

UTKALIKA SATAPATHY

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Education

- Aug 2021– Present **IIT Kharagpur, West Bengal, India, Ph.D., CSE,**
Supervisor: Prof. Sandip Chakraborty
Research Area: Operating Systems, Distributed Systems, and Observability
Research Group: UbiNet Lab.
- 2019–2017 **IIIT Bhubaneswar, Odisha, India, M.Tech., CSE,**
CGPA: 8.66/10
Supervisor: Prof. Debashis Jena
Research Group: ISEA Lab.
- 2013–2009 **Silicon Institute of Technology, Bhubaneswar, India, B.Tech., IT,**
CGPA: 8.46/10 .
- 2009–2007 **Rama Devi Women's Junior College, Bhubaneswar, Higher Secondary.**

Employment/Internship

- May 2023 – **Summer Research Intern, IBM Research Lab, Bangalore,**
Aug 2023 **Project Title:** Policy Enforcement In eBPF based Cloud infrastructure
Project Description: Developed a Linux Security Module (LSM) to enforce policy-based access control and security checks for eBPF programs, ensuring compliance with defined guidelines in cloud infrastructure..
- Feb 2023 – **Senior Research Fellow, IIT Kharagpur sponsored by IGCAR India,**
Present **Project Title:** Development of Algorithms and Tools for Log Analytics
Project Description: To design a unified observability framework for robust, scalable, and efficient logging, provenance tracking, and attack detection in distributed microservice-based applications..
- Feb 2021 – **Junior Research Fellow, IIT Kharagpur sponsored by IGCAR India,**
Feb 2023 **Project Title:** Development of Algorithms and Tools for Log Analytics
Project Description: To design a unified observability framework for robust, scalable, and efficient logging, provenance tracking, and attack detection in distributed microservice-based applications..
- Sep 2019 – **Contractual Assistant Professor, CET, Odisha (Now OUTR, Odisha),**
Jan 2021 **Courses Taught:** Programming for Problem Solving, Java, Data Structure, Internet and Web Technology.
- May 2018 – **Summer Research Intern, IIT Kharagpur,**
Jun 2018 **Project Title:** SilentInformer: A framework for Information Dispersion using Inaudible Acoustic Signals
Project Description: Developed a smartphone-based system for information sharing via inaudible acoustic signals, achieving low bit error rates ($BER \leq 10\%$) in real-world noisy environments..
- Sep 2013 – **Senior System Engineer, Infosys Ltd., Java Developer, at AMEX Account.**
Jul 2017

Publications

- IEEE TSC **XPLOG: A Dynamic Observability Framework for Distributed Sandboxed Microservices,**
Journal 2025 **Utkalika Satapathy, Harsh Borse, Rajat Bachhawat, Neha Dalmia, Subhrendu Chattopad-**
(Under Review) **hyay, Sandip Chakraborty, in IEEE Transactions on Services Computing, 2025.**

