

SASWAT DAS

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Student Researcher, NISER, HBNI, and Visiting Research Scholar at EECS, Syracuse University

Research Interests: Trustworthy AI, differential privacy, fairness, federated learning, cryptography

EDUCATION

JUL 2018 - PRESENT

INTEGRATED M.SC. (BS+MS), NATIONAL INSTITUTE OF SCIENCE EDUCATION AND RESEARCH (NISER), INDIA

- Majoring in Mathematics and Minor in Computer Science (Currently in the 8th Semester)
- Current CGPA : 8.01; Master's Years CGPA: 8.67 (Indian 10-point scale)
- GPA in Computer Science : 9.36/10; top grades in courses including machine learning, cryptography, statistical/machine learning theory etc.

APR 2011 - MAY 2018

AISSE & AISSCE (SECONDARY AND HIGH SCHOOL), DPS KALINGA, ODISHA, INDIA

- Secured 10 CGPA in AISSE (Grade 10 Matriculation Exams)
- Secured 92% in AISSCE (Science Stream) (Grade 12 Exams)

EXPERIENCE

JUNE 2022 - PRESENT

VISITING RESEARCH SCHOLAR, EECS, SYRACUSE UNIVERSITY

Mentor: Dr. Ferdinando Fioretto, EECS, Syracuse University

In this role, I have been working with Dr. Fioretto's lab at Syracuse University and collaborators from Georgia Tech etc. on projects related to trustworthy AI and data analysis. In particular, our work focuses on fairness and privacy in AI and demographic analysis and seeks to inform stakeholders and policymakers about the use and impact of privatising methods used in practice. This position started with an in-person summer internship (June-Aug 2022) in Syracuse, NY.

MARCH 2021 - PRESENT

STUDENT RESEARCHER, SUBHANKAR MISHRA'S LAB, SCHOOL OF COMPUTER SCIENCES, NISER

Mentor: Dr. Subhankar Mishra, School of Computer Sciences, NISER, HBNI

Research Focus: Privacy preserving technologies in the context of AI viz. differential privacy, federated learning, and fairness.

Other Duties: Coordinating the lab's CS Katha Barta Talk Series - inviting CS researchers to deliver talks on their work.

SEPTEMBER 2020

ATTENDEE/PARTICIPANT, SUMMER SCHOOL ON COMPUTER & CYBER SECURITY 2020, TECHNION

Topics covered: Security and privacy. In particular: Tor, mixnets, private messaging systems, differential privacy, privacy by design, privacy-preserving contact tracing and machine learning, and economic and technological aspects of privacy etc.

DEC 2019 - JAN 2020

WINTER INTERN, SCHOOL OF COMPUTER SCIENCES, NISER, BHUBANESWAR

Supervisor: Dr. Rishiraj Bhattacharyya, then at the School of Computer Sciences, NISER. Now at the University of Birmingham.

Focus: Zero knowledge (zk) proofs and their applications, emerging secure zk-based cryptocurrencies/systems like Zerocoin, Zerocash etc., their mechanics, and an in-depth study into the mathematics behind zk-SNARKs.

MAY 2019 - JULY 2019

SUMMER INTERN, SCHOOL OF COMPUTER SCIENCES, NISER, BHUBANESWAR

Supervisor: Dr. Rishiraj Bhattacharyya, then at the School of Computer Sciences, NISER. Now at the University of Birmingham.

Topics covered: Hash functions/hash data structures, blockchains, cryptocurrencies and decentralised cryptosystems viz.

Bitcoin, Ethereum, decentralised peer to peer networks, smart contracts, proofs of work and stake, privacy and pseudonymity and relevant implementations etc.

Tasks Completed: Presented talks on said topics and wrote a report on smart contracts and their applications.

PUBLICATIONS/SUBMITTED PAPERS

- **Fair Context-Aware Threat Modelling (2022)**
Presented at the Workshop on Privacy Threat Modeling (WPTM), USENIX - Symposium on Usable Privacy and Security (SOUPS), 2022
<https://arxiv.org/abs/2207.09750>
Saswat Das, Rakshit Naidu
- **Advances in Differential Privacy and Differentially Private Machine Learning: A Survey (2022)**
Under Review. Submitted to ACM Computing Surveys (CSUR) - Special Edition on Trustworthy AI
Saswat Das, Subhankar Mishra
- **Mitigating Model Explanation-Driven Privacy Attacks via Differentially Private Training (2022)**
Under Review. Submitted to ACM CODS-COMAD 2023 - Young Researchers' Symposium (YRS)
Saswat Das, Subhankar Mishra

