

# P. N. KARTHIK

[website](#)[linkedin](#)[scholar](#)

## PERSONAL DATA

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PLACE AND DATE OF BIRTH: Bengaluru, India | 20 Apr 1992  
ADDRESS: 02-19, 19 Shelford Road, Singapore 288408  
PHONE: +65 8591 2944  
EMAIL: [karthik@nus.edu.sg](mailto:karthik@nus.edu.sg)

## RESEARCH INTERESTS

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Markov decision problems, statistical learning, multi-armed bandits, statistical inference, stochastic adaptive control, optimal stopping problems

## WORK EXPERIENCE

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- 01/2022 - PRESENT    RESEARCH FELLOW  
*Institute of Data Science, National University of Singapore*  
SUPERVISOR: Prof. [Vincent Y. F. Tan](#)  
PROJECT: Towards Trustable Model-Centric Sharing for Collaborative Machine Learning
- 11/2021 - 12/2021    RESEARCH ASSOCIATE - 1  
*Indian Institute of Science*  
SUPERVISOR: Prof. [Rajesh Sundaresan](#)
- 11/2019 - 03/2020    INTERN  
*Netradyne Technology India Pvt Ltd*  
MENTORS: [Pratik Verma](#), Dr. [Ajeesh Sahadevan](#), and Prof. [Rajesh Sundaresan](#)
- 08/2019 - 12/2019    GRADUATE TEACHING ASSISTANT  
*Indian Institute of Science*  
COURSE: E2 201: Information Theory  
COURSE INSTRUCTOR: Prof. [Himanshu Tyagi](#)
- 08/2018 - 12/2018    GRADUATE TEACHING ASSISTANT  
08/2017 - 12/2017    *Indian Institute of Science*  
COURSE: E2 202: Random Processes  
COURSE INSTRUCTORS: Prof. [Utpal Mukherji](#) and Prof. [Parimal Parag](#)
- 08/2014 - 06/2015    PROJECT ASSISTANT  
*Indian Institute of Science*  
SUPERVISOR: Prof. [Chandra R. Murthy](#)
- 08/2013 - 12/2013    PROJECT TRAINEE  
*Karnataka State Sericulture Research and Development Institute*  
MENTOR: Prof. [M. Govinda Raju](#)

## EDUCATION

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- 07/2015 - 11/2021    Ph.D. and M.Sc. Engg., [Indian Institute of Science](#), Bengaluru  
DEPARTMENT: Electrical Communication Engineering  
THESIS: Sequential Controlled Sensing to Detect an Anomalous Process  
SUPERVISOR: Prof. [Rajesh Sundaresan](#)  
GPA: 7.00/8.00    | [Detailed List of Courses](#)
- 08/2010 - 07/2014    Bachelor of Engineering, [R V College of Engineering](#), Bengaluru  
MAJOR: Electronics and Communications  
GPA: 9.72/10.00 (**RANK 2** among 140 students)    | [Detailed List of Courses](#)

## PUBLICATIONS

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- PREPRINTS    *Best Arm Identification in Restless Markov Multi-Armed Bandits*    [[arxiv](#)]  
[P. N. Karthik](#), [Kota Srinivas Reddy](#), and [Vincent Y. F. Tan](#)  
Submitted to the IEEE Transactions on Information Theory, MAR 2022
- 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](#)  
Submitted to the Special Issue of Transport Policy Journal on  
Sustainable City Transportation in the Indian Subcontinent, JAN 2022
- Learning to Detect an Odd Restless Markov Arm with a Trembling Hand*    [[arxiv](#)]  
[P. N. Karthik](#) and [Rajesh Sundaresan](#)  
Submitted to the Journal of Machine Learning Research, JAN 2022
- Axiomatic Characterisation of Projection Rules: An Open Question*    [[draft](#)]  
[P. N. Karthik](#) and [Rajesh Sundaresan](#)  
Draft
- JOURNAL PUBLICATIONS    *Detecting an Odd Restless Markov Arm with a Trembling Hand*    [[xplore](#)]  
[P. N. Karthik](#) and [Rajesh Sundaresan](#)  
IEEE Transactions on Information Theory, AUG 2021
- Learning to Detect an Odd Markov Arm*    [[xplore](#)]  
[P. N. Karthik](#) and [Rajesh Sundaresan](#)  
IEEE Transactions on Information Theory, JUL 2020
- THESIS    *Sequential Controlled Sensing to Detect an Anomalous Process*    [[pdf](#)]  
[Karthik Periyapattana Narayanaprasad](#)  
Department of Electrical Communication Engineering,  
Indian Institute of Science, NOV 2021
- CONFERENCE PUBLICATIONS    *Learning to Detect an Odd Restless Markov Arm*    [[xplore](#)]  
[P. N. Karthik](#) and [Rajesh Sundaresan](#)  
IEEE International Symposium on Information Theory, JUL 2021
- Detecting an Odd Restless Markov Arm with a Trembling Hand*    [[xplore](#)]  
[P. N. Karthik](#) and [Rajesh Sundaresan](#)  
IEEE International Symposium on Information Theory, JUN 2020

