

# Aditya S. Mate

+1(424)335-7152

(+91) 9892430170

✉ [aditya\\_mate@g.harvard.edu](mailto:aditya_mate@g.harvard.edu)

📄 <https://projects.iq.harvard.edu/adityamate>

## Curriculum Vitae

### Education

- 2018–present **Harvard University**, Cambridge, MA  
*Ph.D. in Computer Science (expected graduation: May 2023).*
- 2013–2018 **Indian Institute of Technology Bombay**, Mumbai  
*B.Tech & M.Tech in Electrical Engineering | Minor: Computer Science and Engineering.*

### Academic Achievements

- 2023 IAAI 'Innovative Application' Award.
- 2022 INFORMS "Doing Good with Good OR" Competition Runner-up.
- 2021 **Best Paper Award** at NeurIPS'21 Workshop on Machine Learning in Public Health (MLPH).
- 2020 **Best Lightning Paper Award** at NeurIPS'20 Workshop on Machine Learning in Public Health.
- 2018 Awarded **Annenberg Fellowship** by University of Southern California during the 2018-19 A.Y.
- 2017 Offered a 'Cognitive Data Scientist' role at IBM on Day-1 of IIT Bombay campus placements.
- 2013 **Selected to represent India** by the Dept.of Science and Technology, Govt.of India and sent to Australia to receive the Prof. Harry Messel **ISS scholarship** of the University of Sydney.
- 2013 **All India Rank 273** in the IIT Joint Entrance Exam (**JEE**) 2013, amongst 1.3 million examinees.
- 2012 Secured **All India Rank 15** in the **KVPY scholarship** awarded by Government of India.
- 2013 Selected among top 300 participants of India to compete in **all three national olympiads: INPhO** (Indian National Physics Olympiad), **INChO**(Chemistry), **INAO** (Astronomy).
- 2009 Selected for the Indian National Mathematics Olympiad (**INMO**) training camp.

### Industry Experience

- June–Sept'22 **Google Research**, India.  
RESEARCH INTERN | Manager: Dr. Aparna Taneja
- Project 1: Cohort Reshuffling in Field Trials Evaluating Resource Allocation Algorithms (under review)
  - Project 2: Field Evaluation of Decision-Focused Learning methods for Restless Bandits (under review)
  - Project 3: SAHELL: Deployed RMAB system for Maternal and Child Care (**IAAI 2023**)
- Nov'21– **Google Research**, United States.
- April'22 STUDENT RESEARCHER | Managers: Philip Nelson, Dr. Aparna Taneja
- Project 1: Non-Stationary Restless Bandits for Planning Public Health Interventions (under review)  
*Preliminary version appeared at EAAMO'22 as poster*
  - Project 2: Decision-Focused Learning in Restless Bandits (**AAAI 2023**)  
*Awarded a spot bonus for impact in 2021, recognizing "hard work, dedication, talent and creativity".*
- June–Sept'21 **IBM Thomas J. Watson Research Center**, Yorktown Heights, NY (remote).  
RESEARCH INTERN | Manager: Dr. Kush R. Varshney
- Project: Data-Driven Planning and Resource Allocation for Social Change Non-profits (Working paper)
- April–June'21 **Google Research**, United States (remote).  
RESEARCH INTERN | Manager: Philip Nelson, *Director of Software Engineering, Google Research*
- Project: Field Study in Deploying Restless Bandits for improving Maternal Health (**AAAI 2022**)  
*Awarded a peer bonus for "tremendous efforts and contributions" during the internship.*

- May–July'16 **Sony Corporation**, Tokyo, Japan.  
R&D INTERN | Mentor: Yohei Kawamoto
- Project: Sensor fusion and machine learning algorithms for signal quality assessment of PPG signals
- May–July'15 **Focus Analytics**, Mumbai, India.  
R&D INTERN
- Project: Machine learning algorithms for WiFi-based indoor localization & path-tracking
- December'14 **Planceess Edusolutions**, Mumbai, India.  
SOFTWARE ENGINEER
- Project: Algorithms for IIT-JEE rank predictor and study planner/scheduler

