

Rahul Bothra

<https://rahul-bothra.github.io>

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Education	Birla Institute of Technology and Science, Pilani B.E. in Computer Science (GPA: 8.09/10.00)	Aug. 2016 - Dec. 2019
Experience	Research Fellow, Microsoft Research Advisors: Dr. Venkat Padmanabhan , Dr. Ranjita Bhagwan Project: Optimizing resource efficiency for Microsoft Teams <ul style="list-style-type: none">Designed a peak-aware resource provisioning and allocation plan, with time-aware redundancy planning, which led to estimated cost savings of about 120M\$/year and latency improvement of about 50%.Under submission at SIGMETRICS 2023. (Link to preprint). Project: Network sensitivity of video conferencing applications <ul style="list-style-type: none">Devised metrics of user engagement and analyzed their sensitivity to network performance. Identified applications in improving traffic engineering, congestion control, and server allocation techniques.Under submission at PAM 2023. (Link to preprint). Advisors: Dr. Ramachandran Ramjee , Dr. Muthian Sivathanu Project: Identifying communication bottlenecks in ML training <ul style="list-style-type: none">Fixed issues in how DL communication frameworks interacted with kernel APIs, which were causing latency overheads.Reduced ephemeral congestion in All Reduce communication by strategically modifying the size and order of the ring topology.Improved communication performance by up to 60%.	2021 - Present
	Software Engineer, Azure Migrate Managers: Priyank Gaharwar, Charumathy Srinivasan <ul style="list-style-type: none">Designed components to scale-out and orchestrate migration from multiple servers for customers with large in-house datacenters.Built in-application debugging for network and authentication issues and improved the user interface, both of which improved the SLA from 96% to 99.5% and generated strong positive customer feedback.	2020
Projects	P4-TrafficTool Advisor: Prof. Ben Leong, NUS Singapore P4-TrafficTool generates protocol and packet templates for frameworks like Scapy, MoonGen, Wireshark, etc. Understood the p4c compiler pipeline and added support in P4-Traffictool to handle more variations of P4 programs. Source .	2020
	Heuristical approach to Clustered Orienteering Advisor: Prof. Abhishek Mishra, BITS Pilani , Prof. Pramod Tanwar, CSIR CEERI Clustered Orienteering is an exponentially harder variation of the Travelling Salesman Problem. I designed a GA and Swarm Optimization based heuristic, which improved performance by 38% and accuracy by 5% than state of the art. (Link to thesis).	2019

	Reducing image distortion via object aware Seam Carving 2019 Advisor: Prof. Pramod Tanwar, CSIR CEERI Identified conditions under which important parts of an image can get distorted by Seam Carving and designed an object-aware technique to reduce these distortions. We are working towards a patent filing.
	Google Summer of Code - Sugar Labs 2018 Advisor: Walter Bender, Founder - MIT Media Lab Implemented cross-version Python support for the Sugar OS, and build pedagogy applications on top of it. Tested the system across hardwares (OLPC laptops, Raspberry Pi's), distributions (Debian, Fedora), and Python versions (2.3 to 3.7). Source .
	Hyperloop India, SpaceX Global Challenge 2017 Designed and manufactured the <i>MagLev</i> system with Neodymium magnets for a Hyperloop prototype. Our team was amongst the 24 finalists who piloted the pod at the SpaceX Global Challenge.
Teaching Positions	Teaching Assistant, BITS Pilani 2017 - 2019 Professors: Jagat Sesh., Sundaresan Raman. et. al. Courses: Logic in Computer Science (CS F211), and Programming (CS F111)
	Mentor, Google Open Source Programs 2018 - 2020 Mentored university and high school students in working with open-source projects.
	Lecturer, CSD course, BITS Pilani 2019 Introduced and led an audit course <i>Data Science with Python</i> . Designed course content and evaluative components and taught over 50 students.
Academic Honors	KVPY Fellowship by Dept. of Science and Technology, Govt of India NTSE Scholarship by NCERT Council, Govt of India