Sarah Christine Kaiser

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RESEARCH INTERESTS

- Quantum information and computation
- Quantum key distribution
- Long distance quantum communication
- Single photon detection

EDUCATION

University of Waterloo
Institute for Quantum Computing
PhD Physics (Quantum Information)

Bethel University
Bachelor of Science in Physics
Bachelor of Arts in Math
Summa Cum Laude with Honors

COURSEWORK

- 701 Quantum Mechanics 1
- 767 Quantum Information Processing
- 750 Implementations of Quantum Information Processing
- 890 Implementations of Quantum Communications
- 820 Theory of Quantum Information
- 890 Topics in Quantum-safe Cryptography
- 890 Optical and Atomic Implementation
- 890 Applied Quantum Cryptography

PUBLICATIONS

- Vadim Makarov, Jean-Philippe Bourgoin, Poompong Chaiwongkhot, Mathieu Gagne, Thomas Jennewein, **Sarah Kaiser**, Raman Kashyap, Matthieu Legre, Carter Minshull, Shihan Sajeed. "Laser damage creates backdoors in quantum communications." arXiv:1510.03148 [quant-ph] (2015).
- J-P Bourgoin, B L Higgins, N Gigov, C Holloway, C J Pugh, **S Kaiser**, M Cranmer and T Jennewein. "Free-space quantum key distribution to a moving receiver." Optics Express Vol. 23, Issue 26, pp. 33437 – 33447 (2015).
- Shihan Sajeed, Igor Radchenko, **Sarah Kaiser**, Jean-Philippe Bourgoin, Anna Pappa, Laurent Monat, Matthieu Legr, and Vadim Makarov. "Attacks exploiting deviation of mean photon number in quantum key distribution and coin tossing" Phys. Rev. A 91, 032326 (2015).
- Feihu Xu, Shihan Sajeed, **Sarah Kaiser**, Zhiyuan Tang, Li Qian, Vadim Makarov, and Hoi-Kwong Lo. "Experimental quantum key distribution with source flaws and tight finite-key analysis." Phys. Rev. A 92, 032305 (2015).

CONFRENCES

- **Sarah Kaiser**. "Extending the reach of QKD". Talk at Last Frontiers in Quantum Information Science 2016.
- **Sarah Kaiser**, Chris Pugh, Jean-Philippe Bourgoin, Brendon Higgins, Thomas Jennewein. "Towards satellite-based quantum communication: field testing the QEYSSAT payload". Talk at ASTRO 2016.
- **Sarah Kaiser**, "Practical Quantum Cryptography Devices: how to make them and how to break them", presented as a seminar at Macquarie University on 1 April 2016.

- **Sarah Kaiser**, Chris Pugh, Jean-Philippe Bourgoin, Brendon Higgins, Thomas Jennewein. "Towards satellite-based quantum communication: field testing the QEYSSAT payload". Talk at SQuInT 2016.
- **Sarah Kaiser**. "What QKD can learn from Classical Cryptography". Talk at Last Frontiers in Quantum Information Science 2015.
- **Sarah Kaiser**, Chris Pugh, Jean-Philippe Bourgoin, Brendon Higgins, Nigar Sultana, Elena Anisimova, Eric Choi, Thomas Jennewein. "Towards Airborne Quantum Key Distribution". Poster at Canadian Summer School on Quantum Information 2014.

HONORS

- UW Equity and Inclusivity Award for founding FemPhys Organization 2016
- IQC David Johnston Award for Scientific Outreach 2015
- Mike and Ophelia Lazaridis Fellowship 2012—2016
- Best Poster Presentation, Sigma Zeta National Convention 2009
- COMAP Competition, Meritorious Award Winner 2008, 2009, 2010, 2011

LEADERSHIP

- IQC Equity and Inclusion committee member 2015—2016
- FemPhys Co-founder and officer 2014—2015
- Optical Society of America University of Waterloo chapter officer 2014—2016
- IQC Graduate student association officer 2014—2015
- IQC Entrepreneurship club Co-organizer 2014—2015
- QCRYPT conference student organizer 2013
- Sigma Pi Sigma Chapter President 2010—2011
- Sigma Zeta Chapter Officer 2009—2011

PROFESSIONAL EXPERIENCE

WOLFRAM RESEARCH — Champaign, IL
Junior Kernel Developer — August 2011—August 2012

- Served on the Information Visualization Team for the Mathematica software program, generating ideas for new software functionality.
- Participated in group development of new program features providing enhanced utility and visualization for the end user.
- Wrote code prototypes to facilitate the development of the new program features decided upon by the team.
- Resolved development issues and troubleshoot submitted bugs in current builds to refine the development of the new features.

OUTREACH

- Ontario Centre for Excellence Discovery Trade show 2015
  demo of satellite QKD equipment
- *LIGHT Illuminated* museum exhibit design and grant writing 2014-2015
- Canadian Association for Girls in Science workshop lecture 2014, 2015
  "Quantum Cryptography"
- Waterloo Unlimited workshop for high schoolers "Using Quantum Mechanics to Explore New Frontiers in Cryptography" 2014
- Shad Valley workshop lecture "Exploring the fantastic world of quantum mechanics: Quantum Cryptography" 2014
- Quantum Cryptography School for Young Students lecture 2013-2015
  "Implementations of Quantum Cryptography"
- Undergraduate School on Experimental 2013, 2014
  Quantum Information Processing lecturer

LABORATORY EXPERIENCE

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY Boulder, CO
Undergraduate Research Fellow May 2010—March 2011

- Researched new modeling techniques to improve the theoretical and practical understanding of newly fabricated laboratory devices.
- Implemented proposed algorithms in Mathematica to characterize and predict future device behavior.
- Participated in lab group collaborations to resolve experimental and theoretical issues
- Presented research to a variety of audiences enhancing knowledge of the project.
- Researched theoretical background information to facilitate understanding of the research project.

CALIFORNIA INSTITUTE OF TECHNOLOGY Pasadena, CA
Undergraduate Research Fellow June 2009—August 2009

- Constructed and engineered lab components to aid in facilitating the research project goals.
- Modeled experimental apparatus in Mathematica to better understand the system and its components.
- Collaborated with lab team to identify and successfully meet research challenges.
- Presented research results to a variety of audiences to enhance knowledge of the project.

BETHEL UNIVERSITY St. Paul, MN
Physics Lab Research Assistant May 2008—January 2009

- Coordinated and implement laser lab equipment to facilitate department research projects.
- Utilized laser stabilization and alignment techniques for use in various research projects.
- Collaborated with lab research team assisting in coordinated research efforts.
- Presented project and research information to visiting students and researchers.

Physics Teaching Assistant January 2008—May 2011

- Facilitated tutoring sessions for physics students to aid is academic success.
- Graded assignments and exams for physics faculty providing academic support.
- Assisted faculty with classroom and lab demonstrations facilitating student learning.

Math Lab Coordinator/Tutor September 2007—May 2011

- Coordinated math tutoring sessions and available tutors to provide an essential service to university students.
- Organized and maintain participant schedules to insure an efficient service.
- Scheduled and lead math tutor team meetings to create an effective and cohesive team.
- Tutored students in various math courses aiding them with academic success.

AFFILIATIONS

Optical Society of America 2010-Present

REFERENCES

Available upon request