

## Rajesh Sundaresan

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CURRENTLY	Dean, Electrical, Electronics, and Computer Sciences Division Professor, Electrical Communication Engineering Associate Faculty, Robert Bosch Centre for Cyber-Physical Systems <b>Indian Institute of Science, Bengaluru, India</b>		
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RESEARCH INTERESTS	Decision theory; communication, computation, and control over networks; cyber-social systems; and more recently, data-driven public health responses in the context of COVID-19.		
PROFESSIONAL EXPERIENCE	<b>Indian Institute of Science</b> , Bangalore, India <i>Dean</i> , Electrical, Electronics, and Computer Sciences Division <i>Professor</i> , Department of Electrical Communication Engineering <i>Associate Faculty</i> , Robert Bosch Centre for Cyber-Physical Systems <i>Former Co-Convenor</i> , Centre for Networked Intelligence <b>Indian Statistical Institute - Bengaluru Centre</b> <i>Visiting Scientist</i> , Stat-Math Unit <b>Strand Life Sciences</b> <i>Visiting Scientist</i> <b>Université Paul Sabatier</b> <i>Visiting Faculty</i> , Institut de Mathématiques de Toulouse <b>University of Illinois at Urbana-Champaign</b> , USA <i>Visiting Scholar</i> , Coordinated Science Laboratory <b>Qualcomm Inc.</b> , Campbell, California, USA <i>Visiting Faculty</i> <b>Qualcomm Inc.</b> , Campbell, California, USA <i>Senior Staff Engineer / Manager</i> <b>Princeton University</b> , Princeton, New Jersey, USA <i>Research/Teaching Assistant</i> , Department of Electrical Engineering		
			<b>Jun. 2005 - present</b> <b>Aug. 2021 - present</b>  <b>Feb. 2021 - Jul. 2021</b>  <b>Aug. 2020 - Jan. 2021</b>  <b>Sep. 2015 - Oct. 2015</b>  <b>Aug. 2012 - Jul. 2013</b>  <b>May 2007 - Aug. 2007</b>  <b>Oct. 1999 - May 2005</b>  <b>Sep. 1994 - Aug. 1999</b>
EDUCATION	<b>Princeton University</b> , Princeton, New Jersey USA Department of Electrical Engineering <b>Indian Institute of Technology Madras</b> , Chennai, India Department of Electrical Engineering		
			<b>Ph.D.</b> , September 1999 <b>M.A.</b> , May 1996  <b>B.Tech.</b> , EC, July, 1994

EDITORSHIPS AND GUEST EDITING	Member, Editorial Board, Journal of the Indian Institute of Science
	Guest Co-Editor, 5G and Beyond, Journal of the Indian Institute of Science
	Associate Editor for Communications, IEEE Transactions on Information Theory, 2012-2015
PLENARIES AND INVITED TUTORIALS	SIGMETRICS/Performance 2022, IIT Bombay (2022)
	Keynote speaker at the 14th International Conference on COMmunication Systems & NETworkS (COMSNETS 2022), Bengaluru (2022)
	North American School on Information Theory Speaker, Texas A&M University (2018)
	Plenary speaker at the 15th International Symposium on Modeling and Optimization in Mobile, Ad Hoc, Wireless Networks (WiOpt 2017)
HONOURS AND AWARDS	IISc Alumni Award for Excellence in Research in Engineering 2022
	National Conference on Communications Best Paper Award 2015
	Indo-US Science and Technology Forum Fellow 2012-2013
	IETE K.S.Krishnan Memorial Best Paper Award 2006
	Senior Member, IEEE, 2006
SOME DISTANT RECOGNITIONS	Princeton University Merit Prize, 1994
	Notional Prize awarded by IIT Madras, for creditable performance in the Joint Entrance Examination, 1990 (All India Rank 49)
	Merit Prize awarded by the Central Board of Secondary Education, India, for being in the top 0.1% of successful candidates in Physics, 1990
	National Talent Search Scholarship awarded by the National Council for Educational Research and Training, India, 1988
PUBLICATIONS: JOURNAL	B.Espinoza, et al., "Coupled models of genomic surveillance and evolving pandemics with applications for timely public health interventions", <i>Proceedings of the National Academy of Sciences</i> , 120 (48) e2305227120, November 20, 2023.
	S.Yasodharan, R.Sundaresan, "A sufficient condition for the quasipotential to be the rate function of the invariant measure of countable-state mean-field interacting particle systems", to appear, <i>Advances in Applied Probability</i> .
	M.Moharrami, V.Subramanian, M.Liu, R.Sundaresan, "The Erlang weighted tree, a new branching process," to appear, <i>Random Structures and Algorithms</i> .
	P.N.Karthik, N.Rathod, S.Yasodharan, W.Lobo, A.Sahadevan, R.Sundaresan. P.Verma, "Bus priority lane in Bengaluru: A study on its effectiveness and driver stress," <i>Transport Policy</i> , vol. 139,

