Subhadeep Sarkar

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RESEARCH INTERESTS

I am interested in designing **privacy-aware data systems**. I work at the intersection of designing **data layouts and access methods for storage engines** and developing **systems-level solutions for privacy protection** in modern data systems. The goal of my research is to bridge the gap between the legal requirements and database systems designs by navigating the privacy-performance tradeoff and designing privacy-aware data structures and algorithms.

PROFESSIONAL EXPERIENCE

07/2023 - present	**Assistant Professor** at Brandeis University, MA, USA Department of Computer Science
01/2019 - 06/2023	**Post-doctoral Associate** at Boston University, MA, USA Department of Computer Science, College of Arts & Sciences *Advisor*: Manos Athanassoulis.
01/2023 - 05/2023 01/2020 - 05/2020	**Lecturer** at Boston University, MA, USA Department of Computer Science, College of Arts & Sciences
02/2017 - 10/2018	**Post-doctoral Researcher** at Inria Rennes – Bretagne Atlantique, France *Advisor*: Christine Morin
07/2013 - 06/2017	**Ph.D. Scholar** at Indian Institute of Technology Kharagpur, India Department of Computer Science & Engineering; School of Medical Science & Technology *Advisors*: Sudip Misra and Chandan Chakraborty.
10/2014 - 09/2016	**Senior Research Fellow** at Indian Institute of Technology Kharagpur, India Department of Computer Science & Engineering
04/2013 - 09/2014	**Junior Research Fellow** at Indian Institute of Technology Kharagpur, India School of Information Technology

EDUCATION

2013 - 2017	**Doctor of Philosophy (Ph.D.)** Indian Institute of Technology Kharagpur, India *Specialization*: Wireless communication in sensor networks *Dissertation*: "Analysis of Delay in Wireless Communication for Healthcare Systems"
2008 - 2012	**Bachelor of Technology (B.Tech.)** Institute of Engineering and Management, Kolkata, India *Specialization*: Computer Science and Engineering *Dissertation*: "One World Vigilant Online Surveillance System"

AWARDS AND ACHIEVEMENTS

2022	Invited for a full talk at the **invitation-only workshop** on *High Performance Transaction Systems (HPTS)*.
2020	Selected for a **spotlight talk** at *North-East Database Day (NEDBD)*.
2018	**Marie Sklodowska-Curie Actions Seal of Excellence** by the European Commission. [*url*]
2016	Selected as **Most qualified young scientist** to attend the 4th Heidelberg Laureate Forum, Germany.
2015	**Second best Ph.D. Thesis award** at the 5th IDRBT Doctoral Colloquium organized by Institute for Development and Research in Banking Technology (IDRBT).
2015	**Senior research fellowship** from the Ministry of Human Resource Development (MHRD), Govt. of India (*fellowship duration*: 10/2015 - 09/2016).
2015	**International travel grant** from Ministry of Human Resource Development, Govt. of India for IEEE ICC.
2014	**Honorary certificate of appreciation** from the IEEE Communications Society at the IEEE ComSoc Student Competition.
2013	**Research fellowship** from the Department of Electronics and Information Technology, Govt. of India (*fellowship duration*: 04/2013 - 09/2015).
2012	**Ranked 1885** (among 156,782 candidates) nationally in Graduate Aptitude Test in Engineering (GATE).
2006	**National Merit scholarship of Government of India** for securing a **state rank of 37** (among 764,933 candidates) in secondary board examination.

PUBLICATIONS

Patents

INDIAN PATENT 2023	**S. Sarkar**, S. Chatterjee, S. Misra, E. A. Ansari, D. Ghatak, S. Sarkar, "A Privacy-Aware Ambulatory Healthcare System Using Wireless Body Area Networks (WBANs)", Indian Patent, File no.: 201631000214, Filed on: 01/2016, Granted on: 08/2023.

Books

CRC PRESS T&F 2019	S. Misra, **S. Sarkar**, and S. Chatterjee, "Sensors, Cloud, and Fog: The Enabling Technologies for the Internet of Things", *CRC Press, Taylor & Francis Group*, ISBN 9780367196127, 2019.

