

# Amartya Sanyal

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## Professional Experience

### Tenure Track Assistant Professor in Machine Learning

DEPARTMENT OF COMPUTER SCIENCE, UNIVERSITY OF COPENHAGEN

Copenhagen, Denmark

July 2024-

### Affiliated Assistant Professor

DEPARTMENT OF MATHEMATICS, UNIVERSITY OF COPENHAGEN

Copenhagen, Denmark

July 2024-

### Postdoctoral Fellow, Max Planck Institute for Intelligent Systems

WITH PROF. BERNHARD SCHÖLKOPF

Tübingen, Germany

April 2023 - Now

### Postdoctoral Fellow, ETH AI Center

WITH PROF. FANNY YANG

Zürich, Switzerland

October 2021 - March 2023

### Research Assistant, University of Oxford

WITH PROF. PHILIP H.S. TORR

Oxford, UK

June 2021 - September 2021

### Part Time Researcher, Facebook AI Research

WITH DR. EDWARD GREFENSTETTE

London, UK

November 2020 - April 2021

## Education

### D.Phil in Computer Science (Advisor : Dr. Varun Kanade and Dr. Philip H.S. Torr)

UNIVERSITY OF OXFORD, ST. HUGH'S COLLEGE

Passed with Minor Corrections

2017 - 2021

### B.Tech. in Computer Science and Engineering (Minor in Linguistics Theory)

INDIAN INSTITUTE OF TECHNOLOGY, KANPUR

CPI - 9.4/10.0

2013 - 2017

## Awards

- '23 **Rising Star in AI**, KAUST
- '22 **ELLIS Member**, ELLIS Society
- '21-'23 **ETH AI Center Postdoctoral Fellowships Award**, Awarded by the ETH AI Center, Zürich, Switzerland
- '17-'21 **Turing Doctoral Studentship Award**, Awarded by The Alan Turing Institute, London, UK
- '19-'22 **Top Reviewer Award**, NeurIPS 2022, ICML 2020, NeurIPS 2019
- '14 & '16 **Academic Excellence Award**, Awarded to top 10% student, IIT Kanpur
- '13 **KVPY(Kishore Vaigyanik Pratyashona Yojana)**, Awarded to 280 students nationally by the Gov. of India

## Grants

- 2022 **Awarded an Hasler Stiftung Grant of 50,000 CHF**, Principal Investigator of a project "Understanding the Interaction of Privacy and Fairness in modern ML Algorithms"

ETH Zürich

## Teaching

### INSTRUCTOR

- '23 **Co-Instructor— Advanced Topics in Machine Learning**, Dept. of Computer Science, University of Copenhagen
- '22 **Co-Instructor— Guarantees in Machine Learning**, Dept. of Computer Science, ETH Zürich
- '22 **Co-Instructor— Projects in Machine Learning Research**, Dept. of Computer Science, ETH Zürich

### TUTOR

- '21 **Tutor in Computational Learning Theory**, Dept. of Computer Science, University of Oxford
- '19', '20 **Tutor in Theory of Optimization**, Department of Engineering Science, University of Oxford
- '18', '19 **Tutor in Machine Learning**, Wadham College, Worcester College, Somerville College, University of Oxford
- '18', '19', '20 **Tutor in Machine Learning**, Dept. of Computer Science, University of Oxford
- '17 **Teaching Assistant in Computational Complexity**, Department Computer Science, University of Oxford
- '14 **Academic Mentor in Linear Algebra, Real Analysis and ODEs**, Indian Institute of Technology (IIT) Kanpur

# Academic Service

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## WORKSHOP ORGANISATION

'23 **Workshop on “Pitfalls of limited data and computation for Trustworthy ML” in ICLR 2023,**

## JOURNAL REVIEWING

'22 **Transactions in Machine Learning Research,**  
'20 **International Journal of Computer Vision,**

## AREA CHAIR

'23 **Artificial Intelligence and Statistics (AISTATS),**

## CONFERENCE REVIEWING

'22 **NeurIPS2023,**  
'22 **NeurIPS2022, UAI2022, AISTATS 2022, ICML 2022, ICLR 2023,**  
'21 **NeurIPS 2021, AISTATS 2021, ICLR 2022, ICML 2021,**  
'20 **ICLR 2021, SODA 2020, NeurIPS 2020, ICML 2020, CVPR 2020, ECCV 2020,**  
'19 **NeurIPS 2019,**

