

# Tanmay Goyal

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## EDUCATION

**Indian Institute of Technology, Hyderabad**

*Bachelor of Technology in Artificial Intelligence: Departmental Rank 2/30*

**CGPA: 9.55/10**

2020-2024

## RESEARCH EXPERIENCE

**Microsoft Research India**

*Research Fellow*

*Aug. 2024 - Present*

## PUBLICATIONS

**Efficient Algorithms for Logistic Contextual Slate Bandits with Bandit Feedback**



*Tanmay Goyal, Gaurav Sinha*

*41st Conference on Uncertainty in Artificial Intelligence (UAI), 2025*

**Achieving Limited Adaptivity for Multinomial Logistic Bandits**



*Sukruta Midigeshi, Tanmay Goyal, Gaurav Sinha*

*Reinforcement Learning Conference (RLC), 2025*

## RESEARCH PROJECTS

**Efficient Algorithms for Logistic Contextual Slate Bandits with Bandit Feedback**

*Microsoft Research*

*Accepted at UAI '25 (Main Track): Advised by Dr. Gaurav Sinha*

- Introduced efficient algorithms for Slate Bandits, where the arm-set is a product of several different item-sets.
- Showed that our algorithms are optimal and computationally efficient for a logistic reward model.

**Achieving Limited Adaptivity for Multinomial Logistic Bandits**

*Microsoft Research*

*Accepted at RLC '25: Advised by Dr. Gaurav Sinha*

- Introduced a *batched* and *rarely-switching* algorithm for Multinomial Logistic Bandits with theoretical guarantees.
- Reduced the number of policy updates from  $O(T)$  to  $O(\log \log T)$  and  $\tilde{O}(\log T)$  respectively.

**Quantum Query Complexity**

*IIT Hyderabad*

*Advised by Dr. Kartteek Sreenivasaiah*

*Nov. 2023 - May 2024*

- Attempted to upper bound the quantum query complexity for testing the unateness of a boolean function.
- Worked extensively with Learning Graphs and Span Programs.

**Quantum Random Walks (QRW) for Model Checking**

*IIT Hyderabad*

*Advised by Dr. M.V. Panduranga Rao*

*Jan. 2024 - May 2024*

- Attempted to perform a QRW on a directed weighted graph by combining the notions of a coined QRW for directed unweighted graphs and Szegedy's QRW for weighted undirected graphs.

**Long Landing Analysis**

*IIT Hyderabad*

*Advised by Dr. Maunendra Desarkar, in collaboration with Honeywell USA and Honeywell India*

*Dec. 2024 - Jun. 2024*

- Analyzed 250GB of publicly available data on the landing of 150K flights to predict long landings.
- Built Causality graphs to understand the causal factors for long-landings.

## TEACHING

**Teaching Assistant, IIT Hyderabad**

*Duties involved conducting tutorials and lectures, and assisting the professor in grading assignments and exams*

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|---------------------------------------|------------------------------|
| • Programming for AI                  | <i>Mar. 2024 - May 2024</i>  |
| • Operating Systems - I               | <i>Oct. 2023 - Dec. 2023</i> |
| • Reinforcement Learning              | <i>Jul. 2023 - Dec. 2023</i> |
| • Deep Learning                       | <i>Jan. 2023 - May 2023</i>  |
| • Data Structures and Applications    | <i>Jul. 2022 - Dec. 2022</i> |
| • Introduction to Programming (C/C++) | <i>Nov. 2021 - Mar. 2022</i> |

## KEY COURSES TAKEN

**Artificial Intelligence:** Machine Learning, Deep Learning, Reinforcement Learning, Online Learning and Bandits, Natural Language Processing, Bayesian Data Analysis, Robotics, Image and Video Processing, AI in Healthcare

**Computer Science:** Quantum Computing, Cryptology, Computational Number Theory, Probability in Computing, Data Structures and Algorithms, DBMS, Operating Systems, Computer Networks, Application of Markov Chains

**Mathematics:** Calculus, Matrix Theory, Tensors: Techniques and Algorithms, Convex Optimization, Applied Statistics, Time Series and Regression Analysis, Metric Spaces, Numerical Analysis, Differential Equations

**Electrical Engineering:** Information Theory, Linear Systems and Signal Processing, Control Systems

## INDUSTRY EXPERIENCE

### American Express

May 2023 - Jul. 2023

Analyst Intern

- Developed a model to assign lines for credit cards for high-earning prospects and consumers, alongside performing trend analysis for the same. Impacts a significant 1 million customers per month.

### StoryXpress

May 2022 - Jul. 2022

Machine Learning Intern

- Worked on Video Super-Resolution to upscale videos on smartphone devices in real time to save network bandwidth.

## SCHOLASTIC ACHIEVEMENTS

**Academic Excellence Award:** Highest CGPA in the Department of AI, IIT Hyderabad.

2023-2024

**Google Research Week:** Selected from amongst 5,000+ UG and PG students nationwide.

2024

**JEE Advanced:** All India Rank 645 amongst 250,000 candidates.

2020

**JEE Mains:** All India Rank 1078 amongst 1,000,000 candidates (top 0.09% percentile).

2020

**BITSAT:** Scored 400/450. Ranked in the top 235 amongst 325,000 candidates.

2020

## TECHNICAL SKILLS

**Programming:** Python, C++, C, SQL, L<sup>A</sup>T<sub>E</sub>X

**Tools/Frameworks:** NumPy, Pandas, Matplotlib, Seaborn, PyTorch, TensorFlow, OpenCV

## VOLUNTEERING

### Volunteering

2020-2024

- **National Service Scheme:** Completed 120 hours as a volunteer, including teaching the underprivileged.
- **UG Buddy:** Sunshine, the Counselling Cell, IIT Hyderabad.
- **Career counselor:** Outreach Head, Office of Career Services, IIT Hyderabad.
- **JOSAA counselor:** Bakliwal Tutorials.

### Teaching Intern, Lila Poonawalla Foundation

Curated lesson plans, teaching aids, and held lectures for grade 7 and 8 underprivileged girls

- Numeracy Module: English and Mathematics.

Jan. 2017

- IT Literacy Module: MS-Word and MS-Excel.

Nov. 2017

## POSITIONS OF RESPONSIBILITY

**Outreach Head:** Office of Career Services, IIT Hyderabad

Mar. 2023 - Apr. 2024

**Content Head:** ACM Student Chapter, IIT Hyderabad

Mar. 2022 - Mar. 2023

**Internship Coordinator:** Office of Career Services, IIT Hyderabad

Apr. 2022 - Mar. 2023

**Curation and Content Coordinator:** TEDxIITHyderabad

May 2021 - May 2022

**Ideation Manager:** E-Cell, IIT Hyderabad

May 2021 - May 2022

**Core Member:** Vibes, the Music Club | Lambda, the Software Dev Club

May 2021 - May 2022

**Licensee and Organizer:** TEDxTheOrchidSchool

2019

## EXTRACURRICULARS

### Sports

2020-2024

- **National Sports Organization:** Completed 240 hours of training in Table Tennis.
- **Cricket:** Played in several tournaments throughout college and played at the school and club (district) level.

**Inter-IIT Tech Meet 12.0:** Represented IITH for two High-Prep Problem Statements.

Dec. 2023

**Inter IIT Cultural Meet 6.0:** Represented IITH at the Just-A-Minute(JAM) Competition.

Dec. 2023

**Guitar:** Played the guitar in several competitions and events. Won 3rd prize at Battle of the Bands.

Mar. 2023