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S.Athreya, G.I.Menon, R.Sundaresan, "COVID-19 modeling for India and a roadmap for the future," *Communications of the ACM*, vol. 65, issue 11, pp. 82-87, November 2022,

G.R.Prabhu, S.Bhashyam, A.Gopalan, R.Sundaresan, "Sequential multi-hypothesis testing in multi-armed bandit problems: An approach for asymptotic optimality," *IEEE Transactions on Information Theory*, vol.68, no.7, pp. 4790-4817, July 2022.

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S.Yasodharan, R.Sundaresan, "Large time behaviour and the second eigenvalue problem for finite state mean-field interacting particle systems," *Advances in Applied Probability*, April 2022.

N.Rathod and R.Sundaresan, "Relay Placement Algorithms for IoT Connectivity and Coverage in an Outdoor Heterogeneous Propagation Environment," *IEEE Access*, Volume 10, pp.13270-13289, 2022.

M.R.Padma, et al., "Second round statewide survey for estimation of the burden of active infection and anti-SARS-CoV-2 IgG antibodies in the general population of Karnataka, India," *International Journal of Infectious Diseases – Regions*, Volume 1, pp.107-116, December 2021.

S.Athreya, et al., "COVID-19: Optimal design of serosurvey for disease burden estimation," *Sankhya B*, pp.1-23, 19 October 2021.

Giridhara R. Babu, et al., "The burden of active infection and anti-SARS-CoV-2 IgG antibodies in the general population: Results from a statewide survey in Karnataka, India," *International Journal of Infectious Diseases*, Volume 108, P27-36, July 01, 2021.

P.N.Karthik, R.Sundaresan, "Detecting an odd restless Markov arm with a trembling hand," *IEEE Transaction on Information Theory*, vol.67, no.8, Aug 2021.

K.P.Naveen and R.Sundaresan, "Double-auction mechanisms for resource trading markets," *IEEE/ACM Transactions on Networking*, vol.29, no.3, pp.1210-1223, June 2021.

S.Agrawal et al., "City-scale agent-based simulators for the study of non-pharmaceutical interventions in the context of the COVID-19 epidemic," *Journal of the Indian Institute of Science*, vol. 100, pp. 809-847, November 2020.

P.N.Karthik, R.Sundaresan, "Learning to detect an odd Markov arm," *IEEE Transactions on Information Theory*, vol. 66, no. 7, pp. 4324-4348, July 2020.

N.Rathod, R.Subramanian, R.Sundaresan, "Coverage estimation in outdoor heterogeneous propagation environments," *IEEE Access*, vol. 8, pp. 31660-31673, 2020.

S.R.Athreya, V.S.Borkar, K.S.Kumar, R.Sundaresan, "Simultaneous small noise limit for singularly perturbed slow-fast coupled diffusions," *Applied Mathematics and Optimization*, 2019 Nov 21:1-48.

P.T.Akhil and R.Sundaresan, "Network utility maximization revisited: Three issues and their resolution," *Performance Evaluation*, Volume 136:102050, December 2019.

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- P.T.Akhil and R.Sundaresan, "A survey of algorithms for separable convex optimization with linear ascending constraints," *Sadhana, Academy Proceedings in Engineering Sciences*, 43:146, pp. 1-18, September 2018.
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- S.K.Iyer, D.Manjunath, R.Sundaresan, "In-network computation in random wireless networks: A PAC approach to constant refresh rates with lower energy costs," *IEEE Transactions on Mobile Computing*, vol. 10, no. 1, pp. 146-155, January 2011.
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R.Sundaresan and S.Verdú, “Sequential decoding for the exponential server timing channel,” *IEEE Transactions on Information Theory*, vol. IT-46, pp. 705-709, March 2000.

