Parwat Singh Anjana

Applied Researcher, Supra · Ph.D., IIT Hyderabad

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Research Interests

Blockchains and smart contract execution; parallel and distributed systems; software and block transactional memory; concurrency control; geo-replicated and self-stabilizing distributed algorithms.

Appointments

May 2022 – Present	**Applied Researcher**, Parallel Execution Research, Supra. Lead research and engineering on parallel execution of blockchain transactions, from proof-of-concept to production.
Jan – May 2022	**Postdoctoral Researcher**, PDCRL Lab, Dept. of CSE, IIT Hyderabad, India. Host: Dr. Sathya Peri. Supported by the Institute Postdoctoral Fellowship.
2017 – 2022	**Teaching Assistant**, Dept. of CSE, IIT Hyderabad, India.
2015 – 2016	**Teaching Assistant**, School of Computer and Information Sciences, University of Hyderabad, India.

Education

Jul 2017 – Jan 2022	**Ph.D., Computer Science**, Indian Institute of Technology Hyderabad, India. CGPA 7.43/10. Advisor: Dr. Sathya Peri. Thesis: *Techniques for Efficient Parallel Execution of Smart Contracts in Blockchains*.
Jul 2014 – Sep 2016	**M.Tech., Computer Science**, University of Hyderabad, India. CGPA 8.71/10 (83.88%). Advisor: Dr. Rajeev Wankar.
Jul 2007 – Apr 2011	**B.Tech., Computer Science**, Rajasthan Technical University, India. 63.89%.

Honors and Awards

2022	Institute Postdoctoral Fellowship, IIT Hyderabad.
2017 – 2022	Ministry of Education (MoE) Fellowship for doctoral studies, IIT Hyderabad.
2019	Best Poster Award, ICDCN 2019 Doctoral Symposium, for *Entitling Concurrency to Smart Contracts Using Optimistic Transactional Memory*.
2015	Qualified UGC NET (India) for Lectureship, December 2015.
2014 – 2017	Qualified GATE (India) in four consecutive years; GATE Scholarship for M.Tech (2014–2016).

Publications

* Equal contribution.

Journal Articles

[J3] **Parwat Singh Anjana** and Srivatsan Ravi. *Block Transactional Memory: A Complexity Study.* Theoretical Computer Science (TCS), vol. 1086, article 116241, Elsevier, 2026. Special issue; extended version of the SSS 2025 paper. [DOI]

[J2] **Parwat Singh Anjana**, Sweta Kumari, Sathya Peri, Sachin Rathor, and Archit Somani. *OptSmart: A Space Efficient Optimistic Concurrent Execution of Smart Contracts.* Distributed and Parallel Databases (DAPD), vol. 42, no. 2, pp. 245–297, Springer, 2024. [DOI] [Code]

[J1] Shrey Baheti*, **Parwat Singh Anjana***, Sathya Peri*, and Yogesh Simmhan*. *DiPETrans: A Framework for Distributed Parallel Execution of Transactions of Blocks in Blockchain.* Concurrency and Computation: Practice and Experience (CCPE), vol. 34, no. 10, e6804, Wiley, 2022. [DOI] [Code]

Conference Papers (full papers, peer-reviewed)

[C9] **Parwat Singh Anjana**, Matin Amini, Rohit Kapoor, Rahul Parmar, Raghavendra Ramesh, Srivatsan Ravi, and Joshua Tobkin. *Efficient Parallel Execution of Blockchain Transactions Leveraging Conflict Specifications.* 7th Conference on Advances in Financial Technologies (**AFT 2025**), LIPIcs vol. 354, pp. 29:1–29:26, Schloss Dagstuhl, 2025. [DOI] [Video]

[C8] **Parwat Singh Anjana** and Srivatsan Ravi. *Block Transactional Memory: A Complexity Study.* 27th Intl. Symposium on Stabilization, Safety, and Security of Distributed Systems (**SSS 2025**), LNCS, pp. 56–75, Springer, 2025. [DOI]

[C7] Manaswini Piduguralla, Saheli Chakraborty, **Parwat Singh Anjana**, and Sathya Peri. *DAG-Based Efficient Parallel Scheduler for Blockchains: Hyperledger Sawtooth as a Case Study.* **Euro-Par 2023**: Parallel Processing, LNCS vol. 14100, pp. 184–198, Springer, 2023. [DOI]

[C6] **Parwat Singh Anjana**, Adithya Rajesh Chandrassery, and Sathya Peri. *An Efficient Approach to Move Elements in a Distributed Geo-Replicated Tree.* 15th IEEE International Conference on Cloud Computing (**IEEE CLOUD 2022**), pp. 479–488, 2022. [DOI] [Code]

[C5] Sinchan Sengupta, Sathya Peri, and **Parwat Singh Anjana**. *A Self-stabilizing Minimum Average Stretch Spanning Tree Construction.* Intl. Conference on Networked Systems (**NETYS 2022**), LNCS vol. 13464, pp. 119–135, Springer, 2022. [DOI]

