



Pacific Institute *for the*  
Mathematical Sciences

# Emergent Research: The PIMS Postdoctoral Fellow Seminar

January 13, 2021

9:30 AM Pacific / 10:30 AM Mountain / 11:30 AM Central  
Zoom



PIMS is pleased to present an ongoing lecture series featuring our Postdoctoral Fellows! Every three weeks, you will have the opportunity to connect with emerging research in the mathematical sciences from a PIMS Postdoctoral Fellow. PIMS PDFs are amongst the top young researchers in Canada, and this is an excellent opportunity to learn about them, and their work.



**Christopher van Bommel, PhD**

PIMS Postdoctoral Fellow

**Quantum State Transfer on Graphs**

**Abstract:** Quantum computing is believed to provide many advantages over traditional computing, particularly considering the speed at which computations can be performed. One of the challenges that needs to be resolved in order to construct a quantum computer is the transmission of information from one part of the computer to another. This transmission can be implemented by spin chains, which can be modeled as a graph, and analyzed using algebraic graph theory. The ideal situation is that of perfect state transfer, where there exists a time interval during which the information is perfectly moved from one location to another. As perfect state transfer is relatively rare, we also consider pretty good state transfer, where for any desired level of accuracy, there exists a time interval during which the information transfer achieves this accuracy. We will discuss determining whether graphs admit perfect or pretty good state transfer.

**Bio:** Christopher van Bommel is a PIMS PDF (2020) at the University of Manitoba. He obtained his Ph.D. from the University of Waterloo in 2019 under the supervision of Chris Godsil. His research interests include quantum walks, spectral graph theory, design theory, and domination.

**REGISTRATION:** <https://www.pims.math.ca/seminars/PIMSPDF>