Pacific Institute *for the* Mathematical Sciences

PIMS 25th Anniversary Network-Wide Colloquium

March 11, 2021; 1:30PM PST
Lauren K. Williams, Harvard University

From hopping particles to Macdonald and Schubert polynomials.

The asymmetric exclusion process (ASEP) is a model of particles hopping on a one-dimensional lattice. While it was initially introduced by Macdonald-Gibbs-Pipkin to provide a model for translation in protein synthesis, the stationary distribution of the ASEP and its variants has surprising connections to combinatorics. I will explain how the study of the ASEP on a ring leads to new formulas for Macdonald polynomials, a remarkable family of multivariate polynomials which generalize Schur polynomials. In a different direction, the inhomogeneous ASEP on a ring is closely connected to Schubert polynomials, which represent classes of Schubert varieties in the flag variety. This talk is based on joint work with Corteel-Mandelshtam, and joint work with Donghyun Kim.

Speaker Biography:
Lauren Williams is the Dwight Parker Robinson Professor of Mathematics at Harvard University and the Sally Starling Seaver Professor at the Radcliffe Institute. She is a leader in the field of algebraic combinatorics, with research programs on the positive Grassmannian, and combinatorial models in statistical mechanics. Before moving to Harvard, she was a professor at Berkeley, where she held numerous prestigious prizes and grants including a Sloan fellowship and an NSF Career grant. In a recent Quanta article on her work, she was described as fearless, for her willingness to take mathematical leaps.

Online via Zoom: *https://www.pims.math.ca/scientific/network-colloquium*