

# P. N. KARTHIK

[EMAIL](#)[WEBSITE](#)[LINKEDIN](#)[GOOGLE SCHOLAR](#)

## RESEARCH INTERESTS

multi-armed bandits, federated learning, privacy-preserving learning, reinforcement learning, information theory, statistics

## EXPERIENCE

- FEB'24 - PRESENT **ASSISTANT PROFESSOR**  
*Department of Artificial Intelligence, IIT Hyderabad*  
DATE OF JOINING: 26 February 2024
- JAN'22 - JAN'24 **RESEARCH FELLOW**  
*Institute of Data Science, National University of Singapore*  
SUPERVISOR: Prof. [Vincent Y. F. Tan](#)
- MAY'23 - JUN'23 **VISITING RESEARCHER**  
*Technion Israel Institute of Technology, Haifa, Israel*  
HOST: Prof. [Nir Weinberger](#)
- NOV'19 - MAR'20 **RESEARCH INTERN**  
*Netradyne Technology India Pvt. Ltd., Bengaluru*  
*In collaboration with Bengaluru Metropolitan Transport Corporation*  
ACADEMIC MENTOR: Prof. [Rajesh Sundaresan](#)  
INDUSTRY MENTOR: [Pratik Verma](#)
- AUG'19 - DEC'19 **GRADUATE TEACHING ASSISTANT**  
AUG'18 - DEC'18 *Department of ECE, Indian Institute of Science, Bengaluru*  
AUG'17 - DEC'17 COURSES: Information Theory (E2 201), Random Processes (E2 202)  
INSTRUCTORS: Prof. [Himanshu Tyagi](#), Prof. [Utpal Mukherji](#), Prof. [Parimal Parag](#)
- AUG'14 - JUN'15 **PROJECT ASSISTANT**  
*Department of ECE, Indian Institute of Science, Bengaluru*  
SUPERVISOR: Prof. [Chandra R. Murthy](#)

## EDUCATION

- JUL'15 - MAR'22 **DOCTOR OF PHILOSOPHY AND MASTER OF SCIENCE (ENGINEERING),**  
[Indian Institute of Science](#), Bengaluru  
DEPARTMENT: Electrical Communication Engineering  
THESIS: Sequential Controlled Sensing to Detect an Anomalous Process  
SUPERVISOR: Prof. [Rajesh Sundaresan](#)  
GPA: 7.0/8.0
- AUG'10 - JUL'14 **BACHELOR OF ENGINEERING,**  
[R V College of Engineering](#), Bengaluru  
MAJOR: Electronics and Communications  
GPA: 9.72/10.00 (**RANK 2** among 140 students)

## PUBLICATIONS

### PREPRINTS

1. *Learning to Detect an Odd Restless Markov Arm with a Trembling Hand* [arxiv](#)  
**P. N. Karthik** and Rajesh Sundaresan

2. *Axiomatic Characterisation of Projection Rules: An Open Question* [draft](#)  
P. N. Karthik and Rajesh Sundaresan

#### JOURNAL PUBLICATIONS

1. *Optimal Best Arm Identification with Fixed Confidence in Restless Bandits* [arxiv](#)  
P. N. Karthik, Vincent Y. F. Tan, Arpan Mukherjee, and Ali Tajer  
Accepted, *IEEE Transactions on Information Theory*, 2024  
Doi: [10.1109/TIT.2024.3419924](#)
2. *Federated Best Arm Identification with Heterogeneous Clients*  
Chen Zhirui, P. N. Karthik, Vincent Y. F. Tan, and Yeow Meng Chee  
*IEEE Transactions on Information Theory*, volume 70, number 6, pp. 4258-4279, 2024  
Doi: [10.1109/TIT.2023.3338027](#)
3. *Bus Priority lane in Bengaluru: A Study of its Effectiveness and Driver Stress*  
P. N. Karthik, Nihesh Rathod, Sarath Yasodharan, Wilson Lobo, Ajeesh Sahadevan, Rajesh Sundaresan and Pratik Verma  
Special Issue on Sustainable City Transportation in the Indian Subcontinent, *Transport Policy*, 2023.  
Doi: [10.1016/j.tranpol.2023.04.018](#)
4. *Best Arm Identification in Restless Markov Multi-Armed Bandits*  
P. N. Karthik, Kota Srinivas Reddy, and Vincent Y. F. Tan  
*IEEE Transactions on Information Theory*, volume 69, number 5, pp. 3240-3262, 2023.  
Doi: [10.1109/TIT.2022.3230939](#)
5. *Detecting an Odd Restless Markov Arm with a Trembling Hand*  
P. N. Karthik and Rajesh Sundaresan  
*IEEE Transactions on Information Theory*, volume 67, number 8, pp. 5230-5258, 2021.  
Doi: [10.1109/TIT.2021.3075021](#)
6. *Learning to Detect an Odd Markov Arm*  
P. N. Karthik and Rajesh Sundaresan  
*IEEE Transactions on Information Theory*, volume 66, number 7, pp. 4324-4348, 2020.  
Doi: [10.1109/TIT.2020.2972875](#)