Journals and Journal-Equivalent Conference Papers

TODS 2023	**S. Sarkar**, T. I. Papon, Z. Zhu, D. Staratzis, and M. Athanassoulis, "Enabling Timely and Persistent Deletion in LSM-Engines", *ACM Transactions on Database Systems*, vol. 48(3), 2023.
ICDE 2023	**S. Sarkar**, N. Dayan, and M. Athanassoulis, "The LSM Design Space and its Read Optimizations", *In Proceedings of the IEEE International Conference on Data Engineering*, 2023.
ICDE 2023	A. Raman, **S. Sarkar**, M. Olma, and M. Athanassoulis, "Indexing for Near-Sorted Data", *In Proceedings of the IEEE International Conference on Data Engineering*, 2023.
SIGMOD 2022	**S. Sarkar** and M. Athanassoulis, "Dissecting, Designing, and Optimizing LSM-based Data Stores", *In Proc. of the ACM SIGMOD International Conference on Management of Data*, 2022.
DEBull 2022	M. Athanassoulis, **S. Sarkar**, T. I. Papon, Z. Zhu, and D. Staratzis, "Building Deletion-Compliant Data Systems", *IEEE Data Engineering Bulletin*, vol. 45(1), 2022.

EDBT 2022	**S. Sarkar** and M. Athanassoulis, "Query Language Support for Timely Data Deletion", *In Proc. of the International Conference on Extending Database Technology*, 2022.
PVLDB 2021	**S. Sarkar**, D. Staratzis, Z. Zhu, and M. Athanassoulis, "Constructing and Analyzing the LSM Compaction Design Space", *In Proc. of the Very Large Databases Endowment*, vol. 14(11), 2021.
SIGMOD 2020	**S. Sarkar**, T. I. Papon, D. Staratzis, and M. Athanassoulis, "Lethe: A Tunable Delete-Aware LSM Engine", *In Proc. of the ACM SIGMOD International Conference on Management of Data*, 2020.
SYSTEMS J. 2020	S. Misra, P. K. Bishoyi, and **S. Sarkar**, "i-MAC: In-Body Sensor MAC in Wireless Body Area Networks for Healthcare IoT", *IEEE Systems Journal*, vol. 15(3), 2020.
COMM. LETTERS 2017	**S. Sarkar**, S. Chatterjee, S. Misra, and R. Kudupudi, "Privacy-Aware Blind Cloud Framework for Advanced Healthcare", *IEEE Communications Letters*, vol. 21(11), 2017.
COMP. NET. 2017	P. Bhavathankar, **S. Sarkar**, and S. Misra, "Optimal Decision Rule-Based Ex-ante Frequency Hopping for Jamming Avoidance in Wireless Sensor Networks", *Computer Network, Elsevier*, vol. 128, 2017.
TCC 2016	**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*, vol. 6(1), 2016.
PULSE 2016	**S. Sarkar** and S. Misra, "From Micro to Nano: The Evolution of Wireless Sensor-Based Health Care", *IEEE PULSE*, vol. 7(1), 2016.
IET NET. 2016	**S. Sarkar** and S. Misra, "Theoretical Modeling of Fog Computing: A Green Computing Paradigm to Support IoT Applications", *IET Networks*, vol. 5(2), 2016.
GLOBECOM 2016	**S. Sarkar**, S. Misra, and M. S. Obaidat, "Resource Allocation for Wireless Body Area Networks in Presence of Selfish Agents", *In Proc. of the IEEE Global Communications Conference*, 2016.
TC 2015	**S. Sarkar**, S. Misra, B. Bandyopadhyay, C. Chakraborty, and M. S. Obaidat, "Performance Analysis of IEEE 802.15.6 MAC Protocol Under Non-ideal Channel Conditions and Saturated Traffic Regime", *IEEE Transactions on Computers*, vol. 64(10), 2015.
JBHI 2015	S. Misra and **S. Sarkar**, "Priority-Based Time-Slot Allocation in Wireless Body Area Networks During Medical Emergency Situations: An Evolutionary Game Theoretic Perspective", *IEEE Journal of Biomedical and Health Informatics*, vol. 19(2), 2015.
CLOUD COMP. 2014	**S. Sarkar**, S. Chatterjee, and S. Misra, "Evacuation and Emergency Management Using a Federated Cloud", *IEEE Cloud Computing*, vol. 1(4), 2014.
GLOBECOM 2014	**S. Sarkar**, S. Misra, C. Chakraborty, and M. S. Obaidat, "Analysis of Reliability and Throughput under Saturation Condition of IEEE 802.15.6 CSMA/CA for Wireless Body Area Networks", *In Proc. of the IEEE Global Communications Conference*, 2014.

