

AYUSH MISHRA

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RESEARCH INTERESTS	Systems and Networking → Internet Congestion Control.	
EDUCATION	National University of Singapore , Singapore <i>PhD Candidate</i> , Computer Science Advisor: Dr. Ben Leong Jan 2019 - Present (expected graduation 2023)	
	National Institute of Technology, Trichy , Tamil Nadu, India <i>Bachelor of technology, Computer Science and Engineering</i> May 2018	CGPA: 8.70/10.00
	Global Indian International School , Singapore <i>Higher Secondary School Certificate Examination, CBSE</i> May 2014	Aggregate 95.6%
PUBLICATIONS	Conjecture: Existence of Nash Equilibria in Modern Internet Congestion Control Proceedings of the Asia-Pacific Workshop on Networking APNet 2021 <u>Ayush Mishra</u> , Jingzhi Zhang, Melodies Sim, Sean Ng, Raj Joshi, and Ben Leong.	
	The Great Internet TCP Congestion Control Census. Proceedings of the ACM on Measurement and Analysis of Computing Systems SIGMETRICS 2020 <u>Ayush Mishra</u> , Xiangpeng Sun, Atishya Jain, Sameer Pande, Raj Joshi, and Ben Leong.	
	Random patterned illumination for high resolution imaging. International Conference on Optical and Photonics Engineering 2017 Ananth Shinde, <u>Ayush Mishra</u> , Sandeep Perinchery, Matham V. Murukeshan	
AWARDS	Award for Excellence in Teaching School of Computing, National University of Singapore	January 2021
	Research Achievement Award School of Computing, National University of Singapore	January 2020
	INSPIRE Scholarship for Higher Education Department of Science and Technology (DST) Ministry of Science and Technology, Government of India	July 2014
	APJ Abdul Kalam Award for Academic Proficiency Global Indian International School, Singapore	June 2012
TECHNICAL SKILLS	Programming:	Over 5000 lines: C, C++, Python Familiar: Java, Go, Rust
	Mobile and Web Technologies:	Android, Django, HTML, CSS, JavaScript
	Networking:	P4-16, OpenFlow, Docker
SERVICE	Contributed reviews ACM HotNets '20, APNet '21, ICNP '21	
PROFESSIONAL EXPERIENCE	HP Enterprises, Singapore Software Development Intern May, 2016 - June, 2016 • Team Polling Web application:	

- Designed and built a Polling and Feedback application using Django that was deployed on the HPE cloud.
- The application proved to be an effective productivity tool and was adopted by the Hybrid-APJ cloud computing team.

ACADEMIC INTERNSHIPS

School of Computing, National University of Singapore

Supervisor: *Dr. Ben Leong*

May, 2017 - Aug, 2017

- **Building heterogeneous container clusters for power saving in Data Centres:**
 - Built a heterogeneous cluster with Raspberry Pi and x86 machines with the aim of building a power efficient cluster of nodes.
 - Bench-marked I/O, network and compute performance of the nodes and used these metrics to design a rudimentary scheduler that scheduled less compute intensive tasks to the more power efficient (Raspberry Pi) nodes.
- **Dynamic Bandwidth adaption in 802.11ac WiFi networks:**
 - The project explored hardware for implementing bandwidth adaptation from the client side, to incorporate parameters in the rate determination step that only the client can supply.
 - The project required having an in-depth understanding of the Linux 802.11 stack and OpenWRT.
 - Tested several A/P and chipsets. The project was ultimately abandoned because the only way to implement the solution was to make changes to the PHY interface - which is not possible on most modern chipsets.

SELECTED COLLEGE PROJECTS

Securing container networks through monitoring and orchestration

(BTech FYP)

Supervisor: Dr. C Mala

- Built Prototype Docker swarm scheduler that identified nodes with uncharacteristically high resource consumption
- The scheduler automatically designated one of the swarm nodes as a 'quarantine' node, where work-loads with high resource usage were migrated to and terminated after a timeout.

Gift-wrap - Dynamic Routing protocol for sender and receiver anonymity

- The aim of this project was to provide TOR/HORNET-level anonymity while cutting down on the computation cost and susceptibility to attacks from nodes closest to the end-points.
- Designed an IPSec-based dynamic routing protocol which used random routing (with delivery guarantees) to achieve anonymity.
- Built a simulator in C++ as a proof of concept.

CSPIHT - Compressed trees for SPIHT Image compression

- Improved on the SPIHT image compression algorithm by using line-encoding to further compress SPIHT-generated trees.
- Our approach improved the compression ratio of SPIHT by 2X in most standard image datasets.

TEACHING EXPERIENCE

Teaching Assistant, CS1010X: Programming Methodology

Jan, 2019 - June, 2019, Instructor: *Dr. Ben Leong*, Mean Student Rating: **4.1/5.0**

Jan, 2020 - June, 2020, Instructor: *Dr. Tan Tiow Seng*, Mean Student Rating: **4.4/5.0**

Teaching Assistant, CS1231S: Discrete Structures

Jan, 2021 - May, 2021, Instructor: *Dr. Aaron Tan*, Mean Student Rating: **4.7/5.0**

Teaching Assistant, CS5229: Advanced Computer Networks

Aug, 2021 - Dec, 2021, Instructor: *Dr. Ben Leong*