INVITED ARTICLES C.R.Murthy, R.Sundaresan, 5G and beyond, Guest Editorial, *Journal of the Indian Institute of Science*, vol. 100, no. 2, pp. 259-261, April-June 2020.

Book review of *Game Theory and Mechanism Design* authored by Y. Narahari, *Current Science*, vol. 111, no. 6, 25 September 2016.

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R.Sundaresan, “An introduction to guessing,” *Chakravayuh*, vol. 5, pp. 1-6, May 2008.

P.Subrahmanya, R.Sundaresan, and D.Shui, “An overview of high-speed packet data transport in CDMA systems,” *IETE Technical Review*, vol. 21, no. 5, Sept-Oct 2005.

DISSERTATION R.Sundaresan, *Coded communication over timing Channels*, Ph.D. dissertation, Department of Electrical Engineering, Princeton University, Princeton, NJ, Sept. 1999.

CONFERENCES K.V.Krishna Chaythanya, A.Chattopadhyay, A.Kumar, R.Sundaresan, “Quickest Change Point Detection with Measurements over a Lossy Link,” *62nd IEEE CDC 2023*, Singapore, December 2023.

A.Adiga et al., “A multi-team multi-model collaborative COVID-19 forecasting hub for India,” *Winter Simulation Conference 2023*, San Antonio, TX, USA, December 2023.

V.Kushwaha, A.R.Pinjari, S.K.Shaukat, R.Sundaresan, Y.Suzuki, P.Verma, “An auction mechanism to facilitate collaboration between rideshare and transit service providers for first- and last-mile services,” in *The 16th International Conference on Travel Behaviour Research*, Santiago, Chile, December 2022.

A.Joglekar, G.Bhandari, R.Sundaresan, “ESD wrist strap-based EDA sensor cum ESD strap integrity monitor,” *IECON 2021, the 47th Annual Conference of the IEEE Industrial Electronics Society*, October 2021.

S.Yasodharan and R.Sundaresan, “The four levels of fixed-points in mean-field models,” *National Conference on Communications*, Online, July 2021.

P.N.Karthik, R.Sundaresan, “Learning to detect an odd restless Markov arm,” *2021 IEEE Interna-*

*tional Symposium on Information Theory*, Online, July 2021.

A. Talekar, et al., "Cohorting to isolate asymptomatic spreaders: An agent-based simulation study on the Mumbai Suburban Railway." *The 20th International Conference on Autonomous Agents and Multiagent Systems, AAMAS-2021*, May 2021.

V.Kushwaha, A.R.Pinjari, R.Sundaresan, "Evaluating the benefit of collaboration between rideshare and transit service providers," *ITS Workshop, COMSNETS-2021*, Bangalore, India, January, 2021.

C.Kuruganti, et al., "A distributed hierarchy based framework for validating edge devices performing state estimation in a power system," *2020 IEEE International Conference on Power Systems Technology (POWERCON)*, Bangalore, India, 2020, pp. 1-6, September 2020.

P.N.Karthik, R.Sundaresan, "Detecting an odd restless Markov arm with a trembling hand," *2020 IEEE International Symposium on Information Theory*, Online, July 2020.

C-G. Jansson, et al., "Experiments in creating online course content for signal processing education," *ICASSP 2020*, Barcelona, Spain, pp. 9220-9223, May 2020.

G. Bhandari, P. M. Hiremath, A. Joglekar, A. Kulkarni, D. Kulkarni, C. Mahadeva, S. B. Mohanty, D. Raghunath, M. B. Raju, R. Shorey, R. Sundaresan, "An Implementation of an Industrial Internet of Things on an SMT Assembly Line," *COMSNETS 2020 - Demos and Exhibits*, Bengaluru, India, 2020.

N.Rathod, R.Sundaresan, "Relay Placement Algorithms for Communication in a Heterogeneous Propagation Environment," *Proceedings of the 12th IFIP Wireless and Mobile Networking Conference*, Paris, France, September 2019.

P.N.Karthik, R.Sundaresan, "Learning to detect an odd Markov arm," *Proceedings of the 2019 IEEE International Symposium on Information Theory 2019*, Paris, France, July 2019.