## Publications

### In the Pipeline

- Under Review **Aditya Mate**, Aparna Taneja, Gauri Jain and Milind Tambe  
"Restless and Non-Stationary Multi-Armed Bandits for Planning Public Health Interventions", *Under Review*; Preliminary version appeared at EAAMO'2022 as a poster [\[poster link\]](#).
- Under Review Shresth Verma, **Aditya Mate**, Kai Wang, Neha Madhiwalla, Aparna Hegde, Aparna Taneja and Milind Tambe  
"Restless Multi-Armed Bandits for Maternal and Child Health: Results from Decision-Focused Learning", *Under Review*.
- Under Review Paritosh Verma, Shresth Verma, **Aditya Mate**, Aparna Taneja and Milind Tambe  
"Decision-Focused Evaluation: Analyzing Performance of Deployed Restless Multi-Arm Bandits", *Under Review*.
- Under Review Feiran Jia, **Aditya Mate**, Zun Li, Shahin Jabbari, Mithun Chakraborty, Milind Tambe, Michael Wellman and Yevgeniy Vorobeychik.  
"A Game-Theoretic Approach for Hierarchical Policy-Making", *Under Review*, ([arXiv:2102.10646](https://arxiv.org/abs/2102.10646)).

### Journal Publications

- [J1] Bryan Wilder, Marie Charpignon, Jackson A Killian, Han-Ching Ou, **Aditya Mate**, Shahin Jabbari, PNAS 2020 Andrew Perrault, Angel Desai, Milind Tambe, and Maimuna S. Majumder.  
"Modeling between-population variation in COVID-19 dynamics in Hubei, Lombardy, and New York City", *Proceedings of the National Academy of Sciences (PNAS) 2020*, [\[paper\]](#).

### Rigorously Reviewed Conference Publications

- [C11] Kai Wang\*, Shresth Verma\*, **Aditya Mate**, Sanket Shah, Aparna Taneja, Neha Madhiwalla, AAAI 2023 Aparna Hegde, Milind Tambe.  
"Decision-Focused Learning in Restless Multi-Armed Bandits with Application to Maternal and Child Care Domain", *AAAI Conference on Artificial Intelligence 2023, Washington DC, USA* \*Equal contribution, [\[paper\]](#).
- [C10] Shresth Verma\*, Gargi Singh\*, **Aditya Mate**, Paritosh Verma, Sruthi Gorantla, Neha Madhiwalla, IAAI 2023 Aparna Hegde, Divy Thakkar, Aparna Taneja, Manish Jain and Milind Tambe  
"Increasing Impact of Mobile Health Programs: SAHELI for Maternal and Child Care", *Innovative Applications of Artificial Intelligence (IAAI-23), Washington DC, USA*, [\[paper\]](#).
- [C9] **Aditya Mate**\*, Lovish Madaan\*, Aparna Taneja, Neha Madhiwalla, Shresth Verma, Gargi Singh, AAAI 2022 Aparna Hegde, Pradeep Varakantham and Milind Tambe.  
"Field Study and Deployment of Restless Multi-Armed Bandits for Improving Maternal and Child Health Outcomes", *AAAI Conference on Artificial Intelligence 2022, Vancouver, Canada* \*Equal contribution, [\[paper\]](#).

- [C8] **Aditya Mate**, Arpita Biswas, Christoph Siebenbrunner, Susobhan Ghosh and Milind Tambe.  
AAMAS 2022 “Efficient Algorithms for Finite Horizon and Streaming Restless Multi-Armed Bandit Problems”, *International Conference on Autonomous Agents and Multiagent Systems (AAMAS) 2022*, [paper].
- [C7] Zun Li, Feiran Jia, **Aditya Mate**, Shahin Jabbari, Mithun Chakraborty, Milind Tambe and Yevgeniy Vorobeychik.  
UAI 2022 “Solving Structured Hierarchical Games Using Differential Backward Induction” (Oral Presentation), *Conference on Uncertainty in Artificial Intelligence (UAI) 2022*, [paper].
- [C6] **Aditya Mate**, Andrew Perrault and Milind Tambe.  
AAMAS 2021 “Risk-Sensitive Interventions in Public Health: Planning with Restless Multi-Armed Bandits”, *International Conference on Autonomous Agents and Multiagent Systems (AAMAS) 2021*, [paper].
- [C5] **Aditya Mate\***, Jackson Killian\*, Haifeng Xu, Andrew Perrault and Milind Tambe.  
NeurIPS 2020 “Collapsing Bandits and Their Application to Public Health Interventions”, *Advances in Neural and Information Processing Systems (NeurIPS) 2020, Vancouver, Canada* \*Equal contribution, [paper].
- [C4] Andrew Perrault, Bryan Wilder, Eric Ewing, **Aditya Mate**, Bistra Dilkina and Milind Tambe.  
AAAI 2020 “End-to-End Game-Focused Learning of Adversary Behavior in Security Games”, *AAAI Conference on Artificial Intelligence 2020, New York, USA*, [paper].
- [C3] Kai Wang, Andrew Perrault, **Aditya Mate** and Milind Tambe.  
AAMAS 2020 “Scalable Game-Focused Learning of Adversary Models: Data-to-Decisions in Network Security Games”, *International Conference on Autonomous Agents and Multi-agent Systems (AAMAS) 2020, Auckland, New Zealand*, [paper].
- [C2] Palvi Aggarwal, Omkar Thakoor, **Aditya Mate**, Milind Tambe, Edward A. Cranford, Christian Lebiere, and Cleotilde Gonzalez.  
HFES 2020 “An Exploratory Study of a Masking Strategy of Cyberdeception Using CyberVAN”, *In 64th Human Factors and Ergonomics Society (HFES) Annual Conference*, [paper].
- [C1] B. Sombabu, **Aditya Mate**, D. Manjunath, Sharayu Moharir.  
COMSNETS 2020 “Whittle Index for Aol-aware scheduling”, *In 2020 12th International Conference on Communication Systems and Networks (COMSNETS). IEEE, 2020*, [paper].

