Subarna Chatterjee *February 27, 1990*

Post-Doctoral Researcher • Harvard University • USA
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RESEARCH SUMMARY

I work on improving the performance of modern **data systems** by reasoning about the **read-write** tradeoff of the underlying **data structures and algorithms**. The longer-term goal of my research is to design and build **instance-optimized data systems** that can **self-design** themselves to create a tailored solution for the problem at hand. Toward this, I have explored the self-designing potential of **NoSQL storage engines** on **cloud** by constructing the **design** and **performance space** of these engines for different application contexts.

WORK EXPERIENCE

Post-Doctoral Fellow, Harvard University — Jan '19 *onward*
Department: Harvard John A. Paulson School of Engineering and Applied Sciences
Advisor: Stratos Idreos
Research: Self-designing storage engines

Post-Doctoral Fellow, Inria, Rennes — Feb '17 – Sep '18
Team: Myriads
Advisor: Christine Morin
Research: Performance of stream-processing engines

Tata Consultancy Services (TCS) Research Scholar, IIT Kharagpur — Dec '14 – Jan '17
Advisor: Sudip Misra
Research: Design and development of sensor-cloud infrastructure

Junior Research Fellow (JRF), IIT Kharagpur — Apr '13 – Dec '14
Advisor: Sudip Misra
Research: Target-tracking in sensor networks

Programmer Analyst & Trainee, Cognizant Technology Solutions — Jun '12 – Apr '13
Project: Rentokil Initials
Role: Designer, Backend developer, Tester

EDUCATION

Doctor of Philosophy (Ph.D.) — 2013 – 2017
Indian Institute of Technology, Kharagpur, India
Department: Department of Computer Science and Engineering
Dissertation: Sensors-As-A-Service: Towards the Conceptualization of Sensor-Cloud

Bachelor of Technology (B.Tech.) — 2008 – 2012
Institute of Engineering & Management
Stream: Computer Science & Engineering
Dissertation: OneWorld Vigilant Online Surveillance System *Score*: 8.99/10

ACHIEVEMENTS

Fellowship/Scholarship

1. **Facebook Grace Hopper Scholarship** (*one of the* 50 *recipients worldwide*), 2016.
2. **N2 Women Young Researcher Fellowship** through ACM SIGMOBILE, 2016.
3. **Google Anita Borg Fellowship**, Asia Pacific, 2015.
4. Student Scholarship to attend the **Grace Hopper Celebration of Women in Computing** India (GHCI), 2015.

5. **Tata Consultancy Service (TCS) Research Fellowship**, 2014-2017.
6. **Research Fellowship** from Institute Scheme for Innovative Research and Development (ISIRD), IIT Kharagpur, 2013-2014.

Awards

1. **Mentoring Co-Chair, N2Women Board**, 2021.
2. **Marie-Sklodowska-Curie Actions Seal of Excellence**, 2018.
3. **Awards Co-Chair**, N2Women Board, 2017.
4. **10 Women in Networking/Communications That You Should Watch** by N2Women, 2016.
5. **Most Qualified Young Scientist** to attend the **Heidelberg Laureate Forum**, 2016.
6. **Leader of the Google Anita Borg Scholarship Community** (*solitary from the country and one of the seven across the world*) and invited to attend Google I/O 2016.
7. **Winner** in Hackathon in **Robotics at Google Shanghai**, 2015.
8. **Honorary mention** in **ComSoc Student Competition**, 2014.
9. **Second Runners Up** in **Samsung Innovation Award**, 2014.
10. **Second Runners Up** in a model making competition from West Bengal Renewable Energy Development Agency, 2009.

PUBLICATIONS

Books

1. S. Misra, S. Sarkar, and **S. Chatterjee**, "Sensors, Cloud, and Fog: The Enabling Technologies for the Internet of Things," *CRC Press, Taylor & Francis Group*, 2019.