- IEEE TSC Journal 2025 (Submitted) **μ ProvGAE: Anomaly Detection with Enriched Provenance Graphs and GAE in Distributed Microservice Architecture,** *Utkalika Satapathy, Harsh Borse, Sandip Chakraborty, in IEEE Transactions on Services Computing, 2025.*
- COMSNETS 2025 **Towards Generating a Robust, Scalable and Dynamic Provenance Graph for Attack Investigation over Distributed Microservice Architecture,** *Utkalika Satapathy, Harsh Borse, Sandip Chakraborty, in International Conference on COMMunication Systems & NETworkS (COMSNETS), 2024.*
- COMSNETS 2025 **BeeGuard: Explainability-based Policy Enforcement of eBPF Codes for Cloud-native Environments,** *Neha Chowdhary, Utkalika Satapathy, T A. Benson, S Chattopadhyay, P Kodeswaran, S Sen, S Chakraborty, in International Conference on COMMunication Systems & NETworkS (COMSNETS), 2024.*
- IEEE ICDCS POSTER 2024 **URCD: Unsupervised Root Cause Detection in Microservices Architecture with HGAN,** *Harsh Borse, Utkalika Satapathy, Mainak Mondal, Bivas Mitra, IEEE International Conference on Distributed Computing Systems (Posters and Demos), 2024.*
- IEEE INFOCOM 2023 **DisProTrack: Distributed Provenance Tracking over Serverless Applications,** *Utkalika Satapathy, Rishabh Thakur, Subhrendu Chattopadhyay, Sandip Chakraborty, IEEE International Conference on Computer Communications (INFOCOM), 2023.*
- IJVICs Journal 2022 **Collaborative decision making system in intelligent transportation system using distributed blockchain technology,** *Bhabendu Kumar Mohanta, Debasish Jena, Utkalika Satapathy, Somula Ramasubbareddy, International Journal of Vehicle Information and Communication Systems, 2022.*
- COMSNETS 2020 **SilentInformer: A Framework for Information Dispersion Using Inaudible Acoustic Signals,** *Utkalika Satapathy, Soumyajit Chatterjee, Sandip Chakraborty, in International Conference on COMMunication Systems & NETworkS (COMSNETS), 2020.*
- Elsevier IoT Journal 2020 **Survey on IoT security: Challenges and solution using machine learning, artificial intelligence and blockchain technology,** *Bhabendu Kumar Mohanta, Debasish Jena, Utkalika Satapathy, Srikanta Patnaik, Internet of Things; Engineering Cyber Physical Human Systems, 2020.*
- ICIIS 2018 **An ECC based Lightweight Authentication protocol for Mobile Phone in Smart home ,** *Utkalika Satapathy, Bhabendu Ku. Mohanta, Debasish Jena, Srichandan Shobhanayak, in IEEE 13th International Conference on Industrial and information Systems (ICIIS) at IIT Ropar, 2018.*
- ICACCCN 2018 **Load Performance Testing on Cloud Platform,** *Raken Ku. Lenka, Pranali Bhanse, Utkalika Satapathy, in IEEE International Conference on Advances in Computing, Communication Control and Networking (ICACCCN) at Galgotias College of Engineering and Technology, 2018.*
- ICCCNT 2019 **Secure Communication in Internet of Things Application using Hyperledger based Blockchain,** *Utkalika Satapathy, Bhabendu Ku. Mohanta, Soumyashree S. Panda, Srichandan Shobhanayak, Debasish Jena, in IEEE 10th International Conference on Computing, Communication And Networking Technologies (ICCCNT) at IIT Kanpur, 2019.*
- Tencon 2019 **Study of Blockchain Based Decentralized Consensus Algorithms,** *Soumyashree S. Panda, Bhabendu Kumar Mohanta, Utkalika Satapathy, Debasish Jena, Debasis Gountia, Tapas Kumar Patra.*
- IJSTR 2019 **Trust Management in IoT Enable Healthcare System using Ethereum based Smart Contract,** *Utkalika Satapathy, Bhabendu Ku. Mohanta, Debasish Jena.*

Grants and Awards

- 2025 **COMSNETS Best Paper 1st Runner Up Award**, for presenting the paper titled "Towards Generating a Robust, Scalable and Dynamic Provenance Graph for Attack Investigation over Distributed Microservice Architecture".
- 2025 **COMSNETS Travel Grant**, for attending COMSNETS 2025.
- 2024 **Google Research India**, for participating in Research Week with Google 2024.
- 2024 **ACM India ARCS and Annual Event**, for presenting the paper titled DisProTrack as a part of the Lightning Talks and Posters session.
- 2023 **LRN Foundation International Travel Grant Award in Association with COMSNETS**, for attending IEEE INFOCOM 2023.
- 2023 **ACM-India and IARCS Travel Grant**, for attending IEEE INFOCOM 2023.
- 2023 **INFOCOM 2023 Conference Travel Grant**, for attending IEEE INFOCOM 2023.
- 2018 **Mobicom'18 Scholarship Grant**, for attending ACM Mobicom 2018.
- 2017 **GATE**, Qualified, *Score:432/1000*.