### Selected Workshop Papers

- [W8] Shresth Verma, **Aditya Mate**, Kai Wang, Aparna Taneja and Milind Tambe.  
NeurIPS 2022 “Case Study: Applying Decision Focused Learning in the Real World”, *Workshop on Trustworthy and Socially Responsible Machine Learning, NeurIPS 2022*.
- [W7] **Aditya Mate\***, Lovish Madaan\*, Aparna Taneja, Neha Madhiwalla, Shresth Verma, Gargi Singh, Aparna Hegde, Pradeep Varakantham and Milind Tambe.  
NeurIPS 2021 “Restless Bandits in the Field: Real-World Study for Improving Maternal and Child Health Outcomes”, *Workshop on Machine Learning in Public Health (MLPH), NeurIPS 2021, Remote*, \*Equal contribution.  
**Best Paper Award**
- [W6] Aviva Prins, **Aditya Mate**, Jackson Killian, Rediet Abebe and Milind Tambe.  
NeurIPS 2020 “Incorporating Healthcare Motivated Constraints in Restless Bandit Based Resource Allocation”, *Workshop on Machine Learning for Health (ML4H), NeurIPS 2020, Vancouver, Canada*.  
**Best Thematic Submission**
- [W5] Aviva Prins, **Aditya Mate**, Jackson Killian, Rediet Abebe and Milind Tambe.  
NeurIPS 2020 “Incorporating Healthcare Motivated Constraints in Restless Bandit Based Resource Allocation”, *Workshop on Machine Learning in Public Health (MLPH), NeurIPS 2020, Vancouver, Canada*.  
**Best Lightning Paper**

- [W4] **Aditya Mate\***, Jackson Killian\*, Haifeng Xu, Andrew Perrault and Milind Tambe.  
AAMAS 2020 “Building Decision Aids for Community Health Workers: Optimizing Interventions via Restless Bandits.”, *OptLearnMAS, AAMAS 2020, Auckland, New Zealand, \*Equal contribution.*
- [W3] **Aditya Mate**, Jackson A. Killian, Bryan Wilder, Marie Charpignon, Ananya Awasthi, Milind Tambe and Maimuna S. Majumder. “Evaluating COVID-19 Lockdown Policies For India: A Preliminary Modeling Assessment for Individual States.”, *In ACM SIGKDD 2020 Workshop on Humanitarian Mapping.*
- [W2] Bryan Wilder, Marie Charpignon, Jackson Killian, Han-Ching Ou, **Aditya Mate**, Shahin Jabbari, KDD 2020, Andrew Perrault, Angel Desai, Milind Tambe and Maimuna Majumder.  
ICML 2020 “Bayesian inference of between-population variation in COVID-19 dynamics”, *Workshop on Machine Learning for Global Health, International Conference on Machine Learning. 2020.* .
- [W1] Kai Wang, **Aditya Mate**, Bryan Wilder, Andrew Perrault, and Milind Tambe.  
IJCAI 2019 “Using Graph Convolutional Networks to Learn Interdiction Games”, *In AI for Social Good workshop (AI4SG) at International Joint Conference on Artificial Intelligence (IJCAI) 2019.*

### Pre-prints

- April 2020 **Aditya Mate**, Jackson A. Killian, Bryan Wilder, Marie Charpignon, Ananya Awasthi, Milind Tambe, and Maimuna S. Majumder.  
“Evaluating COVID-19 Lockdown Policies For India: A Preliminary Modeling Assessment for Individual States.”, *SSRN.*

### News Coverage

- May 2020 **Harvard Student Profile**, *CS student helps NGO launch pilot program*, [\[article\]](#) [\[tweet\]](#).  
May 2020 **Sakal Media House**, *Middle ground for India’s lockdown situation*, [\[article\]](#).  
April 2020 **Nature Research Asia**, *“Model finds ‘middle ground’ for India’s lockdown exit”*, [\[article\]](#).

