Traveller Problem (February 2025)

2024
- Expectation in Stochastic Games with Prefix-Independent Objectives at Workshop on Automata and Games for Synthesis, FSTTCS 2024
- Recognizing numbers at TCS Research Expo 2024
- Recognizing numbers at STCS Student Symposium 2024
- Stochastic Window Mean-payoff Games at ENS Paris-Saclay 2024
- Stochastic Window Mean-payoff Games at FoSSaCS 2024
- Student seminar talks at TIFR:
  - Sperner's lemma and the equidissection of regular polygons (July 2024)
  - The connection between circuit complexity and first-order logic (May 2024)
  - The complexity of solving simple stochastic games (February 2024)

2023
- Stochastic Window Mean-payoff Games at STCS Student Symposium 2023
- Stochastic Window Mean-payoff Games at Formal Methods Update meeting 2023
- Student seminar talks at TIFR:
  - Courcelle's theorem (September 2023)

2022
- Student seminar talks at TIFR:
  - Total-payoff games on graphs with windows (October 2022)
  - Determinacy of Two-Player Games with Perfect Information (March 2022)

2021
- Student seminar talks at TIFR:
  - Vertex connectivity of Eulerian orientations (July 2021)

Professional service

Reviewing LICS 2024, STACS 2025, CAV 2025, EC 2025, ATVA 2025

Volunteering FLoC 2022, FoSSaCS 2024

Teaching experience

2025
- Teaching assistant for the course Automata and Computability

Outreach

2025
- Chai and Why: Sperner's lemma and fair division

2024
- Vigyan Vidushi 2024: Sperner's lemma and fair division
- Chai and Why: Voting

2023
- Chai and Why: Hamming codes

2022
- Chai and Why: Graph theory

2020
- Open day at IISc: Impartial games

Conferences attended

2025
- ACM ARCS 2025 in PSG College of Technology, Coimbatore
- ICLA 2025 in ISI Kolkata, India

2024
- FSTTCS 2024 in IIT Gandhinagar, India
- Winter School on Verification 2024 in IIT Delhi, India
- SAT 2024 in TCS Pune, India
- ISLA 2024 in IIT Goa, India
- ETAPS 2024 in Luxembourg

2023
- FSTTCS 2023 in IIIT Hyderabad, India
- Formal Methods Update meeting 2023 in IIT Goa, India

2022
- FSTTCS 2022 in IIT Madras, Chennai, India
- FLoC 2022 in Technion, Haifa, Israel

Experience

May 2019 - Jul 2019 **Summer Intern at CiSTUP**
Indian Institute of Science, Bangalore, India
Worked with Prof. Tarun Rambha
- Learnt about optimization techniques such as branch and bound, and cutting planes.
- Wrote C++ programs to find solutions for cost allocations for the traveling salesman problem and the vehicle routing problem

May 2018 - Jun 2018 **Visiting Research Student**
Tata Institute of Fundamental Research, Mumbai, India
Worked with Prof. Amitava Bhattacharya
- Studied properties relating to the Game of Cops and Robbers on Graphs, such as bounds on the cop number of a graph
- Explored concepts in combinatorics such as counting walks on graphs, Sperner's theorem, and matrix-tree theorem

Apr 2016 - Jul 2021 **Content Intern**
Brilliant.org, Remote
- Created challenging and thought-provoking math and science problems
- Interacted and engaged in discussions with the Brilliant community consisting of math and science enthusiasts

Technical skills

programming	Java, Python, C++, Haskell
typesetting	LaTeX, Typst
web dev	HTML, CSS, Hugo, JavaScript
game dev	Godot