Other Conference and Workshop Papers

TPCTC 2022	A. Raman, K. Karatsenidis, **S. Sarkar**, M. Olma, M. Athanassoulis, "BODS: A Benchmark on Data Sortedness", *In Proc. of the TPC Tech. Conf. on Performance Evaluation & Benchmarking*, 2022.
iThings 2018	**S. Sarkar**, J.-P. Banatre, L. Rilling, and C. Morin, "Towards Enforcement of the EU GDPR: Enabling Data Erasure", *IEEE International Conference on Internet of Things*, 2018.

ICC-W 2015	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 Workshops*, 2015.
AIMoC 2015	S. Chatterjee, **S. Sarkar**, and S. Misra, "Energy-Efficient Data Transmission in Sensor-Cloud", *International Conference on Applications and Innovations in Mobile Computing*, 2015.

Demo Papers

SIGMOD 2023	Z. Zhu, **S. Sarkar**, and M. Athanassoulis, "Acheron: Persisting Tombstones in LSM Engines", *In Proc. of the ACM SIGMOD International Conference on Management of Data*, 2023. [Demo website]
SIGMOD 2022	**S. Sarkar**, K. Chen, Z. Zhu, and M. Athanassoulis, "Compactionary: A Dictionary for LSM Compactions", *In Proc. of the ACM SIGMOD International Conference on Management of Data*, 2022. [Demo website]

SELECTED RECENT TALKS

Invited Talks and Lectures

06/2022	"Toward Privacy-Aware Data Systems", **Boston University**, Philadelphia, USA.
02/2023	"Building Deletion-Compliant Data Systems", **University of Massachusetts Boston**, USA.
02/2023	"Building Deletion-Compliant Data Systems", **Brandeis University**, USA.
12/2022	"Constructing and Analyzing the LSM Compaction Design Space", **MongoDB**, USA.
10/2022	"Toward Building Deletion Compliant Data Systems", **HTPS Workshop** (*Invitation-only*), CA, USA.
07/2021	"Enabling Efficient Deletes in Log-Structured KV-Stores", **Microsoft Research**, Redmond, USA.
02/2021	"Enabling Efficient Deletes in Log-Structured Key-Value Stores", **Boston University**, USA.
07/2020	"Lethe: A Tunable Delete-Aware LSM-Based Storage Engine", **Alibaba Cloud**, China.
01/2020	"Lethe: A Tunable Delete-Aware LSM-Based Storage Engine", North East DB Day, **MIT**, USA. [Spotlight talk]
07/2018	"Personal Data Management in Cloud-based IoT", Guest lecture at **University of Rennes 1**, France.
03/2018	"Enabling Privacy by Design in the Context of the Internet of Things", **University of Rennes 1**, France.
03/2018	"Enabling Privacy by Design in the Context of the Internet of Things", **Université Pierre-et-Marie-Curie**, Paris, France.
02/2018	"Enabling Privacy by Design in the Context of the Internet of Things", **CentraleSupélec – Rennes Campus**, France.
02/2018	"Enabling Privacy by Design in the Context of the Internet of Things", **Laboratoire d'InfoRmatique en Image et Systèmes d'information** (**LIRIS**), Lyon, France.
09/2015	"Fog computing and Internet of Things", **Indian Institute of Technology Kharagpur**, India.
09/2015	"WBANs: IEEE 802.15.6", **Indian Institute of Technology Kharagpur**, India.