## WORKSHOP REVIEWING

'21,'22,'23 **Workshop on Distribution Shifts,** NeurIPS 2021, NeurIPS 2022  
'20 **Workshop on Dataset Curation and Security,** NeurIPS 2020  
'20 **Reviewer for Workshop on Continual Learning,** ICML 2020  
'19 **Critiquing and Correcting Trends in Machine Learning,** NeurIPS 2019

# Advised Students

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'23 **Kristóf Szabó** , Master's Student in Mathematics, ETH Zürich  
'22 **Francesco Pinto**, D.Phil (Ph.D) Student, University of Oxford  
'21 **Yaxi Hu**, Ph.D Student, Max-Planck Institute for Intelligent Systems  
'22 **Piersilvio De Bartolomeis**, Master's Student in Data Science,ETH Zürich  
'22 **Gizem Yüce**, Master's Student in Data Science, ETH Zürich  
'22 **Yunfan Zou**, Master's Student in Computer Science, ETH Zürich  
'22 **John Hill**, Master's Student in Computer Science, Georgia Institute of Technology  
'22 **Angelo Gnazzo**, Master's Student in Mathematics, ETH Zürich  
'20 **Sharan Gopal**, Master's Student in Advanced Computer Science, University of Oxford

# Talks

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Oct '23 **Data Science Seminar, University of Michigan, USA**  
Oct '23 **META AI, Facebook, USA**  
Sep '23 **Department of Electrical Engineering and Computer Science, MIT, USA**  
Sep '23 **Department of Computer Science, University of Helsinki, Finland**  
Feb '23 **Department of Computer Science, University of Copenhagen, Denmark**  
Feb '23 **Rising Stars in AI Symposium, KAUST, Saudi Arabia**  
Dec '22 **École Polytechnique Fédérale de Lausanne, Switzerland**  
Oct '22 **Max-Planck-Institut für Intelligente Systeme, Tübingen, Germany**  
July '22 **The Alan Turing Institute, London, UK**  
June '22 **Department of Engineering Science, University of Oxford, UK**  
June '22 **Department of Computer Science, University of Edinburgh, UK**  
Oct '21 **Department of Statistics, ETH Zürich, Switzerland**  
Feb '21 **Department of Computer Science, Harvard University, Boston**  
Nov '20 **Math Machine Learning seminar MPI MIS + UCLA, Max-Planck-Institut für Mathematik, Germany**  
Nov '20 **Max-Planck-Institut für Informatik, Saarbrücken, Germany**  
Oct '20 **Machine Learning and Computer Vision Group, Institute of Science and Technology, Vienna, Austria**  
Oct '20 **Thoth team, Inria Grenoble Rhône-Alpes, Grenoble, France**  
Sep '20 **Department of Computer Science and Engineering, Indian Institute of Technology, Hyderabad, India**  
Aug '20 **Department of Computer Science and Engineering, Indian Institute of Technology, Kanpur, India**

## Conference and Journal Publications

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### Can semi-supervised learning use all the data effectively? A lower bound perspective

Gizem Yüce, Alenxandru Tifrea, Amartya Sanyal, Fanny Yang  
*Advanced in Neural Information Processing Systems (NeurIPS)*, 2023

### Certifying Ensembles: A General Certification Theory with $\mathcal{S}$ -Lipschitzness

Aleksander Petrov, Francisco Eiras, Amartya Sanyal, Philip H.S. Torr, Adel Bibi  
*International Conference on Machine Learning (ICML)*, 2023

### How robust are pre-trained models to distribution shift?

Yuge Shi, Imant Daunhawer, Julia E. Vogt, Philip H.S. Torr, Amartya Sanyal  
*International Conference on Learning Representations (ICLR)*, 2023

### A law of adversarial risk, interpolation, and label noise

Daniel Paleka, Amartya Sanyal  
*International Conference on Learning Representations (ICLR)*, 2023

### Make Some Noise: Reliable and Efficient Single-Step Adversarial Training

Pau Jorge, Amartya Sanyal, Adel Bibi, Ricardo Volpi, Gregory Rogez, Puneet K. Dokania, Philip H. S. Torr  
*Advanced in Neural Information Processing Systems (NeurIPS)*, 2022