K.Chetan Kumar, G.Gurralla, R.Sundaresan, "A sequential testing framework for identifying a transmission line outage in a power system," *2019 ACM e-Energy 2019 Conference*, Phoenix, USA, June 2019.

G.R.Prabhu, S.Bhashyam, A.Gopalan, R.Sundaresan, "Learning to detect an anomalous target with observations from an exponential family," *2019 IEEE Data Science Workshop*, Minneapolis, USA, June 2019.

N.Rathod, R.Subramanian, R.Sundaresan, "Data-driven and GIS-based coverage estimation in a heterogeneous propagation environment," *Proceedings of the 2018 IEEE Global Communications Conference: Selected Areas in Communications – Internet of Things*, Abu Dhabi, December 2018.

N.Karanjkar, A.Joglekar, S.Mohanty, V.Prabhu, D.Raghunath, R.Sundaresan, "Digital twin for energy optimization in an SMT-PCB assembly line," *Proceedings of the 2018 IEEE International Conference on Internet of Things and Intelligence System (IoTAIS 2018)*, Bali, Indonesia, November 2018.

M.Moharrami, V.Subramanian, M.Liu, R.Sundaresan, "Local weak convergence based analysis of a new graph model", *Proceedings of the 2018 56th Annual Allerton Conference on Communication, Control, and Computing (Allerton)*, pp. 502-503, October 2018.

K.R.Sheetal Kumar, M.S.Mohan Kumar, B.Amrutur, R.Sundaresan, "Application of inequity indices for water supply between district metered areas – A case study on Bangalore South zone,

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K.P.Naveen and R.Sundaresan, “A double-auction mechanism for mobile data-offloading markets with strategic agents,” *Proceedings of the 16th International Symposium on Modeling and Optimization in Mobile, Adhoc, and Wireless Networks, WiOpt 2018*, Shanghai, China, May 2018.

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A.Kadavankandy, K.Avrachenkov, L.Cottatellucci, R.Sundaresan, “Belief propagation for subgraph detection with imperfect side-information,” *Proceedings of the 2017 IEEE International Symposium on Information Theory*, Aachen, Germany, May 2017.

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P.Verma, A.Kumar, N.Rathod, P.Jain, M.Sunkenapally, R.Subramanian, B.Amrutur, M.S.Mohan Kumar, R.Sundaresan, “Towards an IoT based water management system for a campus,” *Proceedings of the 2015 IEEE International Smart Cities Conference, Guadalajara*, Mexico, October 2015.

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filed at the Indian Patent Office with application 202341036246, 25 May 2023.

"Method and system for synchronizing plurality of events in an assembly line",  
coinvented with G.Bhandari, D.Raghunath, Prakash H.M., A.V.Joglekar, D.M.Kulkarni, S.Mohanty,  
V.Prabhu, R.Shorey, J.D.Tew,  
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"Integrated electrostatic discharge protection integrity and electrodermal activity sensor",  
coinvented with A.V.Joglekar,  
filed at the Indian Patent Office as a provisional application 201941048050, 25 November 2019.

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coinvented with J.Sidi,  
US Patent # 8,793,560, 29 July 2014.

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coinvented with G.Mergen, N.Kasturi, and P.Subrahmanya,  
US Patent # 8,160,128, 17 April 2012.

"Fractionally-spaced equalizers for spread spectrum wireless communication",  
co-invented with P.Subrahmanya, I.Kang, and J.Fei,  
US Patent # 8,064,552, 22 November 2011.

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co-invented with G.Mergen, N.Kasturi, and P.Subrahmanya,  
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“Method and apparatus for estimating channel characteristics using pilot and non-pilot data”,  
co-invented with A.Sendonaris,  
US Patent # 6,947,475, 20 September 2005.

“Turbo decoder with multiple scale selections”,  
co-invented with D.Shui,  
US Patent # 6,885,711, 26 April 2005.

#### PROFESSIONAL ACTIVITIES

General Co-Chair, 16th International Conference on COMmunication Systems & NETworkS (COM-SNETS 2024), Bengaluru, 2024

Steering Committee, Asian Engineering Deans Summit, Hong Kong, 2023.

