Vinay Kumar B. R.

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EDUCATION

Indian Institute of Science   Bengaluru, India
- *Doctor of Philosophy: Dept. of Electrical Communication Engineering*   *Aug. 2015 – Dec 2021*

  Research Interests: *Ad-hoc networks, random graphs, probability theory, statistical learning*

Birla Institute of Technology and Sciences   Pilani, India
- *Master of Science (Hons.) in Mathematics*   *Aug. 2009 – July. 2014*

  Bachelor of Engineering (Hons.) in Electrical and Electronics

FELLOWSHIP

RISE Academie-I Post-doctoral fellowship, Univ. Côte d'Azur, France   *Feb 2022 - Jan 2023*
CISCO-IISc PhD Research Fellowship   *Aug 2015 - July 2020*

PROFESSIONAL EXPERIENCE

- **INRIA- Sophia Antipolis Meditarnees**   France
  Post-doctoral researcher   *Feb 2022 - Present*
  Advisor: Dr. Konstantin Avrachenkov
  Project: Clustering in random geometric graphs
    - Propose and analyze clustering mechanisms for random geometric graphs
    - Investigate semi-supervised learning algorithms for community detection on networks with geometry.

- **Dept. of Electrical Communication Engineering, IISc**   Bengaluru, India
  Graduate student researcher   *Aug 2015- Dec 2021*
  Advisor: Prof. Navin Kashyap
  Project: Broadcast mechanisms for ad-hoc networks
    - Propose and analyze distributed broadcast mechanisms for large ad-hoc networks
    - Performace analysis with respect to energy efficiency of the proposed mechanisms and comparison to existing ones

  Open-source code available at https://github.com/vinkumbr/Prob.fwding.git

- **Dept. of Electronic Systems Engineering, IISc**   Bengaluru, India
  Project associate   *Jan 2014 - May 2015*
  Supervisor: Dr. T. V. Prabhakar
  Project: Indoor positioning technologies for airplane cabin systerms
    - Proposed an algorithm for localization (of safety vests) in an airplane cabin using BLE and RFID
    - Realized the system in practice and characterized its performance

- **Birla Institute of Technology and Sciences**   Pilani, India
  Undergraduate researcher   *Aug 2014- Dec 2014*
  Advisor: Prof. G. Raghurama
  Project: Designing a wireless network for the BITS campus
    - Provided inputs to Wifi access point deployment by considering expected load at different places in the BITS-Pilani campus
    - Hands-on experience with programming network routers and switches

- **Madras Atomic Power Station**   Kalpakkam, India
  Undergraduate Intern   *Summer 2011*
    - Designed a website for the Operating Experience Review Committee (OERC) at MAPS
    - First hand experience of the functioning of a nuclear reactor

4.1 Journal

- B. R. Vinay Kumar, N. Kashyap, and D. Yogeshwaran, *"An Analysis of Probabilistic Forwarding of Coded Packets on Random Geometric Graphs"*, *Performance Evaluation*, p.102343, Feb 2023.

- B. R. Vinay Kumar and N. Kashyap, *"Probabilistic Forwarding of Coded Packets on Networks"*, *IEEE/ACM Transactions on Networking*, vol. 29, no. 1, pp. 234 - 247, 2021.

4.2 Conference

- K. Alaluusua, K. Avrachenkov, B. R. Vinay Kumar, and L. Leskelä, *"Multilayer hypergraph clustering using the aggregate similarity matrix"*, accepted to *18th Workshop on Algorithms and Models for the Web Graph (WAW 2023)*.

- B. R. Vinay Kumar, N. Kashyap, D. Yogeshwaran, *"An Analysis of Probabilistic Forwarding of Coded Packets on Random Geometric Graphs"*, in *Proc. 19th International Symposium on Modeling and Optimization in Mobile, Ad hoc, and Wireless Networks (WiOpt 2021)*, Oct 8-11, 2021. [Extended preprint]. Available: arxiv.org/abs/2105.08779.

