PhD Student in quantum information science

Studentship: Untaxed bursary of £16,553 per annum (2017/18 figure including London weighting) plus home/EU fees)

The Department of Computing is a leading department of Computer Science among UK Universities, and has consistently been awarded the highest research rating. In the 2014 REF assessment, The Department was ranked third (1st in the Research Intensity table published by The Times Higher), and was rated as "Excellent" in the previous national assessment of teaching quality.

Applications are invited for a PhD student in **quantum information science** under the supervision of Dr. Mario Berta. The theme of the project is on mathematical methods for **quantum cryptography** and **quantum information theory**.

The starting point of quantum information science is the realization that the theory of information processing is closely related to physics. On one hand performing physical experiments is nothing else but extracting information. On the other hand every representation of information is physical, and hence physical concepts are needed. Information theory based on classical physics is known as classical information science, whereas information theory based on non-relativistic quantum physics is called quantum information science. Research over the past two decades has shown that quantum information is in general fundamentally different from classical information.

The goal of this project is to develop mathematical methods to precisely quantify this difference for various practical problems of interest in quantum cryptography and quantum information theory. This includes, for example the study of quantum security of block chain technologies or the study of information theoretic methods for quantum machine learning.

(There is some flexibility concerning topics within quantum information science as long as it fits the supervisor's research interests, see marioberta.info.)

To apply for this position, you will need to have a strong background and interest in **applied mathematics**. In particular, you should be familiar with in at least one of the following areas: linear algebra and matrix analysis, convex optimization theory, operator algebra theory, quantum mechanics and quantum information theory. Depending on the student's interests the project could also include a numerical component for which programming skills will be helpful.

Applicants are expected to have a First Class or Distinction Masters level degree, or equivalent, in a relevant scientific or technical discipline, such as mathematics, theoretical physics, or theoretical computer science. Applicants must be fluent in spoken and written English.

The position is fully funded, covering tuition fees, travel funds and a stipend/bursary.

How to apply

To apply for this position, please follow the application guidelines at: http://www.imperial.ac.uk/computing/prospective-students/courses/phd/phd-application-guidelines/

Please apply as soon as possible, and no later than 19 March 2018. In the application form, please write "Quantum Information" in the "Proposed Research Topic" field, and "Mario Berta" the "Proposed Research Supervisor" field.

Early applications are encouraged. Informal inquiries about this position are also encouraged and can be directed to Dr. Mario Berta. For further information see marioberta.info.

This position will be based at the South Kensington campus in central London. The anticipated start date is October 2018.

Applicants are advised to visit http://www.imperial.ac.uk/computing/prospective-students/courses/phd/ for general information on becoming a PhD student in the Department of Computing.

We are committed to equality and valuing diversity. We are also an Athena SWAN Silver Award winner, a Stonewall Diversity Champion, a Two Ticks Employer, and are working in partnership with GIRES to promote respect for trans people.