Conferences

1. K. Vaidya, **S. Chatterjee**, E. Knorr, M. Mitzenmacher, S. Idreos, and T. Kraska, "SNARF: A Learning-Enhanced Range Filter," *Proceedings of the Very Large Databases Endowment (VLDB)*, 2022.
2. **S. Chatterjee**, M. Jagadeesan, W. Qin, and S. Idreos, "Cosine: A Cloud-Cost Optimized Self-Designing Key-Value Storage Engine," *Proceedings of the Very Large Databases Endowment (VLDB)*, 2022.
3. A. Wasay, **S. Chatterjee**, and S. Idreos, "Deep Learning: Systems and Responsibility," *Proceedings of the ACM SIGMOD International Conference on Management of Data*, 2021.
4. S. Luo, **S. Chatterjee**, R. Ketsetdis, N. Dayan, W. Qin, and S. Idreos, "Rosetta: A Robust Space-Time Optimized Range Filter for Key-Value Stores," *Proceedings of the ACM SIGMOD International Conference on Management of Data*, 2020.
5. **S. Chatterjee**, and C. Morin, "Experimental Study on the Performance and Resource Utilization of Data Streaming Frameworks," *IEEE/ACM Symposium on Cluster, Cloud and Grid Computing (CCGrid)*, 2018.
6. **S. Chatterjee**, and S. Misra, "Adaptive Data Caching for Provisioning Sensors-As-A-Service," *IEEE International Black Sea Conference on Communications and Networking (BlackSeaCom)*, 2016.
7. **S. Chatterjee**, and S. Misra, "QoS Estimation and Selection of CSP in Oligopoly Environment for Internet of Things," *IEEE Wireless Communications and Networking Conference (WCNC)*, 2016.
8. **S. Chatterjee**, and S. Misra, "Optimal Composition of a Virtual Sensor for Efficient Virtualization Within Sensor-cloud," *IEEE International Conference on Communications (ICC)*, 2015.
9. **S. Chatterjee**, S. Sarkar, and S. Misra, "Quantification of Node Misbehavior in Wireless Sensor Networks: A Social Choice-Based Approach," *IEEE International Conference on Communications (ICC) Workshop*, 2015.
10. **S. Chatterjee**, S. Sarkar, and S. Misra, "Energy-Efficient Data Transmission in Sensor-Cloud," International Conference on Applications and Innovations in Mobile Computing (*AIMoC*), 2015.
11. P. V. S. R. Teja, **S. Chatterjee**, S. N. Das, and S. Misra, "Two-Level Mapping to Mitigate Congestion in Machine to Machine (M2M) Cloud," International Conference on Applications and Innovations in Mobile Computing (*AIMoC*), 2015.

12. **S. Chatterjee** and S. Misra, “Dynamic and Adaptive Data Caching Mechanism for Virtualization within Sensor-Cloud," *IEEE International Conference on Advanced Networks and Telecommunications Systems*, 2014.

Journals

1. S. Idreos, K. Zoumpatianos, **S. Chatterjee**, W. Qin, A. Wasay, B. Hentschel, M. Kester, N. Dayan, D. Guo, M. Kang, and Y. Sun, "Learning Data Structure Alchemy," *Bulletin of the IEEE Computer Society Technical Committee on Data Engineering*, 2019.
2. **S. Chatterjee**, A. Roy, S. K. Roy, S. Misra, M. S. Bhogal, and R. Daga, “Big-Sensor-Cloud Infrastructure: A Holistic Prototype for Provisioning Sensors-as-a-Service," *IEEE Transactions on Cloud Computing*, 2019.
3. S. Sarkar, **S. Chatterjee**, and S. Misra, R. Kudupudi, “Privacy-Aware Blind Cloud Framework for Advanced Healthcare," *IEEE Communication Letters*, 2017.
4. P. Bhavathankar, **S. Chatterjee**, and S. Misra, “Link-Quality Aware Path Selection in the Presence of Proactive Jamming in Fallible Wireless Sensor Networks," *IEEE Transactions on Communications*, 2017.
5. S. Sarkar, **S. Chatterjee**, and S. Misra, “Assessment of the Suitability of Fog Computing in the Context of Internet of Things," *IEEE Transactions on Cloud Computing*, 2015.
6. **S. Chatterjee**, S. Misra, and S. U. Khan, “Optimal Data Center Scheduling for Quality of Service Management in Sensor-cloud," *IEEE Transactions on Cloud Computing*, 2015.
7. **S. Chatterjee**, R. Ladia, and S. Misra, “A Dynamic Optimal Pricing Scheme for Heterogeneous Service-Oriented Architecture for Sensor-cloud Infrastructure," *IEEE Transactions on Services Computing*, 2015.
8. S. Misra, A. Singh, **S. Chatterjee**, and A. K. Mandal, “QoS-Aware Sensor Allocation for Target Tracking in Sensor-Cloud," *Ad Hoc Networks*, Elsevier, 2015.
9. S. Sarkar, **S. Chatterjee**, and S. Misra, “Evacuation and Emergency Management Using a Federated Cloud," *IEEE Cloud Computing Magazine*, 2015.
10. S. Misra, and **S. Chatterjee**, “Social Choice Considerations in Cloud-Assisted WBAN Architecture for Post-Disaster Healthcare: Data Aggregation and Channelization," *Information Sciences, Elsevier*, 2014.
11. **S. Chatterjee**, and S. Misra, “Sensor-Target Mapping in Presence of Overlapping Coverage: Tracking Using Sensor-Cloud," *IEEE Communication Letters*, 2014.
12. S. Misra, A. Singh, **S. Chatterjee**, and M. S. Obaidat, “Mils-Cloud: A Sensor-Cloud Based Architecture for the Integration of Military Tri-Services Operations and Decision Making," *IEEE Systems Journal*, 2014.
13. S. Misra, **S. Chatterjee**, and M. S. Obaidat, “On Theoretical Modeling of Sensor-Cloud: A Paradigm Shift From Wireless Sensor Network," *IEEE Systems Journal*, 2014.