Conference Talks

07/2015	"Importance of WBAN-Based Healthcare in the Context of IoT", **Indian Institute of Technology Kharagpur**, India.
06/2022	"Dissecting, Designing, & Optimizing LSM-based Data Stores", **ACM SIGMOD**, Philadelphia, USA.
06/2022	"Compactionary: A Dictionary for LSM Compactions", **ACM SIGMOD**, Philadelphia, USA.
04/2022	"Query Language Support for Timely Data Deletion", **EDBT**, Edinburgh, UK.
08/2021	"Constructing and Analyzing the LSM Compaction Design Space", **VLDB**, Copenhagen, Denmark.
07/2020	"Lethe: A Tunable Delete-Aware LSM Engine", **ACM SIGMOD**, Portland, USA.
08/2018	"Towards Enforcement of the EU GDPR: Enabling Data Erasure", **IEEE iThings**, Halifax, Canada.
06/2015	"Quantification of Node Misbehavior in Wireless Sensor Networks: A Social Choice-Based Approach", **IEEE ICC Workshops**, London, UK.
06/2015	"Energy-Efficient Data Transmission in Sensor-Cloud", **AIMoC**, Kolkata, India.

Media Interviews

06/2022	"Log-structured Merge Trees", **Disseminate: The Computer Science Research Podcast**. [Link]

TEACHING

Lecturer

Fall, 2024	*Course*: **Advanced Data Systems** (COSI 167A) *Institute*: Brandeis University, MA, USA
Spring, 2024	*Course*: **Introduction to Databases** (COSI 127B) [Website] *Institute*: Brandeis University, MA, USA
Spring, 2023	*Course*: **Data Systems Architectures** (CAS CS-561) [Website] *Institute*: Boston University, MA, USA
Spring, 2020	*Course*: **Fundamentals of Computing Systems** (CAS CS-350) [Website] *Institute*: Boston University, MA, USA

Teaching assistant

Fall, 2021	*Course*: **Introduction to Database Systems** (CAS CS-460) [Website] *Institute*: Boston University, MA, USA
Fall, 2020	*Course*: **Introduction to Database Systems** (CAS CS-460) [Website] *Institute*: Boston University, MA, USA
Spring, 2019	*Course*: **Data Systems Architectures** (CAS CS-591-A1) [Website] *Institute*: Boston University, MA, USA
Autumn, 2015	*Course*: **Wireless Ad-Hoc and Sensor Networks** (IT60119) *Institute*: Indian Institute of Technology Kharagpur, India

SUPERVISION AND MENTORSHIP

At Brandeis University

PhD researchers

Shubham Kaushik	*Jan'24-present*

Graduate researchers

Arun Shrestha	*Jan'24-present*
Arpita Saha	*Oct'23-present*

Undergraduate researchers

Alex Ott	*Jan'24-present*
Sherren Jielita	*Jan'24-present*

At Boston University

Master students

Yu-Cheng Huang (Boston University, MA, USA)	*Jan'23-present*
Shubham Kaushik (*next:* PhD student at Brandeis University)	*Jan'23-Jan'24*
Kaijie Chen (*next:* Software Data Engineer at PingCAP)	*Jun'21-Jan'22*
Guanting Chen (*next:* PhD student at Northeastern University)	*Jun'19-Jun'20*

Undergraduate students

Aaron Ang (Boston University, MA, USA)	*Nov'22-Present*

RISE interns / High school interns

Venkat Subramanian (*next:* Undergrad at Princeton University)	*Jul-Aug'22*
Grace Sun (*next:* Undergrad at Princeton University)	*Jul-Aug'22*
Naomi Johnson (*next:* Undergrad at Northeastern University)	*Jul-Aug'19*
Kevin Xu (*next:* Undergrad at University of Washington)	*Jul-Aug'19*

PROFESSIONAL SERVICES

Organization

Proceedings Chair, Proceedings of International Conference on Very Large Databases (PVLDB), 2024-2025

