

# Sagar Bharadwaj

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## EDUCATION

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### Carnegie Mellon University

PhD in Computer Science

Pittsburgh, Pennsylvania

August 2021 – Present

### National Institute of Technology Karnataka, Surathkal

Bachelor of Technology in Computer Science, GPA : 9.41 / 10.00 (Top 5 Percentile)

Surathkal, India

2015 – 2019

## EXPERIENCE

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### Microsoft Research India

Research Fellow | Dr. Ranjita Bhagwan, Dr. Venkat Padmanabhan, Dr. Saikat Guha

July 2019 – July 2021

Bangalore, India

- Working on data-driven inter-datacenter network optimization. Savings in the order of tens of millions of dollars.
- Solving large-scale data discovery problems in datalakes of size in the order of petabytes.

### Google Summer of Code Student

Mozilla Firefox | Nihanth Subramanya

May 2018 – August 2018

- Implemented a mechanism to prevent multiple downloads from bombarding the Firefox browser.

### Intuit India

Software Engineering Intern | DevOps Team

May 2018 – July 2018

Bangalore, India

- Built a data pipeline to consume, store and analyze real time database operational metrics.
- Used open source tools like *Apache Kafka*, *Druid* and *RabbitMQ* to build the project infrastructure from scratch.

### Samsung India, R&D

Software Engineering Intern | Modem Team

May 2017 – July 2017

Bangalore, India

- Automated unification of Time and Frequency Division Duplex codebases written for Shannon chipsets.
- Achieved 30% code size reduction using C parser scripts in Perl.

## SELECTED PROJECTS

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### Cost-Aware Networking for First-Party Cloud Applications

Dr. Ranjita Bhagwan, Dr. Venkat Padmanabhan

Aug 2019 - Present

Microsoft Research

- Motivation:* Close cooperation between first-party applications and network can lead to WAN cost savings.
- Leveraged large deadlines of applications to reduce bandwidth peak and improve network redundancy provisioning. Estimated network capacity savings is around 20%.

### Discovering Related Data At Scale

Dr. Ranjita Bhagwan, Dr. Saikat Guha

Sep 2019 - Present

Microsoft Research

- Motivation:* Automating discovery of related data in a very large datalake.
- Developed a framework to construct graph of related data from metadata and sampled content. Leveraged user query histories as ground truth to learn properties of related data in the datalake.
- The framework can construct the 'relatedness graph' for a datalake of size 4 petabytes in around an hour.

### Blockchain-Backed Volunteer Computing Platform

Dr. K Chandrasekaran | [Project Link](#)

Aug 2018 - May 2019

National Institute of Technology Karnataka

- Developed a peer to peer system that acts as a trustless marketplace for buying and selling computation resources.
- Leveraged Blockchain to achieve decentralization and trustlessness.

### Virtual Database Administrator (vDBA)

DevOps Team

May 2018 - July 2018

Intuit India

- Large quantities of database telemetry is generated that can be leveraged by database administrators for debugging and maintenance purposes. For example, execution time associated with a query plan.
- Built vDBA: A framework to collect, analyse and visualize large scale telemetry data, specifically database metrics.

### EYantra Snakebot

Eyantra Team | [Project Link](#) | [Finals Video](#)

Nov 2017 - Apr 2018

Indian Institute of Technology Bombay

- Team of 4 designed, 3D printed and programmed a snake robot for EYantra, a national level robotics competition.
- Programmed the bot and the controller. National finals winners. Competed with 5932 teams.

### Handwritten Equation Solver

Oct 2017 - May 2018

IEEE NITK Student Branch | [Project Link](#)

*National Institute of Technology Karnataka*

- Developed a mobile application to solve handwritten mathematical equations using deep learning algorithms.
- Leveraged *SymPy* as the Math Engine and implemented CNN models for symbol recognition.

### Low-rate TCP DoS Attack

Aug 2017 - Dec 2017

Dr. Mohit P Tahiliani | [Project Link](#)

*National Institute of Technology Karnataka*

- Simulated a Low-rate TCP DoS Attack in ns-3. Achieved by exploiting Retransmission Timeout (RTO) in the congestion control algorithm implemented in TCP Reno.

### Parallel Sparse Matrix Vector Multiplication (SpMV)

Aug 2017 - Dec 2017

Dr. Basavaraj Talawar | [Project Link](#)

*National Institute of Technology Karnataka*

- Implemented a parallel algorithm for Sparse-Matrix-Vector Multiplication (SpMV) in *CUDA*. Our novel algorithm beat the state of the art implementation in the standard *cuSparse* library for certain inputs.

### Operating System Simulator

Jan 2017 - Apr 2017

Dr. Shashidhar G Koolagudi | [Project Link](#)

*National Institute of Technology Karnataka*

- Led a team of 11 students to develop a web application that simulates various functions of an Operating System. Built using the *Django* web framework and uses Python for backend calculations.

## PUBLICATIONS

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- **Discovering Related Data At Scale**

Sagar Bharadwaj, Praveen Gupta, Ranjita Bhagwan, Saikat Guha  
International Conference on Very Large Data Bases (VLDB) 2021 | [Link](#)

- **Optimizing Network Provisioning through Cooperation**

H. Sharma\*, S.Bharadwaj\*, P.Thakkar\*, S.Acharyya, Y. Bansal, R. Bhagwan, V. Kumar, V.N. Padmanabhan, K.Voelbel  
Under submission | [Link](#) | \*Equal contribution

- **CollabChain: Blockchain-Backed Trustless Web-Based Volunteer Computing Platform**

Sagar Bharadwaj, Samvid Dharanikota, Adarsh Honawad, K. Chandrasekaran  
Computer Information Systems and Industrial Mgmt (CISIM), 2019. Lecture Notes in Computer Science, Springer | [Link](#)

- **SolveIt: An Application for Automated Recognition and Processing of Handwritten Mathematical Equations**

Sagar Bharadwaj, Vilas Bhat, Arvind Sai Krishnan  
4th IEEE International Conference for Convergence in Technology (I2CT), 2018 | [Link](#)

- **Blockchain Research and Applications: A Systematic Mapping Study**

Sagar Bharadwaj, Samvid Dharanikota, Adarsh Honawad, K. Chandrasekaran  
International Conference on Blockchain Technology (IC-BCT), 2019. Springer | [Link](#)

## ACTIVITIES

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- Open Source Enthusiast
  - Listed as an official contributor to SymPy, a Computer Algebra System (CAS).
  - Contributed many patches to Mozilla Firefox.
- Chief Coordinator for IEEE Women in Technology Summit | Coordinated 70+ volunteers from all over India.
- Secretary of Web Club, NITK | Organized series of events around Open Source Software.
- Executive Member of IEEE NITK | Mentored and completed projects spanning many areas of interest for 3 years.
- Computer Science projects head, Technites (a technical fest), NITK.

## MISCELLANEOUS

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- National Winner of *EYantra*, 2018 | Robotics contest. Competed against 23,728 Students in 5,932 Teams.
- Ranked 2<sup>nd</sup> in India, 94<sup>th</sup> globally out of over 3300 teams in IEEEExtreme 2017, a 24 hour coding contest.
- 99.57 percentile in JEE Main (2015) examination among 1.3 million candidates.
- 99.91 percentile in KCET (2015) examination among 153k candidates.