PIMS-UNBC DISTINGUISHED COLLOQUIUM

### February 23, 2026 | 3:30 PM PST | Room NHSC 9-200 & Online

Quantum 2.0: A Mathematician's Journey

We are in the midst of an exciting revolution in quantum science and technology. One of the most intriguing and potentially disruptive innovations to emerge from this second revolution is the prospect of quantum computation. Serious attempts are being undertaken between academia and industry to design practical quantum computers, and these attempts are pushing physical materials to their extremes. The rise of quantum materials, influenced in part by these attempts, has involved new perspectives and tools not only from physics, chemistry, and material science, but also from mathematics — and not only applied mathematics, but also pure mathematics. I will discuss my work over the past half decade in using ideas from pure mathematics — especially from complex geometry and number theory — to anticipate new models of quantum materials as well as new paradigms for programming quantum devices that might result from these materials. I will explain, with lots of pictures, not only the mathematical and scientific ideas here, but also how the path to fabrication and actualization has led to exciting interdisciplinary collaborations between mathematics and other sciences as well as between academia and industry.

STEVEN RAYAN
University of Saskatchewan

Steven Rayan (he/him) is an algebraic geometer and quantum scientist at the University of Saskatchewan (USask), where he has been based since 2016. He earned his PhD from the University of Oxford in 2011 and held a postdoctoral fellowship at the University of Toronto. A Full Professor of Mathematics at USask, Dr. Rayan leads the Quantum Innovation Signature Area of Research, is founding director of the Centre for Quantum Topology and Its Applications (quanTA), and serves as a PIMS Site Director. His research bridges algebraic geometry and quantum science, with major contributions to quantum materials and quantum computing. His work has been featured twice in Scientific American and was a runner-up for the 2023 Cozzarelli Prize (PNAS). He has received substantial support from NSERC, the Tri-Agency New Frontiers in Research Fund, CFI, PrairiesCan, and PIMS, and leads international collaborations across academia and industry. In 2025, he was inducted into the College of the Royal Society of Canada for his work at the interface of mathematics and quantum science.

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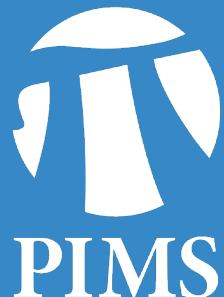
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