Divyanshu Saxena

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Education

The University of Texas at Austin *2021–Present*
Ph.D. in Computer Science, Advisor: Prof. Aditya Akella

University of Wisconsin-Madison *2020–2021 (Transferred)*
Ph.D. in Computer Science, Advisor: Prof. Aditya Akella

Indian Institute of Technology, Delhi *2016–2020*
B.Tech. in Computer Science and Engineering

Publications

Research Interests: Microservices and Cloud Deployments, Learned Systems

Papers

- **Divyanshu Saxena**, William Zhang, Shankara Pailoor, Isil Dillig, and Aditya Akella. *Expressive and Efficient Service Mesh Policies.* To appear in Proceedings of International Conference on Architectural Support for Programming Languages and Operating Systems **(ASPLOS)**, April 2025.
- Tao Ji, **Divyanshu Saxena**, Brent E. Stephens, and Aditya Akella. 2023. *Yama: Providing Performance Isolation for Black-Box Offloads*. In Proceedings of 2023 ACM Symposium on Cloud Computing **(SoCC)**, October 2023.
- **Divyanshu Saxena**, Tao Ji, Arjun Singhvi, Junaid Khalid, and Aditya Akella. *Memory deduplication for serverless computing with Medes.* In Proceedings of European Conference on Computer Systems **(EuroSys)**, April 2022.

Workshop, Poster, and Short Papers

- **Divyanshu Saxena**, Nihal Sharma, Donghyun Kim, Rohit Dwivedula, Jiayi Chen, Chenxi Yang, Sriram Ravula, Zichao Hu, Aditya Akella, Sebastian Angel, Joydeep Biswas, Swarat Chaudhuri, Isil Dillig, Alex Dimakis, Brighten Godfrey, Daehyeok Kim, Christopher Rossbach and Gang Wang. 2023. *On a Foundation Model for Operating Systems*. In **MLSys Workshop at NeurIPS'23**.
- **Divyanshu Saxena**, William Zhang, Madhav Tummala, Saksham Goel, and Aditya Akella. 2023. *Invited Paper: Towards Efficient Microservice Communication.* In Proceedings of the **ApPLIED '23 Workshop at PODC '23**.
- **Divyanshu Saxena**, Tao Ji, Arjun Singhvi, Junaid Khalid, and Aditya Akella. 2023. *Navigating Performance-Efficiency Tradeoffs in Serverless Computing: Deduplication to the Rescue!.* In **SIGOPS Operating Systems Review**
- **Divyanshu Saxena**, Saksham Goel, William Zhang, Madhav Tummala, and Aditya Akella. 2023. *Poster: Application-tailored Communication with xMesh.* In **Poster Session at NSDI '23**

Pre-prints

- Jeremy Carleton, Prathik Vijaykumar, **Divyanshu Saxena**, Dheeraj Narasimha, Srinivas Shakkottai, and Aditya Akella. 2024. *CONGO: Compressive Online Gradient Optimization with Application to Microservices Management.*
- Le Xu, **Divyanshu Saxena**, Neeraja J. Yadwadkar, Aditya Akella, and Indranil Gupta. 2023. *Dirigo: Self-scaling Stateful Actors For Serverless Real-time Data Processing.*

Research Experience

Learned Systems for Microservices *February 2024 - Present*
UT Austin, Supervisor: Prof. Aditya Akella

- Investigating the reliability of learned controllers in meeting desired performance under perturbations to the operating environment.
- Developing a framework that can certifiably provide guarantees and take control actions to meet desired performance.

Learning Directed Operating System *October 2023 - Present*
UT Austin, Supervisor: Prof. Aditya Akella

- Working on the principled usage of learned OS policies, such as congestion control, CPU scheduling, memory allocation, etc.
- Developing abstractions and learning algorithms that provide good worst-case performance.

Expressive and Performant Microservice Communication *September 2022 - January 2024*
UT Austin, Supervisor: Prof. Aditya Akella

- Investigated the performance bottlenecks and programming challenges in enforcing microservice communication policies.
- Developed novel 'path-level' policy abstractions that provide more expressive policies and improve dataplane performance.

Userspace Network Stack as a Service *May 2022 - August 2022*
Microsoft Research

- Worked on a new user-space network stack that requires minimal privileges and can be deployed with containerized applications.
- Implemented reliable single-packet and multi-packet message delivery on flows, with acknowledgments and retransmissions.

Memory Deduplication in Serverless Platforms *October 2020 - April 2022*
UT Austin, UW-Madison, Supervisor: Prof. Aditya Akella

- Investigated the duplication in memory states of containers, and exploited it for better performance-resource trade-offs.
- Designed an efficient deduplication mechanism over disaggregated memory to reduce cold starts and memory footprints.
- Demonstrated a 10-50% reduction in the number of cold starts leading to up to 3.8X improvements in end-to-end latencies.

Professional Experience

Microsoft Research | Research Intern at *Networking Research Group* *May 2022 - Aug 2022*
Development of a userspace network stack for cloud tenants

Joint Seat Allocation Authority (JoSAA) | Software Intern *Feb 2020 - Oct 2020*
Developed and managed database and website for the Joint Engineering Examination (JEE)

Indian Institute of Science, Bangalore | Research Intern with *Prof. Yogesh Simmhan* *Jul 2020 - Sep 2020*
Designing adaptive consistency models for Distributed Edge Storage

Cohesity | Member of Technical Staff Intern *May 2019 - Jul 2019*
Adding Zero Copy Buffer Payloads over gRPC

National University of Singapore | Research Intern with *Prof. Andrew Lim* *May 2018 - Jul 2018*
Designing heuristics for a Two Echelon Vehicle Routing Problem

Scholastic Achievements

- Awarded a **Departmental Scholarship** of USD3000 for the academic session 2020-21 at the UW-Madison.
- Secured **All India Rank 64** in Joint Entrance Exam Advanced - 2016 among 1.5 million applicants.
- Secured **All India Rank 61** in Kishore Vaigyanik Protasahan Yojana (KVPY) - 2015 conducted by IISc Bangalore.
- Secured **All India Rank 1** in FIITJEE Talent Reward Examination (FTRE) - 2014 conducted by FIITJEE Ltd.
- Felicitated with **Design Innovation Summer Award** - 2017 by the Ministry of Human Resource Development (MHRD), given to selected projects from IIT Delhi, for the project *Person Counter and Display Device*.
- Conferred a nine-year scholarship on qualifying **National Talent Search Examination** (2012), conducted by NCERT.
- Qualified the **National Standard Examination** in Physics (NSEP) and Chemistry (NSEC) in 2016.

Teaching Experience

Mentor | Directed Reading Program (DiRP), Emerging Cloud Infrastructure *Fall 2023*
Teaching Assistant | Programming III, at UW-Madison *Fall 2020*
Teaching Assistant | Artificial Intelligence, at IIT Delhi *Fall 2019*

Volunteering Experience

Student Volunteer | HotNets'22 hosted in Austin
Artifact Evaluation Committee | OSDI+ATC'22, SOSP'23

Positions of Responsibility

Class Convener | Elected among 104 students of 2016 Entry Computer Science Batch *April 2019 - July 2020*
Student Mentor | IIT Delhi *June 2018 - May 2019*