

Sayan Biswas

Research interests

Differential Privacy, Federated Learning, Location Privacy, Privacy-Utility Optimization

Positions

2023–present **Postdoctoral Researcher**, EPFL (SaCS Lab), Lausanne, Switzerland.

Education

- 2020–2023 **PhD in Computer Science**, INRIA and École Polytechnique (Institut Polytechnique de Paris), Palaiseau, France.
Supervisor: Catuscia Palamidessi
Thesis: *Understanding and optimizing the trade-off between privacy and utility from a foundational perspective*
- 2016–2020 **Master of Mathematics (M.Math.)**, **First-class honours**, University of Bath, Bath, England.
Specialisation: Probability Theory, Statistics, Data Analysis
M.Math project: *Quantifying Identifiability*. Supervisors: James H. Davenport and Theresa Smith

Publications

Peer-Reviewed Conferences

- 2023 Sayan Biswas and Catuscia Palamidessi: “**PRIVIC: A privacy-preserving method for incremental collection of location data**”. Proceedings on Privacy Enhancing Technologies (PoPETs), Volume 2024, Issue 1, pp 582–596. DOI: 10.56553/popets-2024-0033.
- 2023 Filippo Galli, Sayan Biswas, Kangsoo Jung, Tommaso Cucinotta, and Catuscia Palamidessi: “**Group privacy for Personalized Federated Learning**”. Proceedings of the 9th International Conference on Information Systems Security and Privacy (ICISSP) 2023, pp 252–263, SciTePress Digital Library, February 24 2023. ISBN: 978-989-758-624-8, DOI: 10.5220/0011885000003405.
- 2022 Sayan Biswas, Graham Cormode, and Carsten Maple: “**Impact of Sampling on Locally Differentially Private Data Collection**”. Proceedings of Competitive Advantage in the Digital Economy – Resilience, Sustainability, Responsibility, and Identity (CADE) 2022, pp 64–70, IET Digital Library and IEEE Xplore, November 9 2022. Winner of the **Best Paper Award**. ISBN: 978-1-83953-742-4, DOI: 10.1049/icp.2022.2042.
- 2022 Sayan Biswas, Kangsoo Jung, and Catuscia Palamidessi: “**Tight Differential Privacy Blanket for Shuffle Model**”. Proceedings of Competitive Advantage in the Digital Economy – Resilience, Sustainability, Responsibility, and Identity (CADE) 2022, pp 61–63, IET Digital Library and IEEE Xplore, November 9 2022. ISBN: 978-1-83953-742-4, DOI: 10.1049/icp.2022.2041.
- 2021 Sayan Biswas, Kangsoo Jung, and Catuscia Palamidessi: “**An Incentive Mechanism for Trading Personal Data in Data Markets**”. Proceedings of the 18th International Colloquium on Theoretical Aspects of Computing (ICTAC) 2021, pp 197–213, LNCS 12819, Springer, August 20 2021. ISBN: 978-3-030-85315-0, DOI: 10.1007/978-3-030-85315-0_12.

Journals

- 2023 Filippo Galli, Kangsoo Jung, Sayan Biswas, Catuscia Palamidessi, and Tommaso Cucinotta: “**Advancing Personalized Federated Learning: Group Privacy, Fairness, and Beyond**”. Special issue of Springer Nature Computer Science: Recent Trends on Information Systems Security and Privacy (to appear).

Book Sections

- 2021 Kangsoo Jung, Sayan Biswas, and Catuscia Palamidessi: “**Establishing the Price of Privacy in Federated Data Trading**”. Protocols, Strands, and Logic, pp 232–250, LNCS 13066, Springer, November 19 2021. ISBN: 978-3-030-91631-2, DOI: 10.1007/978-3-030-91631-2_13.

Key Acceptances at Non-Archival Workshops

- 2023 Sayan Biswas and Catuscia Palamidessi: “**PRIVIC: A privacy-preserving method for incremental collection of location data**”. Theory and Practice of Differential Privacy (TPDP) Workshop 2023. September 27–28, 2023; Boston, USA.
- 2023 Filippo Galli, Sayan Biswas, Kangsoo Jung, Tommaso Cucinotta, and Catuscia Palamidessi: “**On the adaptive sensitivity of differentially private machine learning**”. The 4th Workshop on Privacy-Preserving Artificial Intelligence in Conjunction with AAAI (PPAI) 2023. February 13, 2023; Washington DC, USA.
- 2022 Filippo Galli, Sayan Biswas, Kangsoo Jung, Tommaso Cucinotta, and Catuscia Palamidessi: “**Group privacy for personalized federated learning**”. International Workshop on Federated Learning: Recent Advances and New Challenges in Conjunction with NeurIPS (FL-NeurIPS) 2022. December 2, 2022; New Orleans, USA. One of the **12 amongst the 103 submissions selected for oral presentation**.

