

# Mathematical Physics Seminar

Wed, 04/27/22 1:30pm, on Zoom

**Speaker:**

Curtis Wendlandt, University of Saskatchewan

**Title:**

The restricted quantum double of the Yangian

**Abstract:**

Many advances in the representation theory of quantum groups have been inspired by a desire to understand, and produce, solutions of the quantum Yang-Baxter equation (QYBE), called R-matrices. One of the most basic tools in this regard is Drinfeld's quantum double method which takes as input a Hopf algebra (subject to certain constraints) and outputs a second Hopf algebra roughly twice as large which, crucially, comes equipped with a universal R-matrix. A large number of important quantum groups can be realized this way, including the Drinfeld-Jimbo and quantum affine algebras.

A main exception to this pattern is the Yangian associated to a simple Lie algebra. This is a remarkable quantum group which admits a universal R-matrix  $R(z)$  satisfying a parameter dependent QYBE, but which does not appear to arise from the quantum double construction. The goal of this talk is to address this phenomenon by explaining that, in a certain sense, a Yangian is nearly equal to its own quantum double, and  $R(z)$  can in fact be obtained as a byproduct of this construction. Making this rigorous involves a proof of a conjecture which appeared in the 1990's in the work of Khoroshkin and Tolstoy.

**Zoom Link:** available at <https://www.math.purdue.edu/~ebkaufma/seminar.html>