

# VENKAT ARUN

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## RESEARCH INTEREST AND VISION

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Today's networked systems perform well most of the time, but not all the time. A key reason for this is that they use heuristics whose behavior is poorly understood. I use automated reasoning in new ways to augment human ability to understand the behavior of widely deployed heuristics. My tools prove performance properties of network heuristics and uncover unexpected ways in which they fail in the real world. I have applied this technique to many areas with the bulk of my work focusing on congestion control. Going forward, I will use this approach to design systems that are provably performant and robust.

## EDUCATION

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**Massachusetts Institute of Technology (MIT)** 2019-Present

Ph.D. Student in Dept. of EECS

Advisors: Hari Balakrishnan and Mohammad Alizadeh

**Massachusetts Institute of Technology (MIT)** 2017-2019

Master of Science, Dept. of EECS

Advisors: Hari Balakrishnan and Mohammad Alizadeh

**Indian Institute of Technology Guwahati (IIT-G)** 2013-2017

B.Tech. in Computer Science & Engineering

*President of India Gold Medal*

## INDUSTRY IMPACT

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1. Meta uses my congestion control algorithm (CCA), Copa [3], for live video uploads
2. Meta uses a my modification to BBR [2] (a CCA designed by Google) for a vast majority of their user-facing traffic

## HONORS AND AWARDS

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- Marconi Society Young Scholar Award, 2023
- ACM SIGCOMM Best Student Paper Award, 2022
- ACM SIGCOMM Best Paper Award, 2017
- Jacobs Presidential Fellowship, 2017 (MIT)
- President of India Gold Medal, 2017 (IIT Guwahati)
- Institute Merit Scholarship, 2015 and 2016 (IIT Guwahati)
- KVPY Government of India Scholarship, 2013

## PUBLICATIONS

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1. *Starvation in End-to-End Congestion Control*  
**Venkat Arun**, Mohammad Alizadeh, Hari Balakrishnan  
ACM SIGCOMM 2022  
**Best Student Paper Award**  
<https://dl.acm.org/doi/10.1145/3544216.3544223>
2. *Toward Formally Verifying Congestion Control Behavior*  
**Venkat Arun**, Mina Arashloo, Ahmed Saeed, Mohammad Alizadeh, Hari Balakrishnan  
ACM SIGCOMM 2021  
**Being used at Meta**  
<https://dl.acm.org/doi/10.1145/3452296.3472912>
3. *Copa: Practical Delay-Based Congestion Control for the Internet*  
**Venkat Arun**, Hari Balakrishnan

USENIX NSDI 2018

**Being used at Meta**

<https://web.mit.edu/copa/>

4. *RFocus: Practical Beamforming for Small Devices*

**Venkat Arun**, Hari Balakrishnan

USENIX NSDI 2020

**Largest antenna array ever used for a single communication link**

<https://people.csail.mit.edu/venkatar/rfocus.html>

5. *Finding Safety in Numbers with Secure Allegation Escrows*

**Venkat Arun**, Aniket Kate, Deepak Garg, Peter Druschel, Bobby Bhattacharjee

NDSS Symposium 2020

<https://arxiv.org/abs/1810.10123>

6. *Language-Directed Hardware Design for Network Performance Monitoring*

Srinivas Narayana, Anirudh Sivaraman, Vikram Nathan, Prateesh Goyal, **Venkat Arun**, Mohammad Alizadeh, Vimalakumar Jeyakumar, and Changhoon Kim

ACM SIGCOMM 2017

**Best Paper Award**

<https://web.mit.edu/marple/>

7. *Automating Network Heuristic Design and Analysis*

Anup Agarwal, **Venkat Arun**, Devdeep Ray, Ruben Martins, Srini Seshan

ACM SIGCOMM HotNets 2022

[https://conferences.sigcomm.org/hotnets/2022/papers/hotnets22\\_agarwal.pdf](https://conferences.sigcomm.org/hotnets/2022/papers/hotnets22_agarwal.pdf)

8. *Quantitative Verification of Scheduling Heuristics*

Saksham Goel, Benjamin Mikek, Jehad Aly, **Venkat Arun**, Ahmed Saeed, Aditya Akella

In Submission

<https://arxiv.org/abs/2301.04205>

9. *Privid: Practical, Privacy-Preserving Video Analytics Queries*

Frank Cangialosi, Neil Agarwal, **Venkat Arun**, Junchen Jiang, Srinivas Narayana, Anand Sarwate, Ravi Netravali

USENIX NSDI 2022

<https://arxiv.org/pdf/2106.12083.pdf>

10. *Throughput-Fairness Tradeoffs in Mobility Platforms*

Arjun Balasingam, Karthik Gopalakrishnan, Radhika Mittal, **Venkat Arun**, Ahmed Saeed, Mohammad Alizadeh, Hamsa Balakrishnan, Hari Balakrishnan

ACM MobiSys 2021

<https://people.csail.mit.edu/arjunvb/pubs/mobius-mobisys21-paper.pdf>

11. *Enabling High Quality Real-Time Communications with Adaptive Frame-Rate*

Zili Meng, Tingfeng Wang, Yixin Shen, Bo Wang, Mingwei Xu, Rui Han, Honghao Liu, **Venkat Arun**, Hongxin Hu, Xue Wei

USENIX NSDI 2023

12. *The Case for an Internet Primitive for Fault Localization*

Will Sussman, Emily Marx, **Venkat Arun**, Akshay Narayan, Mohammad Alizadeh, Hari Balakrishnan, Aurojit Panda, Scott Shenker

ACM SIGCOMM HotNets 2022

[https://conferences.sigcomm.org/hotnets/2022/papers/hotnets22\\_sussman.pdf](https://conferences.sigcomm.org/hotnets/2022/papers/hotnets22_sussman.pdf)

## SELECTED PRESS COVERAGE

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Starvation in CC [1]	MIT News, IEEE Spectrum, APNIC Blog, The Register, Extreme Tech
RFocus [4]	MIT News, BBC Radio, Tech Crunch, Venture Beat, Engadget, Tech Spot, Digital Trends
Privid [9]	MIT News, IEEE Spectrum, Hacker News, Sci Tech Daily, MarkTechPost