*Learning to Detect an Odd Markov Arm* [\[xplore\]](#)

P. N. Karthik and Rajesh Sundaresan

IEEE International Symposium on Information Theory, JUL 2019

*On The Equivalence of Projections in Relative  $\alpha$ -Entropy and Rényi Divergence* [\[xplore\]](#)

P. N. Karthik and Rajesh Sundaresan

National Conference on Communications, FEB 2018

*Model-Based Interference Cartography and Visualization* [\[xplore\]](#)

P. N. Karthik, Raksha Ramakrishna, Geethu Joseph,  
Chandra R. Murthy, Joyson Sebastian, and Neelesh B. Mehta

National Conference on Communications, MAR 2016

## RESEARCH PRESENTATIONS AND SEMINARS

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2022 *Behind the Scenes of  $Ax = b$ : Axioms and an Open Question* [\[video\]](#) [\[slides\]](#)

A talk given to Prof. Vincent Tan's research group, MAR 2022

2021 *Sequential Controlled Sensing to Detect an Anomalous Process* [\[video\]](#) [\[slides\]](#)

Ph.D. defence, Department of Electrical Communication Engineering,  
Indian Institute of Science, NOV 2021

*Finding a Markov Anomaly Quickly and Accurately* [\[video\]](#)

100 seconds competition organised by the Kanpur Chapter of INAE, OCT 2021

First place under "Electronics and Communication Engineering" category

*GATE 2022: A Pathway to Research* [\[video\]](#)

An online interactive session on the Graduate Aptitude Test in Engineering as a  
pathway to research organised by the Division of EECS,  
Indian Institute of Science, OCT 2021

*Information Geometry and Its Applications to Statistics* [\[video\]](#) [\[notes\]](#)

An online lecture for the students of Indian Institute of Science, SEP 2021

*Learning to Detect an Odd Restless Markov Arm* [\[video\]](#) [\[slides\]](#)

2021 IEEE International Symposium on Information Theory, JUL 2021

*Sequential Controlled Sensing to Detect an Anomalous Process* [\[video\]](#) [\[slides\]](#)

Ph.D. colloquium talk, Department of Electrical Communication Engineering,  
Indian Institute of Science, JUN 2021

*Crack Open the GATE* [\[video\]](#)

A session conducted for the students of R V College of Engineering  
to educate them about the Graduate Aptitude Test in Engineering, MAY 2021

2020 *Probability in Real-Life: Example Applications from Visual Neuroscience,  
Colour Blindness Detection, and Covid-19 Outbreak Modelling* [\[video\]](#) [\[slides\]](#)

A talk presented virtually to the 5th semester students and the faculty of the  
department of Electronics and Communication Engineering,  
R V College of Engineering, SEP 2020

*Odd Arm Identification in Multi-armed Bandits with Markov Observations* [\[video\]](#) [\[slides\]](#)

2020 EECS Research Students' Symposium, Indian Institute of Science, JUL 2020

Best paper award under "Signal Processing, Communication Networks,

and Information Theory” track

*Detecting an Odd Restless Markov Arm with a Trembling Hand* [video] [slides]  
2020 IEEE International Symposium on Information Theory, JUN 2020

