Cryptographer

As a cryptographer in the quantum sector, you may work within a university, company or government organisation such as the National Cyber Security Centre. You will use a variety of mathematical techniques to find and develop quantum-safe solutions to problems that conventional cryptography faces. You will develop new forms of cryptography that are resistant to attack by quantum computers and help to make sure that the world's cyber security is future-proofed, ready for a world where powerful quantum computers exist.

What does the role involve?

- Identifying threats and risks to cryptographic systems
- Keeping up to date with advances in cryptography and in computing technologies
- Reading research papers
- Keeping abreast of attacks on cyber security systems
- Designing cryptographic schemes and testing them
- Collaborating with colleagues on research projects

Where would I work?

Offices, sometimes laboratories and/or other specialist research facilities.

What subjects should I do well in at school?

Computer Science, Mathematics, Physics.

What qualifications do I need?

Minimum bachelor's degree but ideally a PhD in Computer Science, Mathematics or Physics, with a focus on cryptography, cryptographic implementation or quantum computing.

What skills and attributes are required?

Problem solving, understanding of computer programming languages (e.g. Python, C/C++, Java), familiarity with computer hardware and software architecture and design, able to work as part of a team and independently, time management, logical thinker, inquisitiveness, determination.

What work experience would be helpful?

Experience carrying out research and publishing scientific papers, familiarity with conventional cryptography, coding experience, 'ethical hacking'.

What about career progression?

Progression in this career pathway can take many forms. Cryptographers can work in academia for many years, eventually working up to being professors, others eventually hold senior positions within companies. There are many opportunities for cryptographers to work for governments, working to protect cyber security and national infrastructure.

CASE STUDY

Dr Ciara Rafferty

Ciara completed a PhD in Applied Cryptography at Queen's University Belfast and is now a Lecturer in Cyber Security at Queen's. Ciara works as part of the Quantum Communications Hub and many European research projects. She works with experimental and theoretical colleagues to design and implement new cryptographic schemes that will enable us to keep our data secure, even when quantum computers arrive. Find out more about Ciara's journey at: (***tinyurl.com/careersinquantum***).

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