Program Chair, North East Database Day (NEDB Day), 2024

Poster Chair, ACM Symposium on Cloud Computing (SoCC), 2023

Web Chair, ACM SIGMOD International Conference on Management of Data, Reproducibility & Availability, 2023

Sponsorship Chair, ACM Symposium on Cloud Computing (SoCC), 2022

Web Chair, ACM SIGMOD International Conference on Management of Data, Reproducibility & Availability, 2022

Program committee member

International Conference on Very Large Databases (VLDB), 2025

International Conference on Very Large Databases (VLDB), Demonstration, 2024

IEEE International Conference on Big Data (BigData), 2024

Workshop on Search, Exploration, and Analysis in Heterogeneous Datastores: Graph Edition (SEA Graph), 2024

International Conference on Very Large Databases (VLDB), Demonstration, 2023

IEEE International Conference on Big Data (BigData), 2023

International Conference on Very Large Databases (VLDB), Demonstration, 2022

IEEE International Conference on Big Data (BigData), 2023

International Conference on Extending Database Technology (EDBT), 2023

ACM Symposium on Cloud Computing (SoCC), 2022

ACM International Conference on Distributed and Event-Based Systems (DEBS), 2022

IEEE International Conference on Big Data (BigData), 2022

IEEE International Conference on Data Engineering (ICDE), 2022

ACM SIGMOD International Conference on Management of Data, Demonstration, 2021

ACM International Conference on Distributed and Event-Based Systems (DEBS), 2021

The Web Conference (TheWebConf), 2020

IEEE SmartData, 2019

ACM SIGMOD International Conference on Management of Data, Reproducibility, 2018

ACM MobiCom workshop on Future Industrial Communication Networks (FICN), 2018

International Conference on Advanced Computing, Networking, and Informatics, 2018

International Conference on Advanced Computing and Intelligent Engineering, 2018

International Conference on Advanced Computing and Intelligent Engineering, 2017

International Conference on Advanced Computing and Intelligent Engineering, 2016

IEEE Students' Technology Symposium (TechSym), 2016

Reviewer: International journals

International Journal on Very Large Data Bases (VLDBJ)

ACM Transactions on Database Systems (TODS)

Journal of Systems Architecture (JSA), Elsevier

IEEE Transactions on Parallel and Distributed Systems (TPDS)

IEEE Transactions on Mobile Computing (TMC)

IEEE Transactions on Cloud Computing (TCC)

IEEE Transactions on Vehicular Technology (TVT)

IEEE Transactions on Big Data (TBD)

IEEE Transactions on Green Communications and Networking (TGCN)

IEEE Transactions on Industrial Informatics (TII)

IEEE Systems Journal (SJ)

IEEE Communications Letters (CL)

IEEE Wireless Communications Letters (WCL)

IEEE Wireless Communications Magazine (WC)

IEEE Communications Magazine

IEEE Vehicular Technology Magazine (VT)

International Journal of Communication Systems (IJCS), Wiley

External Reviewer: Peer-reviewed conferences

International Conference on Innovative Data Systems Research (CIDR) [2023], PVLDB [2022, 2021], IEEE International Conference on Big Data (BigData) [2021, 2017], Euro-Par [2018], International Conference on Distributed Computing Systems (ICDCS) [2017], International Conference on Cloud Computing Technology and Sciences (Cloud-Com) [2017], IEEE Conference on Network Function Virtualization and Software Defined Networks (NFV-SDN) [2017], IEEE International Conference on Fog and Edge Computing (ICFEC) [2018, 2017], International Conference on Electronics, Communications and Networks (CECNet) [2017], IEEE Wireless Communications and Networking Conference (WCNC) [2016], International Conference on Software, Telecommunications and Computer Networks (SoftCOM) [2016], IEEE International Conference on Advanced Networks and Telecommunications Sys-

tems (ANTS) [2016, 2015].

Society Member

Member, Association for Computing Machinery (ACM)

Member, ACM Special Interest Group on Management of Data (SIGMOD)

Member, Institute of Electrical and Electronics Engineer (IEEE)

Member, IEEE Computer Society & IEEE Computer Society Technical Community on Cloud Computing (TCCLD)