- B. R. Vinay Kumar, N. Kashyap, *"Probabilistic Forwarding of Coded Packets on Networks,"* in *Proc. IEEE International Symposium on Information Theory (ISIT 2019)*, Paris, Jul 7-12, 2019.

- B. R. Vinay Kumar, R. Antony and N. Kashyap, *"The Effect of Introducing Redundancy in a Probabilistic Forwarding Protocol,"* in *Proc. 2018 National Conference on Communications (NCC 2018)*, IIT- Hyderabad, Feb 25-28, 2018

4.3 Presentations/Posters

- **Third prize** in the '*My Research Story*' video contest organized by IEEE-IISc Communications Society- Sept. 2021

- "Probabilistic forwarding with coding for network-wide broadcast", EECS Symposium-2021, IISc, Bengaluru - won the **Best Presentation Award**

- "Probabilistic forwarding of coded packets on networks", EECS Symposium-2019, IISc, Bengaluru - one of the winners of the **Ittiam Systems-Best Poster award**

- "Probabilistic forwarding of coded packets on networks", JTG-2019, IIT-Madras

- "The Effect of Introducing Redundancy in a Probabilistic Forwarding Protocol", 10th International Conference on Communication Systems and Networks (COMSNETS), Asian Students' Symposium on Emerging Technology (ASSET) Bengaluru, Jan 3-9, 2018

- "Independent Percolations on a Finite Graph", Lectures in Probability and Stochastic Processes (LPS) XII, ISI-Kolkata, Dec 15-19, 2017

- **COVID-19 infection rate estimation** - Joint work with Navin Kashyap, Manjunath Krishnapur, Arvind Rameshwar, Jnaneshwar B.S. and Anand Jerry George.

  Built an estimator for the unknown time series, I(t), formed by the daily number of new COVID-19 infections, based on the observed time series, P(t), of the number of hospitalized cases that test positive each day.

  Webpage: https://covid19-prev-est.herokuapp.com/

- **Coursereg**- Joint work with Arthi Ramaniam, Bhargava Srivatsa, Nihesh Rathod, Parimal Parag, Rajesh Sunderasan, Sagar Gubbi, Suman Panchal

  Created a website to aid in the course registration process for academic institutions.

  Open-source code available at https://github.com/s-gv/bheemboy

- **OERC Deliberations**- Designed a website for the Operating Experience Review Committee at Madras Atomic Power Station (MAPS), Kalpakkam, India

  Tools used - PHP, MySQL

Teaching Experience

- Teaching Assistant for the course **Error correcting codes**, Dept. of ECE, IISc,   Fall 2018, 2020, 2021
- Teaching Assistant for the course **Probability models**, Mathematics Dept., IISc   Spring 2018
- Convenor of the study group on **Point processes**, Dept. of ECE, IISc   Fall 2016
- Teaching Assistant for the course **Engineering Graphics**, BITS-Pilani   Fall 2010

Skills

Python, Manim, MATLAB, C, Django

Professional service

- Executive Committee member of the **IISc-Society of Industrial and Applied Mathematics (SIAM) student chapter**; a platform for inter-disciplinary interaction related to mathematics in IISc
- Co-organizer of the **ECE Students' Seminar Series** in IISc; an in-house platform for ECE students to exchange ideas and collaborate
- Reviewer: IEEE/ACM Transactions on Networking, International Teletraffic Congress (ITC), Computer Communications, Stochastic Models.

Extra-curricular activities

- Leader of the project "**Inter-connectuvity of Schools**" in Nirmaan, an NGO working to create employment and provide education in Pilani
- Joint Secretary of the **Mathematics Association, BITS-Pilani**: Conducted events and was also involved in projects during APOGEE, the technical fest of BITS-Pilani.
- A puzzle enthusiast and an avid cyclist