Miscellaneous Research Appointments

- Sep'23 - Oct'23 **Visiting Scholar.**
Macquarie University – Sydney, Australia
Supervisors: Annabelle McIver and Natasha Fernandes
- Jan'22 - Mar'22 **Visiting Scholar.**
WMG and Dept. of Computer Science, University of Warwick – Coventry, England
Supervisors: Carsten Maple and Graham Cormode
- Jun'20 - Aug'20 **Research Intern.**
Dept. of Computer Science, University of Warwick – Coventry, England
Supervisors: Graham Cormode and Carsten Maple
- Jun'19 - Sep'19 **Research Intern.**
INRIA – Palaiseau, France
Supervisor: Catuscia Palamidessi
- Jun'18 - Aug'18 **Research Intern.**
Institute for Mathematical Innovation (IMI) and University of Bath – Bath, England
Supervisor: Christopher Jennison

Select Talks

- 2022 “**Incremental collection of location data: Differential Privacy and beyond...**”. 7th Franco-Japanese Cybersecurity Workshop 2022. Presentation: 24th October 2022 in Tokyo, Japan.
- 2022 “**Three-way optimization of privacy and utility of location data**”. 12th Atelier sur la Protection de la Vie Privée (APVP) 2022. Presentation: 14th March 2022 in Chatenay-sur-Seine, France.

Teaching

- Aug'22 - Sep'22 **INRIA-DFKI European Summer School on AI (IDESSAI 2022), Saarbrücken, Germany.**
- Delivered a hands-on session to implement *differential privacy with federated learning in Python*
- Got a *special mention* as the *most liked course* of the summer school
- Feb'21 - Jun'23 **École Polytechnique, Palaiseau, France.**
Teaching Assistant
- CSE 102: Advanced Programming with Python
- Oct'18 - May'20 **University of Bath, Bath, England.**
Teaching Assistant
- XX10190 Programming & Discrete Mathematics (with MATLAB) – 2018-19
- MA10209 Algebra 1A – 2019-20
- MA10212 Prob. & Stat. 1B – 2019-20
- Jul'17 - Aug'17 **Humen Foreign Language School, Humen, China.**
Foreign Exchange Teacher
- Taught Mathematics and English at the 2017 International Summer Camp organised by HFLS

Academic Services

- 2021 - present Peer Reviewer – *IEEE Transactions on Dependable and Secure Computing*
- 2022-23 Member of the Programme Committee – *AAAI Workshop Privacy Preserving Artificial Intelligence (PPAI) 2023*

Other Work Experience

- Nov'18 - May'20 **Lead student-editor of Dept. of Mathematics newsletter, University of Bath.**
- Feb'17 - Nov'19 **Coordinator of Mathscon, Project head of UK's largest student-led maths conference.**
- Jan'17 - Mar'20 **Mentor for British Mathematical Olympiad, United Kingdom Mathematics Trust.**

Awards and Achievements

- Winner of the Best Paper Award at the Competitive Advantage in the Digital Economy – Resilience, Sustainability, Responsibility, and Identity (CADE) 2022** held in Venice, Italy (2022)
- Qualified the UK and Ireland Programming Contest (UKIEPC)** (was the **first solver of Problem 5 in the UK and Ireland**) for the North-West European Regional Contest (NWER) of *International Collegiate Programming Contest (ICPC) European Finals* in Eindhoven University of Technology, Netherlands, representing University of Bath (2018)
- Qualified the Regional Mathematical Olympiad (top 28 in West Bengal, India)**, organised by the National Board of Higher Mathematics and Homi Bhabha Centre for Science and Education (2013 & 2014)
- Qualified the national stage of Panini Linguistics Olympiad (top 15 in India)**; attended the International Linguistics Olympiad Training Camp and invitational round at Microsoft Research Lab, India; received *Honourable Mention* (2015)
- Qualified the final round of Indian National Philosophy Olympiad (top 10 from India)**; received *Honorable Mention* in the International Philosophy Olympiad Training Camp (2016)
- Qualified the Zonal Informatics Olympiad (top 6 in Kolkata, India)**, organised by the Indian Association for Research in Computing Science (2016)