# Characterising Cognitive Biases Elicited by Disinformation Using Reinforcement Learning

- **Supervisors:** [Dr Rani Moran](#)
- **Studentship Funding:**
    - **Name:** SBBS Studentship
    - **Funder:** School of Biological and Behavioural Sciences (SBBS) at QMUL
- **Application Deadline:** 23.59pm on 7th October 2024
- **Expected Start Date:** Jan 2025

## Project Overview

Applications are open for a 3-Year funded PhD Studentship in the [School of Biological and Behavioural Sciences](#) (SBBS) at Queen Mary University of London.

Disinformation is a major threat to society, leading to issues like public health risks, political extremism, violence, and the spread of conspiracy theories (e.g., [1-5]). To address these dangers, we need to understand why disinformation is so appealing and find ways to reduce its harmful effects. However, we still lack a deep understanding of how disinformation affects individual learning processes.

This project aims to explore how disinformation influences learning, focusing on which aspects align with rational principles and which are distorted by cognitive biases [6]. We believe that disinformation spreads by exploiting these biases.

Our approach combines experimental methods with computational modelling [7-8], using Reinforcement Learning (RL)—a powerful tool in psychology and neuroscience for studying decision-making. RL allows us to create controlled behavioural tasks and develop models that can estimate how disinformation affects learning and choices [9].

The project builds on ongoing research by Dr. Moran [10], which has identified cognitive biases triggered by disinformation, such as the failure to ignore unreliable information, confirmation bias (the tendency to seek out information that supports pre-existing beliefs [11]), and the tendency to draw conclusions too quickly.

Key research questions include (but are not limited to):

- What biases does disinformation trigger?
- What interventions can reduce these biases and improve decision-making?
- How do people learn to distinguish between reliable and unreliable information?
- Is reliable information important to individuals, and what are they willing to sacrifice to obtain it?
- How do people revise their beliefs when they discover that previously trusted information was false?

As a PhD candidate, you will primarily use behavioural studies (especially online data collection) and computational modelling to investigate these questions. This project will deepen our understanding of how disinformation affects cognitive processes and explore potential interventions to counteract these effects.

This is a unique opportunity to engage in multidisciplinary research on a critical social issue. You will develop varied skills for example: research design, computational modelling, sophisticated statistical analysis, academic writing, teamwork, programming, and data collection.

Find out more about the School of Biological and Behavioural Sciences on our website.

## Keywords:
Dis/misinformation; Decision Making; Cognitive Biases; Reinforcement Learning; Computational Modelling

## Research Environment
The School of Biological and Behavioural Sciences at Queen Mary is one of the UK's elite research centres, according to the 2021 Research Excellence Framework (REF). We offer a multi-disciplinary research environment and have approximately 180 PhD students working on projects in the biological and psychological sciences. Our students have access to a variety of research facilities supported by experienced staff, as well as a range of student support services.

Dr Moran's lab studies the cognitive mechanisms supporting decision-making, memory and learning with a focus on how these flexibly adapt to varying tasks demands. Research in the lab uses computational modelling of cognitive processes (particularly reinforcement-learning) and online and lab-based behavioural studies to understand how our learning and decisions are affected by disinformation, how we balance exploration and exploitation and how we use sophisticated mental models to improve our choices. Our vision is that a better understanding of these processes will allow us to develop interventions promoting their effective usage.

Find out more about the School of Biological and Behavioural Sciences on our website.

## Entry Requirements & Criteria

We are looking for outstanding candidates to have or expecting to receive a first class honours degree in an area relevant to the project such as in an area relevant to the project such as Psychology, Cognitive Sciences and Neuroscience, Biology, Economics, Mathematics, Statistics, Computer Sciences or Engineering.

A Master's degree is desirable, but not essential. Candidates must also have some experience conducting research.

Knowledge and prior experience with computer coding, computational modelling, statistical testing and academic writing are essential.

Knowledge and prior experience with behavioural (particularly online) data collection would be highly advantageous but are not required.

Find out more about our entry requirements here.

Applicants from outside of the UK are required to provide evidence of their English language ability. Details can be found on our English Language requirements page.

## Funding

The studentship is funded by the Queen Mary University of London. It will cover home tuition fees, and provide an annual tax-free maintenance allowance for 3 years at the UKRI rate (£21,237 in 2024/25).

To classify for Home Fees, this typically means the candidate will have unrestricted access on how long they can remain in the UK (i.e. are a British National, have settled, or pre-settled status, have indefinite leave to remain etc.)

International students will need to cover the difference in fees between the home and overseas basic rate from external sources. Further details can be found on our PhD Tuition Fees page.

Funding and eligibility queries can be sent to the sbbs-pgadmissions@qmul.ac.uk

## How to Apply

Formal applications must be submitted through our online form by the **stated deadline** for consideration.

Applicants are required to submit the following documents:
- Your CV
- Personal Statement
- References
- Copies of academic transcripts and degree certificates

Find out more about our application process on our SBBS website.

Informal enquiries about the project can be sent to **Rani Moran** at **r.moran@qmul.ac.uk**

Admissions-related queries can be sent to sbbs-pgadmissions@qmul.ac.uk.

## Apply Online

The School of Biological and Behavioural Sciences is committed to promoting diversity in science; we have been awarded an Athena Swan Silver Award. We positively welcome applications from underrepresented groups.

http://hr.qmul.ac.uk/equality/
https://www.qmul.ac.uk/sbbs/about-us/athenaswan/

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