



**Dr Chris Erven**  
**BASc Honours, MSc, PhD**

Lecturer in Quantum Engineering

**Area of research**

Integrated Quantum Cryptography and Metrology

Office NSQI  
HH Wills Physics Laboratory,  
Tyndall Avenue, Bristol BS8 1TL  
([See a map](#))

[chris.erven@bristol.ac.uk](mailto:chris.erven@bristol.ac.uk)

**Summary**

Dr. Chris Erven is a Lecturer in Quantum Engineering at the University of Bristol. He is a Co-Director of the Quantum Engineering Centre for Doctoral Training and a researcher at the Centre for Quantum Photonics. His interests include photonic quantum technologies, in particular the development of integrated quantum cryptography devices and their commercial application.

**Biography**

Chris received his B.A.Sc. in Honours Co-op Systems Design Engineering at the University of Waterloo in April 2005. While completing an option in Physics, he was eventually led to the field of quantum computing, a unique blend of physics and engineering.

Thereafter, Chris joined the Institute for Quantum Computing at the University of Waterloo under the supervision of Prof. Gregor Weihs and Prof. Raymond Laflamme. He completed his M.Sc. in Physics in 2007 and his Ph.D. in Physics with a specialization in Quantum Information in 2012. During his Masters and Ph.D. he built an experimental entangled free-space quantum key distribution system securely connecting the University of Waterloo and Perimeter Institute campuses; acted as a quantum cryptography consultant to CSEC; improved the key rate of the system through biasing the basis choices, source development, and studying the free-space transmission channel; and was the first to experimentally implement oblivious transfer secure under the noisy storage model.

Following his Ph.D, Chris accepted a 1 year postdoctoral position under Prof. Thomas Jennewein and Prof. Kevin Resch to complete the first space-like separated Mermin inequality violation. In April 2013, Chris moved to Bristol, UK to work as a postdoctoral fellow under Prof. Jeremy O'Brien at the Centre for Quantum Photonics. His initial work hopes to include a number of quantum metrology experiments, as well as the operational development of an integrated quantum cryptography chip.

Chris grew up in Toronto, Ontario, Canada. In addition to his academics, Chris was a part of the University of Waterloo's Varsity Badminton Team for eleven years, taking over as the head coach for the last five years. He is also an avid golfer and tries to squeeze in a round at every opportunity.

**Keywords**

- Integrated quantum photonics
- quantum cryptography

- [quantum information](#)

## Memberships

### Organisations

[Interface Analysis Centre](#)

[School of Physics](#)

### Physics staff

- [Physics academic staff](#)

### Research areas

- [Quantum Foundations and Technologies](#)

### Research groups

- [Quantum Photonics](#)

## Recent publications

- Price, A, Rarity, J & Erven, C, 2019, '[Experimental Implementation of a Combined Cryptographic Ecosystem for Quantum-Safe Communications](#)'.
- Semenenko, H, Sibson, P, Thompson, M & Erven, C, 2019, '[Interference between independent photonic integrated devices for quantum key distribution](#)'. *Optics Letters*.
- Sibson, P, Erven, C, Kennard, J, Price, A, Llewellyn, D, Wang, J & Thompson, M, 2018, '[Chip-Based Quantum Communications](#)'. in: *2018 European Conference on Optical Communication (ECOC)*. Institute of Electrical and Electronics Engineers (IEEE)
- Aktas, DV, Sibson, P, Lowndes, D, Frick, S, Price, A, Semenenko, H, Raffaelli, F, Llewellyn, D, Kennard, J, Ou, Y, Ntavou, F, Salas, EH, Hart, A, Collins, R, Laing, A, Erven, C, Nejabati, R, Simeonidou, D, Thompson, M & Rarity, J, 2018, '[A Metropolitan Quantum Network with Hand-Held and Integrated Devices](#)'.
- Semenenko, H, Sibson, P, Erven, C & Thompson, M, 2018, '[Integrated Photonic Devices for Measurement-Device-Independent Quantum Key Distribution](#)'.
- Vaquero-Stainer, A, Hart, A, Kirkwood, RA, Semenenko, H, Burenkov, V, Sibson, P, Chunnillal, C, Erven, C, Thompson, M & Sinclair, AG, 2018, '[Measurements towards providing security assurance for a chip-scale QKD system](#)'.
- Price, A, Rarity, J & Erven, C, 2018, '[A Quantum Key Distribution Protocol for Rapid Denial of Service Detection \(Poster\)](#)'.
- Price, AB, Sibson, P, Erven, C, Rarity, JG & Thompson, MG, 2018, '[High-Speed Quantum Key Distribution with Wavelength-Division Multiplexing on Integrated Photonic Devices](#)'. in: *2018 IEEE/OSA Conference on Lasers and Electro-Optics (CLEO 2018)*. Institute of Electrical and Electronics Engineers (IEEE)
- Salas, EH, Ntavou, F, Ou, Y, Kennard, J, White, C, Gkounis, D, Nikolovgenis, K, Kanellos, G, Erven, C, Lord, A, Nejabati, R & Simeonidou, D, 2018, '[Experimental Demonstration of DDoS Mitigation over a Quantum Key Distribution \(QKD\) Network Using Software Defined Networking \(SDN\)](#)'. in: *Optical Fiber Communications Conference*. Optical Society of America (OSA)
- Collins, R, Aktas, D, Rarity, J & Erven, C, 2018, '[QComms QKD Software Toolkit](#)'. *The Journal of Open Source Software*.

[View complete publications list](#) in the University of Bristol publications system