### How unfair is private learning?

Amartya Sanyal, Yaxi Hu, Fanny Yang  
*Conference on Uncertainty in Artificial Intelligence (UAI)* Oral Paper, 2022

### Open Problem: Do you pay for Privacy in Online learning?

Amartya Sanyal, Giorgia Ramponi  
*Conference on Learning Theory (COLT)*, Open Problem, 2022

### How Benign is Benign Overfitting ?

Amartya Sanyal, Varun Kanade, Philip H.S. Torr, Puneet K. Dokania  
*International Conference on Learning Representations (ICLR)*, *Spotlight Paper*, 2021

### Progressive Skeletonization: Trimming more fat from a network at initialization

Pau Jorge, Amartya Sanyal, Harkirat S. Behl, Philip H. S. Torr, Gregory Rogez, Puneet K. Dokania  
*International Conference on Learning Representations (ICLR)*, 2021

### Stable Rank Normalization for Improved Generalization in Neural Networks and GANs

Amartya Sanyal, Philip H.S. Torr, Puneet K. Dokania  
*International Conference on Learning Representations (ICLR)*, *Spotlight Paper*, 2020

### The Intriguing Effects of Focal Loss on the Calibration of Deep Neural Networks

Jishnu Mukhoti, Viveka Kulharia, Amartya Sanyal, Stuart Golodetz, Philip H. S. Torr, Puneet K. Dokania  
*Advances in Neural Information Processing Systems (NeurIPS)*, 2020

### TAPAS: Tricks to Accelerate (encrypted) Prediction As a Service

Amartya Sanyal, Matt Kusner, Adria Gascon, Varun Kanade  
*International Conference on Machine Learning (ICML)*, 2018

### Optimizing non-decomposable measures with deep networks

Amartya Sanyal, Pawan Kumar, Purushottam Kar, Sanjay Chawla, Fabrizio Sebastiani  
*Springer, Machine Learning*. 2018

### A Hybrid Deep Architecture for Face Recognition in Real-Life Scenario

Amartya Sanyal, Ujjwal Bhattacharya, Swapan K. Parui  
*Lecture Notes in Computer Science (Vol. 10481)*, 2016

## Workshop Publications and Preprints

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### Sample-efficient private data release for Lipschitz functions under sparsity assumptions

Konstantin Donhauser, Johan Lokna, Amartya Sanyal, March Boedihardjo, Robert Hönig, Fanny Yang  
*Theory and Practice of Differential Privacy (TPDP)*. 2023

### PILLAR: How to make Semi-private learning more effective

Francesco Pinto, Yaxi Hu, Fanny Yang, Amartya Sanyal  
*ICLR 2023: Pitfalls of limited data and computation for Trustworthy ML*  
*Theory and Practice of Differential Privacy (TPDP)*, 2023

### How robust accuracy suffers from certified training with convex relaxations

Piersilvio De Bartolomeis, Jacob Clarysse, Fanny Yang, Amartya Sanyal  
*NeurIPS 2022: Workshop on Understanding Deep Learning Through Empirical Falsification* Contributed Talk, 2022

### Semi-private learning via low dimensional structures

Yaxi Hu, Francesco Pinto, Amartya Sanyal, Fanny Yang  
*Third Workshop on Seeking Low-Dimensionality in Deep Neural Networks*, 2023

### Catastrophic Overfitting is a bug but also a feature

Guillermo Ortiz-Jimenez, Pau Jorge, Amartya Sanyal, Adel Bibi, Puneet Dokania, Pascal Frossard, Gregory Rogez, Philip H. S. Torr  
*ICML 2022: Workshop on New Frontiers In Adversarial Machine Learning*, 2022

### Robustness via Deep Low Rank Representations

Amartya Sanyal, Varun Kanade, Philip H.S. Torr, Puneet Dokania  
*ICML 2018: Workshop on Theory and Application of Deep Generative Models*, 2018

## Multiscale sequence modeling with a learned dictionary

Bart Merriënboer, Amartya Sanyal, Hugo Larochelle, Yoshua Bengio

*ICML 2017: Workshop on Machine Learning in Speech and Language Processing, 2017*