### Harvard Business School Coursework

- Negotiation
- Strategy in Professional Service Firms
- Digital Innovation and Transformation

### Academic Research Experience

- 2019–present **Doctoral Research Assistant, Harvard University**,  
*Center for Research and Computation in Society (CRCS).*  
○ Advised by Prof. Milind Tambe.
- 2017–2018 **Master’s Thesis, Indian Institute of Technology Bombay**,  
*Title: Latency Reduction in Cloud Computing Systems & Age of Information Scheduling Policies.*  
○ Advised by Prof. Sharayu Moharir.
- Summer 2017 **Research Internship, National Taiwan University**,  
*Title: Ensemble learning algorithms for multimedia processing.*  
○ Advised by Dr. Yu Tsao.

### Professional Service

- **Co-organizer** of Pasteur’s Quadrant Seminar Series (PQSS)
- **Co-organizer** of Harvard CRCS Rising Stars Speaker Series, March 2021
- **Co-organizer** of Harvard CRCS Workshop on AI for Social Impact, Rising Stars, March 2020
- **Invited Judge** for TryAI, AAI 2020 workshop for high-school female students

o **Program Committee member/Reviewer** for:

Conferences

- o AISTATS 2023
- o ICLR 2023
- o AAAI 2023
- o NeurIPS 2022
- o EAAMO 2022
- o ICML 2022
- o IJCAI 2022
- o ICLR 2022
- o AISTATS 2022
- o NeurIPS 2021
- o COMPASS 2021
- o AAAI 2021
- o AAAI 2020

(AI for Social Impact Track)

Workshops

- o KDD 2022, 2021, 2020  
(Humanitarian Mapping)
- o IJCAI 2020 (AI4SG)
- o AAMAS 2020 (OptLearnMAS)
- o AAMAS 2021 (AASG)
- o ICLR 2021 (AI for Public Health)
- o NeurIPS 2020 (NewInML)
- o IJCAI 2021 (AI4SG)

Subreviewer

- o NeurIPS 2020
- o IJCAI 2020

- o **Convener** of Robotics Club, IIT Bombay

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## Accepted Talks/Posters

- o 51<sup>st</sup> Union World Conference on Lung Health, 2020
- o Doctoral Consortium on Computational Sustainability, 2020
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## Teaching experience

Fall 2020 **CS 182: “Artificial Intelligence”, Harvard University, Head Teaching Fellow,**

Instructors: Prof. Milind Tambe and Prof. Boaz Barak.

- o Responsible for teaching class sections, designing exams, assignments, grading and coordinating and distributing responsibilities among other TFs.

Spring 2018 **EE 328: “Digital Communication”, IIT Bombay, Teaching Assistant.**

Instructor: Prof. Kumar Appaiah

Fall 2017 **EE 225: “Network Theory”, IIT Bombay, Teaching Assistant.**

Prof. Manoj Gopalkrishnan

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## Other Undergraduate Technical Projects

Spring'17 **Supervised Research Exposition,**

Guide *Prof. Sharayu Moharir, IIT-B .*

- o **Title:** Redundancy in Cloud Computing systems to reduce latency

Spring'16 **Visible Light Communication System (Li-Fi),**

Guide *Prof. Kumar Appaiah, IIT-B .*

- o Designed and built a PCB prototype, capable of communicating data via regular home LED lights

Fall'15 **Ultrasonic Sensor based car parking system.**

Lab o Designed a car park system with auto-braking, obstacle detection and safety alarm function by interfacing ultrasonic sensors with an 8051 microcontroller using embedded C

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## Skills

Softwares Python, Pytorch, MATLAB, C/C++, JAVA,  $\LaTeX$

Languages English (GRE: 333/340, TOEFL: 111/120), Hindi, Marathi

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## Extra-Curricular Activities

- Part of Harvard Cricket Team
- Part of University of Southern California's **Division-1 Hardball Cricket Team**
- **Captain** of IIT Bombay Hostel Cricket Team in Institute Cricket General Championship, 2017
- **'Player of the Tournament'** for hostel, in Institute Cricket General Championship, 2016
- **Highest-bid wicket-keeper batsman** in bidding for Trident Cricket League, IIT-B, 2014
- Completed the National Sports Organization (NSO) program for Cricket
- Finished among **top five tables** in Bournvita Open Interschool **Chess** Tournament and **got featured in newspaper, Times of India (TOI)** for the same