Teaching & Lab

- Jan 2026 **Database Management Systems Theory**, *Dept. of CSE, IIIT Bhubaneswar, Odisha.*
<https://usatpath01.github.io/courses/2026-spring-DBMS>
- Jan 2026 **Database Management Systems Lab**, *Dept. of CSE, IIIT Bhubaneswar, Odisha.*
<https://usatpath01.github.io/courses/2026-spring-DBMS>
- Aug 2025 **Object Oriented Programming Theory**, *Dept. of CSE, IIIT Bhubaneswar, Odisha.*
<https://usatpath01.github.io/courses/2025-autumn-OOP>
- Aug 2025 **Operating systems**, *Dept. of CSE, IIIT Bhubaneswar, Odisha.*
<https://usatpath01.github.io/courses/2025-autumn-OS>
- Aug 2020 **Java Programming Theory and Lab, Programming and Problem Solving Theory and Lab**, *Dept. of IT, OUTR, Odisha.*
- Aug 2020 **Data Structures and Algorithms Theory, Internet and Web Technologies Theory**, *Dept. of IT, OUTR, Odisha.*
- Aug 2019 **Programming and Problem Solving Theory and Lab, Java Programming Theory and Lab**, *Dept. of IT, OUTR, Odisha.*

Teaching Assistance

- Autumn 2024-2025 **CS61065: Theory and Applications of Blockchain**, *By Prof. Sandip Chakraborty & Prof. Shamik Sural, Dept. of CSE, IIT Kharagpur.*
https://onlinecourses.nptel.ac.in/noc24_cs15/preview
- Jan–Apr 2023 **Theory of Blockchain & Application**, *By Prof. Sandip Chakraborty & Prof. Shamik Sural, NPTEL Online Certification Course, IIT Kharagpur Dept. of CSE.*
https://onlinecourses.nptel.ac.in/noc23_cs47/preview
- Spring 2023-2024 **CS19001: Programming & Data Structure Tutorial and Lab**, *By Prof. Rajib Mall & Prof. Sudeshna Sarkar, Dept. of CSE, IIT Kharagpur.*
<https://cse.iitkgp.ac.in/~aritrah/course/theory/PDS/Spring2024/>
- Autumn 2023-2024 **CS61065: Theory and Applications of Blockchain**, *By Prof. Sandip Chakraborty, Dept. of CSE, IIT Kharagpur.*
<https://sandipc-iitkgp.github.io/sandip-web/courses/cs61065/cs61065.html>
- Jan–Apr 2023 **Theory of Blockchain & Application**, *By Prof. Sandip Chakraborty & Prof. Shamik Sural, NPTEL Online Certification Course, IIT Kharagpur Dept. of CSE.*
https://onlinecourses.nptel.ac.in/noc23_cs47/preview
- Spring 2022-2023 **CS60002: Distributed Systems**, *By Prof. Sandip Chakraborty, Dept. of CSE, IIT Kharagpur.*
<https://cse.iitkgp.ac.in/~sandipc/courses/cs60002/cs60002.html>

- Autumn 2022-2023 **CS61065: Theory and Applications of Blockchain**, By Prof. Sandip Chakraborty, Dept. of CSE, IIT Kharagpur.
<https://sandipc-iitkgp.github.io/sandip-web/courses/cs61065/cs61065.html>
- Spring 2021-2022 **CS10003: Programming and Data Structure Theory & Lab**, By Prof. Sudebkumar Prasant Pal, Dept. of CSE, IIT Kharagpur.
<https://cse.iitkgp.ac.in/%7Espp/teaching.html>
- Jan-Apr 2022 **Theory of Blockchain & Application**, By Prof. Sandip Chakraborty & Prof. Shamik Sural, NPTEL Online Certification Course, IIT Kharagpur Dept. of CSE.
https://onlinecourses.nptel.ac.in/noc22_cs44/preview
- Spring 2019 **Operating System**, Dept. of CSE, IIIT Bhubaneswar.
- Aut 2018 **Java Programming**, Dept. of CSE, IIIT Bhubaneswar.
- Aut 2018 **Programming in C**, Dept. of CSE, IIIT Bhubaneswar.