*Visual Search with a Trembling Hand: An Analysis of Odd Arm Identification in Restless Multi-armed Bandits* [video] [slides]  
Centre for Networked Intelligence, Indian Institute of Science, MAY 2020

*On Detecting an Anomalous Arm in a Multi-armed Bandit with Markov Observations* [slides]  
STCS Symposium, School of Theory and Computer Science,  
Tata Institute of Fundamental Research, Mumbai, JAN 2020

2019 *Search in Research: The Importance of the Theory of Probability in Real-Life* [slides]  
R V College of Engineering, DEC 2019

*Learning to Detect an Odd Markov Arms* [slides]  
Lectures on Probability and Stochastic Processes XIV,  
Indian Statistical Institute Delhi, DEC 2019

*On Detecting an Anomalous Arm in Multi-armed Bandits with Markov Observations* [slides]  
[Networks Seminar](#), Robert Bosch Centre for Cyber Physical Systems,  
Indian Institute of Science, NOV 2019

*Learning to Detect an Odd Markov Arm* [poster]  
2019 Joint Telematics Group Summer School,  
Indian Institute of Technology, Madras, AUG 2019

*Learning to Detect an Odd Markov Arm* [slides]  
ICTS Program on Advances in Applied Probability,  
International Centre for Theoretical Sciences, AUG 2019

*Learning to Detect an Odd Markov Arm* [slides]  
2019 IEEE International Symposium on Information Theory (ISIT), JUL 2019

*A Short Course on Probability and Random Processes* [course material]  
R V College of Engineering, JUN 2019

*$Ax = b$ : A Familiar Setup, Axioms and An Open Question* [slides]  
[ECE Students' Seminar Series](#), Department of Electrical Communication Engineering,  
Indian Institute of Science, FEB 2019

2018 *On the Equivalence of Projections in Relative  $\alpha$ -Entropy and Rényi Divergence* [slides]  
National Conference on Communications,  
Indian Institute of Technology, Hyderabad, FEB 2018

2017 *On the Equivalence of Projections in Relative  $\alpha$ -Entropy and Rényi Divergence* [slides]  
Lectures on Probability and Stochastic Processes XII,  
Indian Statistical Institute, Kolkata, DEC 2017

## AWARDS AND HONORS

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- **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 award at the ECE Students' Seminar Series, Department of Electrical Communication Engineering, 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

## PROFESSIONAL SERVICE

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- Graduate teaching assistant for the course "E2-201: Information Theory", AUG-DEC 2019, Department of Electrical Communication Engineering, Indian Institute of Science
- Graduate teaching assistant for the course "E2-202: Random Processes", AUG-DEC 2018, 2017, Department of Electrical Communication Engineering, Indian Institute of Science
- Reviewer, IEEE Transactions on Information Theory
- Reviewer, IEEE Transactions on Signal Processing
- Reviewer, Entropy
- Reviewer, Sadhana
- Reviewer, IEEE International Symposium on Information Theory
- Reviewer, National Conference on Communications

## REFERENCES

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Name	Designation	Department	Institute	Email
<a href="#">Rajesh Sundareshan</a>	Professor	ECE*	IISc**	<a href="mailto:rajeshs@iisc.ac.in">rajeshs@iisc.ac.in</a>
<a href="#">Utpal Mukherji</a>	Professor	ECE	IISc	<a href="mailto:utpal@iisc.ac.in">utpal@iisc.ac.in</a>
<a href="#">Navin Kashyap</a>	Professor	ECE	IISc	<a href="mailto:nkashyap@iisc.ac.in">nkashyap@iisc.ac.in</a>
<a href="#">Himanshu Tyagi</a>	Associate Professor	ECE	IISc	<a href="mailto:htyagi@iisc.ac.in">htyagi@iisc.ac.in</a>
<a href="#">Parimal Parag</a>	Associate Professor	ECE	IISc	<a href="mailto:parimal@iisc.ac.in">parimal@iisc.ac.in</a>

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\* ECE: Electrical Communication Engineering

\*\* IISc: Indian Institute of Science