TPC Member, IEEE International Symposium on Information Theory, ISIT 2021

TPC Member, 12th International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks, WiOpt 2021

TPC Member, IEEE International Symposium on Information Theory, ISIT 2020

TPC Member, 11th International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks, WiOpt 2020

TPC Member, ACM Mobihoc 2019

TPC Member, IEEE International Symposium on Information Theory, ISIT 2019

TPC Member, National Conference on Communications, NCC 2019

TPC Member, 10th International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks, WiOpt 2019

Workshop Co-Chair and TPC Member, International Conference on Signal Processing and Commu-nications, SPCOM 2018

TPC Member, IEEE International Symposium on Information Theory, ISIT 2018

TPC Member, 10th International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks, WiOpt 2018

TPC Member, National Conference on Communications, NCC 2018

TPC Member, 10th Intl. Conference on Communication Systems & Networks, COMSNETS 2018

TPC Member, 2017 International Conference on Advanced Networks and Telecommunication Sys-tems (ANTS 2017)

Co-chair, Workshop on Research to Impact, November 2017.

General Co-chair, International Symposium on Cyber-Physical Systems, July 2017.

TPC Member, 10th International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks, WiOpt 2017

TPC Member, National Conference on Communications, NCC 2017

TPC Member, 9th Intl. Conference on Communication Systems & Networks, COMSNETS 2017

TPC Member, IEEE International Symposium on Information Theory, ISIT 2016

TPC Member, International Conference on Signal Processing and Communications, SPCOM 2018

TPC Member, 10th International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks, WiOpt 2016

TPC Member, National Conference on Communications, NCC 2016

Co-chair, Workshop on Game Theory and Mechanism Design, January 2016

Co-chair, Advanced Training in Mathematics, Workshop on Applied Probability, January 2016

Associate Editor for Communications, IEEE Transactions on Information Theory, 2012-2015

Workshop Co-Chair, 13th International Symposium on Modeling and Optimization in Mobile, Ad

Hoc, and Wireless Networks, WiOpt 2015

TPC Member, National Conference on Communications, NCC 2015

Coordinator, Joint Telematics Group of IITs and IISc, 2008 - 2014

Programme Committee, IISc/Microsoft Research Summer School on Wireless Networking, 2014

TPC Member, IEEE International Symposium on Information Theory, ISIT 2014

TPC Member, 12th International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks, WiOpt 2014

TPC Member, National Conference on Communications, NCC 2014

Organiser, Workshops on New Avenues for Network Models and Social Networks, January 2014

TPC Co-Chair, 11th International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks, WiOpt 2013

TPC Member, National Conference on Communications, NCC 2013

Finance Co-Chair, International Conference on Signal Processing and Communications, SPCOM 2012

TPC Member, National Conference on Communications, NCC 2012

Local Organisation Committee, IISc Mathematics Initiative (IMI) Networks Thematic Programme 2011-2012

TPC Member, 10th International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks, WiOpt 2012

Member, Organising Committee, ICTS School and Workshop on Network Science in Electrical Engineering and Computer Science, January 2012

TPC Member, Gamesec 2011

Member, Organising Committee, Workshop on Introduction to Network Science, September 2011

TPC Member, 9th International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks, WiOpt 2011

Member, Conference Executive Committee, Finance and Local Organisation, National Conference on Communications 2011

Member, Local Organising Committee, ICM Satellite Conf on Probability and Stochastics 2010

TPC Member, International Conference on Signal Processing and Communications, SPCOM 2010

Organiser, Joint Telematics Group Summer School 2010

TPC Member, National Conference on Communications, NCC 2010

TPC Member, International Conference on Distributed Computing and Networking, ICDCN 2010

Organiser, Joint Telematics Group Summer School 2009

TPC Co-Chair, Wireless Systems: Advanced Research & Development, WISARD 2009

TPC Member, IISc Centenary Conference on Managing Complexity in a Distributed World 2008

TPC Co-Chair, Wireless Systems: Advanced Research & Development, WISARD 2008

TPC Member, IEEE GlobeCom 2008

TPC Member, Wireless Personal Mobile Communications, WPMC 2007

TPC Member, Wireless Systems: Advanced Research & Development, WISARD 2007

Organiser, Workshop on Cognitive Radio 2007