#### DOCTORAL DISSERTATION

- *Sequential Controlled Sensing to Detect an Anomalous Process* [pdf](#) [source](#) [etd iisc](#)  
Ph.D. thesis, Department of ECE, Indian Institute of Science, NOV 2021

#### CONFERENCE PUBLICATIONS

1. *Optimal Multi-Objective Best Arm Identification with Fixed Confidence*  
Chen Zhirui, P. N. Karthik, Yeow Meng Chee, and Vincent Y. F. Tan  
International Conference on Artificial Intelligence and Statistics (*AISTATS 2025*), MAY 2025
2. *Best Arm Identification with Arm Erasures*  
Kota Srinivas Reddy, P. N. Karthik, and Vincent Y. F. Tan  
IEEE International Symposium on Information Theory (*ISIT 2024*), JUL 2024  
Doi: [10.1109/ISIT57864.2024.10619688](#)
3. *Fixed-Budget Differentially Private Best Arm Identification*  
Chen Zhirui, P. N. Karthik, Yeow Meng Chee, and Vincent Y. F. Tan  
International Conference on Learning Representations (*ICLR 2024*), MAY 2024
4. *Best Arm Identification in Bandits with Limited Precision Sampling*  
Kota Srinivas Reddy, P. N. Karthik, Nikhil Karamchandani, and Jayakrishnan Nair  
IEEE International Symposium on Information Theory (*ISIT 2023*), JUN 2023  
Doi: [10.1109/ISIT54713.2023.10206610](#)
5. *Almost Cost-Free Communication in Federated Best Arm Identification*  
Kota Srinivas Reddy, P. N. Karthik, and Vincent Y. F. Tan  
Proceedings of the 37th AAAI Conference on Artificial Intelligence (*AAAI 2023*), Washington D.C., FEB 2023.  
Doi: [10.1609/aaai.v37i7.26010](#)