RESEARCH PROJECTS

- **On the Equity of Privacy Preserving Methods in (Demographic) Data Analysis**
Ongoing Joint Work with: Ferdinando Fioretto (Syracuse University), Keyu Zhu (Georgia Tech), and Pascal van Hentenryck (Georgia Tech)
- **Mitigation of Privacy and Security Risks from Post-Hoc Model Explanations via Differentially Private Training**
Ongoing Joint Work with: Subhankar Mishra (NISER, HBNI) and Rakshit Naidu (Carnegie Mellon University)
- **Training High-Utility Differentially Private Graph Neural Networks with Public Pretraining**
Proposed Work with: Subhankar Mishra (NISER, HBNI), Rucha Bhalchandra Joshi (NISER, HBNI), Georgios Kaissis (TU Munich), and Tamara Mueller (TU Munich)
- **Adaptive Sampling and DecenP2PFedAvg - Novel Methods for Federated Learning with Communication Efficiency and for P2P Networks (2021)**
Yet-to-be-published joint work with: Suraj Patel (NISER, HBNI) and Subhankar Mishra (NISER, HBNI)

TEACHING/EDITING/VOLUNTEERING

SECTION LEADER, CODEINPLACE, STANFORD UNIVERSITY

APR. 2021 - MAY 2021

Served as a section leader in Stanford University's CodeInPlace programme and taught coding to a section of students from a global pool of applicants using material from the first half of Stanford University's popular course, CS106A.

COLLEGE MATHEMATICS TUTOR, NISER, HBNI

FEB. 2021 - MAY 2021

Served as a mathematics tutor to freshman in the spring of 2021 as part of an initiative by mathematics majors at the School of Mathematical Sciences, NISER. Helped clarify mathematical concepts, solve questions, and encouraged mathematical rigour.

ONLINE MENTOR AND TUTOR, AVETI LEARNING

APR. 2020 - SEP. 2022

Served as an online mathematics tutor and mentor to high school students in rural Eastern India to make quality education more accessible.

STUDENT MENTOR, AVANTI FELLOWS

SEPT 2018 - AUG 2019

Served as a mentor and mathematics tutor to high school students at JNV Dhenkanal as part of the acclaimed Avanti Fellows programme.

AWARDS/HONOURS

- Selected for the prestigious TIFR - Visiting Students' Research Programme (VSRP), 2022 in Technology & Computer Science
- DISHA Fellowship, Department of Atomic Energy, Government of India (2018-2023)
- National Talent Search (NTS) Scholarship, NCERT, India (2016)

ACADEMIC/EXTRACURRICULAR POSITIONS HELD

STUDENT REPRESENTATIVE, UGCS, SCHOOL OF MATHEMATICAL SCIENCES, NISER

DEC. 2020 - PRESENT

Serving as one of two student representatives to the Undergraduate Committee of the School (UGCS) of Mathematical Sciences, NISER, and help professors design and develop the academic course structure, pedagogy, and evaluation schemes of the undergraduate programme.

EDITOR, INVENTA MAGAZINE

JUL. 2021 - DEC. 2021

Worked on the editorial board for Inventa, an annual national science outreach magazine published jointly by the premier public research institutes of India: NISER, CeBS, IISc, and the IISERs.

CLUB PRESIDENT, QUIZONE, NISER

MAY 2019 - NOV. 2021

Served as the president of Quizzone, the quiz club of NISER, HBNI, for two consecutive terms. In this role, I organised and hosted quizzes (online and offline), which involved planning and running logistics, making questions, maintaining a social media presence for the club, engaging with partners and sponsors etc. Helped codify club rules and regulations by drafting a club constitution.

MEMBER, CULTURAL COMMITTEE, NISER

AUG 2019 - NOV. 2021

Served as a member of the cultural committee of NISER, HBNI, which is responsible for planning and organising cultural events in the college.

HEAD BOY (SCHOOL CAPTAIN), DELHI PUBLIC SCHOOL KALINGA, INDIA

SEP. 2016 - JUL. 2018

Served as head boy of Delhi Public School Kalinga, in a role which involved representing the school on an interschool level, presiding over the students' council, organising events, and looking after the welfare and interests of the students of the school.

NOTABLE SKILLS/TRAITS

- Lingual Proficiency: Native/Bilingual Fluency in English, Hindi, Odia, familiarity with French
- Languages and Tools: C++, SQL, Python, JavaScript, LaTeX, PyTorch, Opacus, Captum
- Familiar with the use of Linux (Arch and Debian based)
- Teaching and Tutoring Experience
- Soft Skills: Leadership and Team Management, Diligence, Quick Learning, Event Organisation, Public Speaking and Presentation Skills, Time Management