Projects

- Apr 2024 **Leveraging Micro-resource Observation for Non-invasive Trace Analysis for Distributed Applications**, Developed a trace aggregation technique and automated tool to hierarchically analyze execution traces, enabling precise identification of performance bottlenecks and enhancing diagnosis accuracy..
- Apr 2024 **Enforcing Organizational Policies as Security Rules Within the System**, Designed a dynamic policy enforcement framework integrating Open Policy Agent (OPA) with eBPF at the kernel level, enabling low-level network packet inspection and automated conversion of human-readable security policies into machine-executable policies using advanced AI techniques..
- Nov 2023 **Unified System and Application Log Generation and Analysis on Serverless Environment using eBPF**, Developed a web-based interface for parsing eBPF-generated unified logs, enabling intuitive visualization, efficient debugging, and enhanced security in containerized computing environments..
- Nov 2023 **Attack Investigation in Distributed Environments**, Designed a tailored attack investigation system for distributed systems to enhance detection, response, and defense against Advanced Persistent Threat (APT) attacks..
- Nov 2022 **Reverse Engineering on Docker Images**, Proposed a method to extract source code or binaries from containerized serverless applications to enable effective provenance tracking and issue diagnosis..
- Nov 2022 **Unified System Call Log and Application Log Generation on Serverless Environment using eBPF**, Developed a novel eBPF-based tool to generate unified system and application logs, enabling efficient provenance tracking across containerized applications and multiple hosts for root cause analysis..

Responsibility

- 2025 **Organizing Committee**, for Indocrypt 2025, The 26th International Conference on Cryptology in India, <https://www.indocrypt2025.in/>.
- 2025 **Organizing Committee**, for InGARSS 2025, for India Geoscience and Remote Sensing Symposium, <https://www.ingarss-2025.in/>.
- 2025 **Organizing Committee**, for ISEA National Workshop 2025, CipherStorm: Unlocking Digital Security organized by IIIT Bhubaneswar in collaboration with ISI Kolkata under ISEA Phase-III Project, <https://isea.gov.in/event.php/IVP20251031JASE>.
- 2023 **Volunteer**, for ICDCN 2023, The 24th International Conference On Distributed Computing And Networking, <https://cse.iitkgp.ac.in/conf/ICDCN23/>.
- 2022 **Web Chair**, for AI-ML Systems 2022, The Second International Conference on AI-ML Systems, <https://www.aimlsystems.org/2022/>.

2021 **Volunteer**, for *AI-ML Systems 2021, The First International Conference on AI-ML Systems*, <https://www.aimlsystems.org/2023/>.

Skills

Programming Language Python, C, C++, Java, SQL

Tools eBPF, LKM, Git, Docker, Virtual Box, MATLAB, TEXnicCenter, Anaconda Navigator, Google Colab, Pycharm, Eclipse IDE, Jenkins, MySQL Workbench

Databases Oracle 10g, DB2, MySQL, MongoDB

Operating System Ubuntu, Mac, Windows 10, Kali Linux

Extra-Curriculars

- **Languages:** English, Hindi, Odia
- Awarded with first prize in IGT 2.0 in Infosys
- 1st Runner's up in Infosys Dancing Star Competition

Personal Details

Date of Birth 01-04-1992

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References

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Email: sandipc@cse.iitkgp.ac.in
Phone: (+91) (3222) (282898)
Relationship: PhD Supervisor.
- 2 **Prof. Debashish Jena**, Associate Professor, Department of Computer Science, IIIT Bhubaneswar, India,
Email: debasish@iiit-bh.ac.in
Phone: (0674) (3060519)
Relationship: M.Tech Supervisor.