[C4] **Parwat Singh Anjana**, Hagit Attiya, Sweta Kumari, Sathya Peri, and Archit Somani. *Efficient Concurrent Execution of Smart Contracts in Blockchains Using Object-Based Transactional Memory.* 8th Intl. Conference on Networked Systems (**NETYS 2020**), LNCS, pp. 77–93, Springer, 2021. [DOI] [Code]

[C3] **Parwat Singh Anjana**, Sweta Kumari, Sathya Peri, Sachin Rathor, and Archit Somani. *An Efficient Framework for Optimistic Concurrent Execution of Smart Contracts.* 27th Euromicro Intl. Conference on Parallel, Distributed and Network-Based Processing (**PDP 2019**), pp. 83–92, IEEE, 2019. [DOI] [Code]

[C2] **Parwat Singh Anjana**, Priyanka Badiwal, Rajeev Wankar, Swaroop Kallakuri, and C. Raghavendra Rao. *Cloud Service Provider Evaluation System Using Fuzzy Rough Set Technique.* 13th IEEE Intl. Conference on Service-Oriented System Engineering (**SOSE 2019**), IEEE, 2019. [DOI]

[C1] **Parwat Singh Anjana**, Rajeev Wankar, and C. Raghavendra Rao. *Design of a Cloud Brokerage Architecture Using Fuzzy Rough Set Technique.* 11th Multi-disciplinary Intl. Workshop on Artificial Intelligence (**MIWAI 2017**), pp. 54–68, Springer, 2017. [DOI]

Short Papers, Posters, and Doctoral Symposia

[S5] **Parwat Singh Anjana**, Adithya Rajesh Chandrassery, and Sathya Peri. *An Efficient Approach to Move Elements in a Distributed Geo-Replicated Tree.* 22nd IEEE/ACM Intl. Symposium on Cluster, Cloud and Internet Computing (**CCGrid 2022**), short paper, pp. 767–770, 2022. [DOI] [Code]

[S4] **Parwat Singh Anjana**. *Efficient Parallel Execution of Block Transactions in Blockchain.* 22nd Intl. Middleware Conference: Doctoral Symposium (**Middleware 2021**), pp. 8–11, ACM, 2021. [DOI]

[S3] **Parwat Singh Anjana**, Hagit Attiya, Sweta Kumari, Sathya Peri, and Archit Somani. *Efficient Concurrent Execution of Smart Contracts in Blockchains Using Object-based Transactional Memory.* 15th Academic Research and Careers for Students Symposium (**ARCS 2021**), short paper presentation, 2021.

[S2] Prashansa Agrawal*, **Parwat Singh Anjana***, and Sathya Peri. *DeHiDe: Deep Learning-based Hybrid Model to Detect Fake News Using Blockchain.* 22nd Intl. Conference on Distributed Computing and Networking (**ICDCN 2021**), pp. 245–246, ACM, 2021. [DOI]

[S1] **Parwat Singh Anjana**, Sweta Kumari, Sathya Peri, Sachin Rathor, and Archit Somani. *Entitling Concurrency to Smart Contracts Using Optimistic Transactional Memory.* 20th Intl. Conference on Distributed Computing and Networking (**ICDCN 2019**), p. 508, ACM, 2019. **Best Poster Award.** [DOI]

Preprints and Manuscripts Under Review

[M2] **Parwat Singh Anjana**, Srivatsan Ravi, and Maurice Herlihy. *Blockchain Transaction Conflicts: A Historical Perspective.* arXiv:2505.05358, 2026. [arXiv]

[M1] **Parwat Singh Anjana**, Rohit Kapoor, Raghavendra Ramesh, Srivatsan Ravi, Joshua Tobkin, and Maurice Herlihy. *Adaptive Parallel Execution of Blockchain Transactions.* 2026.

Other Manuscripts

[O3] **Parwat Singh Anjana**, Sandeep Kulkarni, Sathya Peri, Raaghav Ravishankar, and Diksha Sethi. *Caliber-GC: A Causally Consistent Space Efficient Geo-Replicated Distributed Key-value Store.* 2022.

[O2] **Parwat Singh Anjana**, Shailesh Mishra, and Sathya Peri. *BDIDS: A Blockchain-based Distributed Intrusion Detection System for IoT Networks.* 2021.

[O1] Priyanka Badiwal, **Parwat Singh Anjana**, Rajeev Wankar, and C. Raghavendra Rao. *DRONA: A Data-driven Randomized Algorithm for Complex Optimization Problems.* 2016.

