Rajath Shashidhara

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Education

University of Texas, Austin 2019 – Present

Master of Science — Computer Science

Birla Institute of Technology and Science (BITS), Pilani 2012 – 2017

Master of Science (Hons.) — Physics

Bachelor of Engineering (Hons.) — Computer Science

Grade: **Distinction** | CGPA: **9.01/10** | CS Major GPA: **9.33/10**

Research Experience

Samsung R & D Institute Bangalore, July 2017 – July 2019

Software Engineer (Research) | Transport protocols team, 5G Communication Division

5G Access Stratum Protocol stack development

- Developed the fast data-plane protocol stack for the world's first Pre-5G mobile user equipment
- Designed the data path of network side 5G NR gNB Distributed Unit on native & virtualized (NFV) platforms. Developed a user-plane abstraction layer (UPAL) to abstract platform dependencies from protocol code with minimal performance overhead
- Technical support for high speed 5G mmWave communication live demonstration at PyeongChang Winter Olympics, South Korea (2018)
- Research on parallelization strategies, memory management and flow control algorithms to handle thousands of simultaneous connections with small main memory footprint

Senior Software Engineer (Research) | Transport protocols team, 5G Communication Division

- Research on Reinforcement Learning based Radio-Resource Allocation – solved multi-objective optimization problem of scheduling transmission radio-resources using Deep Q-Networks (DQN) and Policy gradient methods
- Mentored interns on user-space network drivers and kernel network stack

Graduate Institute of Astronomy, National Central University Taiwan, May – July 2015

Undergraduate Summer Research Intern | Gravitational Data Mining Group

Solving Gravitational lensing equation on a cluster

Under the guidance of Dr. Chung Ming-Ko, derived the gravitational lensing equation for an elliptical galaxy and developed a distributed algorithm to compute the numerical solutions to the equation on a cluster

Bhaskaracharya Institute of Space Applications & Geoinformatics Gandhinagar, May – July 2014

Summer Research Intern | Satellite Image Processing Team

Satellite Image Stitching using Feature Detection Algorithms

Surveyed existing literature on algorithms to stitch large satellite images into a mosaic. Evaluated OpenCV implementations of SIFT & SURF algorithms on large datasets of satellite images

Professional Experience

Symantec Software Solutions — Bangalore, Jan – June 2017

Software Development Intern | Website Security Development Team

- Development of a proof-of-concept cloud-ready Software-as-a-Service web application to automate the delivery and installation of SSL certificates for webservices hosted on Amazon AWS
- Designed a microservices based web architecture – including application server, web server, databases, authorization, load balancer and web cache for full horizontal scalability

Microsoft R & D — Hyderabad, May – July 2016

Software Development Intern | Enterprise Finance Software Team

Integrated Azure AD cloud authentication/authorization service into ASP.NET Core cloud deployed web applications

Google Summer of Code — June – Sept 2013

Open-Source Software Development Intern | Apache OpenOffice

Developed an opensource in-app document version management toolbar which connects to a cloud content repository

Academic Projects

IoT enabled Laboratory Environment: Project SmartLAB — Aug 2012 – Dec 2013

Proactive lab monitoring and activity tracking using speech and gesture recognition applications. Major contribution in system design: building communication network with IoT sensors and actuators for response based on stimulus

Concurrent External Memory Data Structures Library — Oct 2015 – Mar 2016

- Implemented thread-safe templatized out-of-core (on secondary storage) data structures (B+ Trees, Vectors) supporting C++ STL abstraction, backed by customized buffer cache for high efficiency I/O
- Implemented TF-IDF vector search engine using B+ Tree to store the inverted index to demonstrate scalability

Distributed Branch & Bound Algorithm Design and Implementation — Mar – May 2016

Term project under Prof. Sundar Balasubramaniam to design a framework to solve NP-complete combinatorial optimization problems using Branch and Bound search on a commodity cluster. Designed a peer-to-peer dynamic load balancing algorithm based on the idea of diffusion

Fast semantic matching of strings generated by Context Free Grammar — Jan – May 2016

Designed a language for domain experts to express the semantic equivalence of strings based on parse tree structure. Developed a hash function to hash the parse tree of a string generated by CFG for fast semantic matching: as a part of study project under Prof. Sundar Balasubramaniam

Studying Quantum Chaos in Aubry-André systems — Aug 2015 – Dec 2016

- Studied phase transitions in Hofstadter's butterfly under time-varying magnetic field and the relationship between topological invariants and Hall conductivity under Dr. Tapomoy Guha Sarkar
- Simulated and computationally evaluated Schrodinger's equation for special quantum systems using perturbation methods and computational physics algorithms
- Defended master's thesis titled "Driven Aubry-André-Harper Systems". Led to a paper publication in a peer-reviewed international journal

Publications

Phase transition in an Aubry-André system with a rapidly oscillating magnetic field

Tridev Mishra, Rajath Shashidhara, Tapomoy Guha Sarkar, and Jayendra N. Bandyopadhyay

Phys. Rev. A 94, 053612 – Published 14 November 2016

Honors & Achievements

- **Best Outgoing Student of Batch 2017 Award** – adjudged by Department of Physics, BITS Pilani for outstanding academic and research track record
- **Prof. I J Nagrath Student Project Fund** for Project SmartLAB – awarded by BITSAA and adjudged by Department of Electrical and Electronics Engineering, BITS Pilani
- **BITS Pilani MCN Scholarship Award** – 80% tuition fee waiver for all semesters for consistent academic performance (top 5% in a batch of 800 students)
- **Samsung Professional Software Competency Certification** – held by < 10% employees globally
- **Samsung Annual Excellence Awards** – Outstanding Project of the Year 2018-19
- **Samsung Citizen Awards (2)** – for technological excellence and quality of code

Skills

- **Languages**: C, C++, Java, Python (+numpy/scipy/matplotlib/PyTorch), Julia, LaTeX, JavaScript
- **Platforms/Frameworks**: Linux, OpenMP, MPI, Pthreads, OpenCV, OpenCL, ODP, DPDK, ns-3, AWS, Azure
- **Tools**: git, gdb, make, valgrind, strace, VampirTrace