Rajdeep Das — PhD Candidate CS@UCSD — Systems and Networking

CONTACT INFORMATION

Computer Science and Engineering
UC San Diego

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RESEARCH INTERESTS

Programmable Networks, P4, Userspace networking, DPDK, Network Virtualization, User-Defined Networking, (Real-Time) Streaming, Networks and Distributed Systems

EDUCATION

PhD / Computer Science and Engineering
University of California San Diego 2017 - present

M.Tech / Computer Science and Engineering
Indian Institute of Technology Kanpur 2013 - 2015

B.Tech / Information Technology
West Bengal University of Technology 2009 - 2013

High School / Indian School Certificate
Council for the Indian School Certificate Examinations 2009

SUMMARY

As a PhD candidate in Computer Science and Engineering at UC San Diego, I am working on enabling user-defined network behavior using programmable switches and active networking, that can optimize performance, reliability, and security of cloud-hosted applications. My research has recently been published at SIGCOMM where it received the **best paper award**, and at Hotnets'20. This research has also be supported by a hardware grant from **Intel Fast Forward Initiative 2022**.

Through my academic and professional career, I have worked in several dimensions of computer systems and networking - including real-time streaming, software defined networking, and P4 - and contributed to several research projects and publications in this domain. Previously, I was a research fellow at Microsoft Research India, where I addressed performance deficiencies in real-time streaming applications, and have contributed to projects published at two major conferences respectively. I also have a master's degree in computer science from IIT Kanpur, where I won the **best software award** for building Prutor, an intelligent tutoring system for programming.

I am passionate about advancing the state of the art in networked systems. My goal is to complete my PhD and pursue a career in academia or industry, where I can continue to innovate and collaborate with other researchers and practitioners in this field.

SELECTED PUBLICATIONS

Rajdeep Das and Alex C. Snoeren. "Memory Management in ActiveRMT: Towards Runtime-programmable Switches". ACM SIGCOMM, 2023 (**Best Paper**)

Rajdeep Das and Alex C. Snoeren. "Enabling Active Networking on RMT Hardware". ACM Hotnets, 2020

William M. Mellette, Rajdeep Das, Yibo Guo, Rob McGuinness, Alex C. Snoeren, George Porter. "Expanding across time to deliver bandwidth efficiency and low latency". Usenix NSDI, 2020

Arjun Roy, Rajdeep Das, Hongyi Zeng, Jasmeet Bagga, Alex C. Snoeren. "Understanding the Limits of Passive Realtime Datacenter Fault Detection and Localization". IEEE/ACM Transactions on

Networking, 2020

Rajdeep Das, Nimantha Baranasuriya, Venkat Padmanabhan, Christoffer Rodbro, Seth Gilbert. "Informed Bandwidth Adaptation in Wi-Fi Networks using Ping-Pair". ACM CoNext, 2017

Junchen Jiang, Rajdeep Das, Ganesh Ananthanarayanan, Philip A. Chou, Venkata Padmanabhan, Vyas Sekar, Esbjorn Dominique, Marcin Goliszewski, Dalibor Kukoleca, Renat Vafin, Hui Zhang. "VIA: Improving Internet Telephony Call Quality Using Predictive Relay Selection". ACM SIGCOMM, 2016

Patents

Philip Andrew Chou, Venkata N Padmanabhan, Rajdeep Das, Ganesh Ananthanarayanan, Junchen Jiang. "Data-driven network path selection". US Patent App. 15/169,429, 2017

Awards & Achievements

Best Paper Award 2023
ACM SIGCOMM 2023

Best Software Award 2015
Indian Institute of Technology Kanpur

Academic Services

Journal article review, IEEE/ACM Transactions on Networking, 2021

Artifact evaluation, ACM SIGCOMM, 2022

Professional Experience

Microsoft Research India / Research Fellow Bangalore (India), August 2015 - August 2017
Mobility, Networks and Systems Research Group

Via - Mapping the network performance between a cluster of network endpoints (such as autonomous systems) using data collected from Skype calls. This was then used to predict the quality of future calls or alternative paths that could lead to better call quality. Ran simulations and built a real-world prototype. Also built a web-based 3D visualization tool to aid in the understanding of this approach.

Kwikr - Improving bandwidth adaptation for real-time streaming applications such as Skype running over Wi-Fi networks. Built detectors for congestion, handoffs and link-strength-change at the WiFi access point. The congestion detector involved our novel ping-pair technique which estimates the queueing delay at the wireless access point. Integrated Kwikr into Skype for Android consumer production clients which we used to evaluate our approach on millions of Skype consumers. This project received the **Best Corporate Demo** Award at COMSNETS 2017.

Multipath in Real-Time Streaming - Evaluating the benefits of using multipath in real-time streaming applications. Built a WebRTC based experimental framework which we used to collect data from users located at different parts of the world. Analyzed data to understand cause of call drops and simulated potential benefits of using multipath.

PriceWaterhouseCoopers / Intern Kolkata (India), June 2012 - August 2012
Assessing web applications for security vulnerabilities and recommending fixes for them. Vulnerabilities tested for include attacks such as cross-site-scripting, injection, session hijacking, sensitive data leakage, cross-site-request-forgery, insecure direct object references and unvalidated forwards/redirects.

Master's Thesis

A Tutoring System for Introductory Programming
Developed a software system for teaching introductory programming (Prutor). Prutor is a dis-

tributed system for managing a programming course. It exports a web interface that students can use to solve programming problems and receive feedback on syntactic/semantic errors. Prutor can trace the evolution of student programs to aid in understanding of the student's approach while solving the programming problem. The system helps improve interactivity between students and tutors/TAs. Data collected using Prutor has been used to develop a lot of tools which aid in computer science education and has led to publications in major conferences. Prutor is now the standard for teaching introductory programming at IIT Kanpur and has also been deployed at IIT Bombay and IIT Goa to conduct introductory programming courses. This project received the **Best Software Award** at IIT Kanpur.

STUDENT COMPETITIONS

Google Dev Fest / Runner Up — September 2013
WishEmAll: Created an app that automatically wishes Facebook friends on their birthdays.

Yahoo! Hack U / Honourable Mention — August 2013
Gyaanometer: Our hack was a user rating system for Yahoo answers, where every user would be given a rating according to her past activity. Our hack was ranked in the top 7 hacks.

Microsoft Code.Fun.Do / Participated — January 2013
Botomatic: We created an app which would connect to Facebook on behalf of a user and chat with her friends. The app used Pandorabots AI to converse with the users' friends.