6. *Best Restless Markov Arm Identification*  
**P. N. Karthik**, Kota Srinivas Reddy, and Vincent Y. F. Tan  
 Proceedings of the 2022 IEEE Information Theory Workshop (ITW 2022), IIT Mumbai, Nov 2022.  
**Doi:** [10.1109/ITW54588.2022.9965908](https://doi.org/10.1109/ITW54588.2022.9965908)
7. *Learning to Detect an Odd Restless Markov Arm*  
**P. N. Karthik** and Rajesh Sundaresan  
 Proceedings of the 2021 IEEE International Symposium on Information Theory (ISIT 2021), virtual, JUL 2021.  
**Doi:** [10.1109/ISIT45174.2021.9518083](https://doi.org/10.1109/ISIT45174.2021.9518083)
8. *Detecting an Odd Restless Markov Arm with a Trembling Hand*  
**P. N. Karthik** and Rajesh Sundaresan  
 Proceedings of the 2020 IEEE International Symposium on Information Theory (ISIT 2020), virtual, JUN 2020.  
**Doi:** [10.1109/ISIT44484.2020.9174397](https://doi.org/10.1109/ISIT44484.2020.9174397)
9. *Learning to Detect an Odd Markov Arm*  
**P. N. Karthik** and Rajesh Sundaresan  
 Proceedings of the 2019 IEEE International Symposium on Information Theory (ISIT 2019), Paris, France, JUL 2019.  
**Doi:** [10.1109/ISIT.2019.8849807](https://doi.org/10.1109/ISIT.2019.8849807)
10. *On The Equivalence of Projections in Relative  $\alpha$ -Entropy and Rényi Divergence*  
**P. N. Karthik** and Rajesh Sundaresan  
 Proceedings of the 34th National Conference on Communications (NCC 2018), IIT Hyderabad, FEB 2018.  
**Doi:** [10.1109/NCC.2018.8599980](https://doi.org/10.1109/NCC.2018.8599980)
11. *Model-Based Interference Cartography and Visualization*  
**P. N. Karthik**, Raksha Ramakrishna, Geethu Joseph, Chandra R. Murthy, Joyson Sebastian, and Neelesh B. Mehta  
 Proceedings of the 22nd National Conference on Communications (NCC 2016), IIT Guwahati, MAR 2016.  
**Doi:** [10.1109/NCC.2016.7561174](https://doi.org/10.1109/NCC.2016.7561174)

## TEACHING AT IIT HYDERABAD

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- *AI1013: Programming for AI* (JAN–APR 2025)  
 Number of students enrolled: 36  
 Instructor feedback: 4.74/5
- *AI5090: Stochastic Processes: Theory and Applications* (JAN–APR 2025)  
 Number of students enrolled: 33  
 Instructor feedback: 4.95/5
- *CS6660: Mathematical Foundations of Data Science* (AUG–NOV 2024)  
 Number of students enrolled: 25  
 Instructor feedback: 4.8/5
- *AI5090: Probability and Stochastic Processes* (AUG–NOV 2024)  
 Number of students enrolled: 87  
 Instructor feedback: 4.84/5
- *AI1104: Programming for AI* (MAR–APR 2024)  
 Number of students enrolled: 73  
 Instructor feedback: 4.19/5

## AWARDS AND HONORS

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- Faculty Teaching Excellence Award 2025, presented by IIT Hyderabad
- First place in the 100 seconds competition organised by INAE Kanpur Chapter
- Best paper award at the 2020 EECS Research Students' Symposium, Indian Institute of Science
- Best 3-minute presentation, ECE Students' Seminar Series, Department of ECE, Indian Institute of Science
- Rank 136 (among the top 0.01%) in the 2015 Graduate Aptitude Test in Engineering
- Infineon India scholarship for securing rank 2 in the 2011 Visvesvaraya Technological University examinations.
- Rank 23 (among the top 0.02%) in the 2010 Karnataka Common Entrance Test

## SERVICE AT IIT HYDERABAD

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- Member, Faculty Search Committee (FSC), Department of AI (JAN 2025 – PRESENT)
- Faculty Advisor (FA) for MTech 2024 batch of students (AUG 2024 – PRESENT)
- Faculty-in-Charge, Graduate Admissions, Department of AI (OCT 2024 – PRESENT)
- Faculty Coordinator, [Advanced Executive Program in AI and Cybersecurity](#) (to start in MAY 2025)
- Co-Organiser, [2024 JTG/IEEE ITSoc Summer School](#) (24–28 JUN 2024)

## PROFESSIONAL SERVICE

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- Technical Program Committee (TPC) Member, ISIT 2025
- Reviewer, IEEE Transactions on Information Theory
- Reviewer, IEEE Transactions on Signal Processing
- Reviewer, Journal on Selected Areas in Communications (JSAC)
- Reviewer, International Conference on Machine Learning (ICML 2024)
- Reviewer, International Conference on Learning Representations (ICLR 2024)
- Reviewer, Conference on Neural Information Processing Systems (NeurIPS 2023, 2024)
- Reviewer, Conference on Decision and Control (CDC 2023)
- Reviewer, IEEE International Symposium on Information Theory (ISIT 2019, 2023, 2024)
- Reviewer, National Conference on Communications (NCC 2018)