Patents

1. S. Idreos, **S. Chatterjee**, M. Jagadeesan, and W. Qin, "Optimized Self-designing Key-Value Storage Engine," Docket No.: HRV-045/107105-5045, filed in 2021.
2. **S. Chatterjee**, A. Roy, S. K. Roy, S. Misra, M. S. Bhogal, and R. Daga, "Sensory network for persuasive and pervasive virtualization of physical sensors into renderable time service", Indian patent filed in November 2014 (Ref: 1145/KOL/2014).
3. S. Sarkar, **S. Chatterjee**, S. Misra, E. A. Ansari, D. Ghatak, and S. Sarkar, "A Privacy-Aware ambulatory healthcare system using wireless body area networks (WBANS).", Indian patent filed in January 2016 (Ref: 201631000214).

Theses

1. **S. Chatterjee**, "Sensors-As-A-Service: Towards the Conceptualization of Sensor-Cloud", *Ph.D. Thesis*, 2017.

INVITED TALKS

1. "Cosine: A Cloud-Cost Optimized Self-Designing NoSQL Storage Engine", **MongoDB**, USA, 2022.
2. "Cosine: A Cloud-Cost Optimized Self-Designing NoSQL Storage Engine", **Meta Research**, USA, 2022.
3. "Cosine: A Cloud-Cost Optimized Self-Designing NoSQL Storage Engine", **Huawei Research**, USA, 2022.
4. "Cosine: A Cloud-Cost Optimized Self-Designing NoSQL Storage Engine", **Intel Labs**, USA, 2022.
5. "Cosine: A Cloud-Cost Optimized NoSQL Storage Engine", **Cornell University**, USA, 2021.
6. "Cosine: A Cloud-Cost Optimized NoSQL Storage Engine", **North East DB Day, Massachusetts Institute of Technology**, USA, 2020.
7. "Cosine: A Cloud-Cost Optimized NoSQL Storage Engine", **Boston University**, USA, 2020.
8. "Design and development of cloud-based autonomous stream processing platforms for big data streams", **Inria** Rennes, France, 2017.
9. "Design and development of cloud-based autonomous stream processing platforms for big data streams", **Université Pierre-et-Marie-Curie**, Paris, France, 2017.
10. "Sensors-As-A-Service: Towards the Conceptualization of Sensor-Cloud", **Polytechnic University of Catalonia**, Catalonia, 2017.
11. "Sensors-As-A-Service: Towards the Conceptualization of Sensor-Cloud", **Berkeley National Laboratory**, USA, 2017.

TEACHING EXPERIENCE

Harvard University

Teaching Fellow for CS265: Big Data Systems (*Spring 2023, Spring 2020*, *Spring 2019*)

Teaching Fellow for CS165: Data Systems (*Fall 2022*, *Fall 2021*, *Fall 2019*)

Indian Institute of Technology Kharagpur

Teaching Assistantship for IT60102: Internet and Web Technologies (*Spring 2015*)

Teaching Assistantship for IT60119: Wireless Adhoc Sensor Networks (*Fall 2015*, *Fall 2014*)

SERVICES TO COMMUNITY

Mentoring Co-Chair, **N2Women Board** 2021 *onward*

ACM SIGMOD **Reproducibility Committee** 2020

Core Member of **Embedded EthiCS**, Harvard University 2019 *onward*

Awards Co-Chair, **N2Women Board** 2016 – 2018

Reviewer in International Journals
IEEE Transactions on Vehicular Technology, IEEE Transactions on Cloud Computing, IEEE Transactions on Big Data, IEEE Transactions on Communications, IEEE Transactions on Parallel and Distributed Systems, Pervasive and Mobile Computing, Elsevier, IEEE Systems Journal, IEEE Internet of Things, International Journal of Communication Networks and Distributed Systems (IJCNDS)

Program Committee Member
ICDE *(2022)*, ACM SIGMOD *(2021)*, The WebConf (*2020*), ACM FICN *(2018)*, IEEE SmartData *(2019)*, IEEE BigData (*2019, 2018*), IEEE TechSym (*2016, 2014*)

Reviewer in International Conferences
PVLDB *(2022)*, ICDE *(2022)*, ACM SIGMOD *(2021)*, The WebConf (*2020*), ACM FICN *(2018)*, IEEE SmartData *(2019)*, IEEE BigData (*2019, 2018*), IEEE ICFEC (*2017*), IEEE ICC (*2016, 2015*), IEEE TechSym (*2016, 2014*), IEEE ANTS (*2015*)

TECHNICAL SKILLS

Selected Languages: C, C++, Java, Python, Database coding (NoSQL, SQL)
Selected Platforms: RocksDB, WiredTiger, FASTER, Apache Flink, Apache Storm, Twitter Heron, Apache Spark