

# AmirPouya Moeini

PhD student in Engineering @ University of Cambridge

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## Research Interests

I am broadly interested in problems at the intersection of **information theory**, **high-dimensional probability**, and **combinatorics**. My PhD focuses on the fundamental asymptotic limits of communication, using tools from probabilistic combinatorics, with a particular focus on mismatched and universal settings.

## Education

### Ph.D. in Engineering

📅 Oct 2023 – Ongoing

🏛 University of Cambridge, UK — Probabilistic Systems, Information, and Inference Group (PSI<sup>2</sup>)

Supervisor: Prof. Albert Guillén i Fàbregas

### B.Sc. in Computer Engineering (Minor in Applied Mathematics)

📅 Sep 2018 – Jun 2023

🏛 Sharif University of Technology, Iran

Thesis: *Information-theoretic understanding of online learning*

## Publications

### Two-Class Joint Source-Channel Coding: Expurgated Exponents with i.i.d. Distributions

🔗 [\[Link\]](#)

*Moeini, A. and Guillén i Fàbregas, A., 2026 International Zurich Seminar on Information and Communication (IZS)*

### Dual-Domain Exponent of Maximum Mutual Information Decoding

🔗 [\[Link\]](#)

*Moeini, A. and Guillén i Fàbregas, A., 2025 IEEE Information Theory Workshop (ITW)*

### Class-Based Expurgation Attains Csiszár's Expurgated Source-Channel Exponent

🔗 [\[Link\]](#)

*Moeini, A. and Guillén i Fàbregas, A., 2025 IEEE Information Theory Workshop (ITW)*

## Academic Visits

### 🏛 National University of Singapore, Singapore

October 2025

School of Computing – Institute of Data Science, visiting Dr. Jonathan Scarlett

### 🏛 University of Brescia, Brescia, Italy

September 2025

Department of Information Engineering, visiting Dr. Marco Dalai

## Honours and Awards

2023 **Cambridge International Trust Full-Scholarship**

Cambridge, UK

2022 **Summer @ Aalto University Fellowship**

Espoo, Finland

2018 **Gold Medal** *12th International Olympiad on Astronomy and Astrophysics (IOAA)*

Beijing, China

2017 **Gold Medal** *13th National Astronomy and Astrophysics Olympiad*

Iran

2017 – Present **Member of the Iran National Elites Foundation**

Iran

## Teaching Experience

### Supervision 🏛 University of Cambridge

- Information Theory and Coding (3F7), Michaelmas 24, 25
- Data Transmission (3F4), Lent 25, 26

### Teaching Assistant 🏛 Sharif University of Technology

- Information theory & Coding \*, Fall 22
- Theoretical Machine learning \*, Fall 22
- Statistical Machine learning \*, Spring 22
- Mathematical Statistics, Fall 21
- Data Structure & Algorithm, Spring 21
- Linear algebra, Spring 21
- Regression Analysis, Spring 21
- Artificial intelligence, Fall 21, Spring 22

\*: Graduate-level Course

## Research Experience

### Approximate Bayesian Computation in the Presence of Outliers

📅 Jul 2022 – Oct 2022

- Probabilistic Machine Learning Group, Aalto University, Finland

- Supervisor: [Prof. Samuel Kaski](#).

- Developing computationally efficient algorithms that enhance the robustness of Approximate Bayesian Computation (ABC) inference under outliers and model misspecification.

### Information-Theoretic Bounds for Online Learning Problems

📅 Oct 2021 – Mar 2023

- Machine Learning Laboratory, Sharif University of Technology, Iran

- Supervisors: [Dr. Mahdieh Soleymani](#) and [Dr. Hassan Hafez-Kolahi](#).

- Deriving information-theoretic bounds for online learning is challenging because the data are assumed to be distribution-free and adversarial. We develop new techniques that allow online learning problems to be analyzed using information-theoretic tools, and we establish performance upper bounds based on conditional mutual information.

## Skills

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**Programming Language:** Python (*advanced*), Java (*advanced*), C / C++, SQL.

**Statistical Programming Languages:** R (*advanced*), Stata, MatLab & Octave, Julia.

**Tools and Software:** MS Excel, L<sup>A</sup>T<sub>E</sub>X, Jupyter NB / G Colab, PyTorch, Git / GitHub

**Language:** Farsi/Persian (*native*), English (*fluent*), French (*basic*).