Whitepaper

[W1] Supra. *SupraContainers Whitepaper*, 2024 (contributor). [PDF]

Research and Engineering Projects

- **SupraBTM (iBTM)**, Supra (2022–). Co-designed a Block Transactional Memory–based parallel execution engine that uses transactions' conflict specifications; integrated into SupraEVM and SupraMoveVM, with ongoing work for Solana SVM. Up to 2.43× over sequential execution on historical workloads and up to 1.33× over Parallel-EVM on synthetic workloads. Backed by a $1M open challenge to beat its performance. [C9, C8, J3]
- **SupraAdaptive**, Supra. Parallel execution engine for Supra's Multi-VM (EVM, MoveVM, SVM) that selects its execution strategy from workload characteristics and contention patterns. [M1]
- **Parallel Jellyfish Merkle Tree**, Supra. Parallel JMT construction, a flat storage design and an optimized Merkleization pipeline (including sharded storage) for EVM blockchains.
- **SupraContainers**, Supra (2024). Contributed to containerized parallel execution using the Supra work-sharing queue scheduler; ∼6× over sequential on synthetic workloads. [W1]
- **Historical conflict analysis**, Supra. Extraction pipelines and large-scale study of transaction conflicts and available parallelism in historical Ethereum and Solana blocks. [M2]
- **Parallel execution of smart contracts**, Ph.D. and postdoc, IIT Hyderabad (2017–2022). Optimistic and object-based STM miners and validators, distributed execution, and a DAG-based scheduler for Hyperledger Sawtooth. [J1, J2, C3, C4, C7, S1, S4]

Invited Talks

Jun 2024	*Blockchain Lab: Hands-on Implementation*. Workshop on Blockchain and Cloud Security, School of CSE, XIM University, Bhubaneswar.
May 2024	Speaker, *The Tech Behind Supra* webinar series, Supra.
Apr – May 2024	*Ethereum Blockchain and Smart Contracts*. Online FDP on Blockchain Technology and its Current Research Challenges, Vasavi College of Engineering, with ISOC Hyderabad Chapter.
Mar 2023	*Efficient Parallel Execution of Smart Contracts in Blockchains*. National Conference on Use of Smart Contracts in Public Procurement and Supply Chain, Arun Jaitley National Institute of Financial Management (AJNIFM), Ministry of Finance, Government of India, New Delhi. [Video]
Dec 2019	*Ethereum Blockchain and Smart Contracts*. TEQIP Workshop on Blockchain Technologies, IIT Hyderabad.

Professional Service

Program Committees

- ACM Conference on Computer and Communications Security (**CCS**) 2026, Demo Program Committee
- Advances in Financial Technologies (**AFT**) 2026
- Mathematical Research for Blockchain Economy (**MARBLE**) 2026
- IEEE Intl. Conference on Blockchain and Cryptocurrency (**ICBC**) 2024, invited TPC member
- Blockchain and Internet of Things Conference (**BIOTC**) 2023, 2024, 2025, 2026

Reviewer / Sub-reviewer

Conferences

- SIROCCO 2027
- FC 2025
- ICDCN 2019, 2020, 2021, 2022
- ICDCIT 2019, 2020, 2021, 2022
- CoDS-COMAD 2019, 2020, 2021
- ISEC 2022
- COMSNETS 2019 (poster track)
- IndoSys 2019

Journals

- Concurrency and Computation: Practice and Experience
- Computer Networks
- IEEE Access
- Expert Systems with Applications
- Blockchain: Research and Applications
- Acta Informatica
- Information Systems and e-Business Management
- Intl. Journal of Network Management
- Journal of Internet Services and Applications

Organization and Coordination

Dec 2019	Co-organizer, TEQIP Workshop on Blockchain Technologies, IIT Hyderabad.
2015 – 2016	Student Placement Coordinator, School of CIS, University of Hyderabad.
Oct 2015	Coordinator, Works Applications Co., Ltd. placement drive, Hyderabad.

Teaching

Teaching Assistant, IIT Hyderabad

- CS5320 Distributed Computing (Autumn 2018; Spring 2020, 2021)
- CS5300 Parallel and Concurrent Programming (Spring 2019; Autumn 2020)
- CS5280 Concurrency Control in Transactional Systems (Autumn 2019, 2021)
- CS5530 Basics of Blockchains: Distributed Computing Perspective (Autumn 2018)
- CS3510 Operating Systems 1 (Autumn 2017, 2018); CS3523 Operating Systems 2 (Spring 2018, 2019)
- CS2323 Computer Architecture (Autumn 2017); CS1303 Introduction to Programming Languages (Autumn 2019)

Teaching Assistant, University of Hyderabad

- CS751 Parallel Computing (Spring 2015); CS773 Grid and Cloud Computing (Autumn 2016)

Student Mentoring (PDCRL Lab, IIT Hyderabad)

- **M.Tech:** Diksha Sethi, Sachin Rathor, Kunal Jaun
- **B.Tech:** Sai Ramana Reddy, Sitapara Om, Harshit Patel, Raaghav Ravishankar
- **Interns:** Adithya Rajesh (NITK), Shailesh Mishra (IIT Kharagpur)

Technical Skills

C, C++, Rust, Python, Solidity; concurrent programming; Git, LaTeX, Gnuplot, Remix; AI-assisted development (Claude, ChatGPT).

References

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