

# Torus knots and quantum modular forms

**Dr Jeremy Lovejoy**

**Researcher, CNRS, Université Paris Diderot - Paris 7**

**Date: 28 April 2017 (Friday)**  
**Time: 10.30am to 11.30am**  
**Venue: SPMS LT 4 (SPMS-03-09)**  
**School of Physical and Mathematical Sciences**



## Abstract

In the first part of this talk I will explain how the theory of Bailey pairs leads to an explicit formula for the cyclotomic coefficients of the colored Jones polynomial of the torus knots  $(2, 2t+1)$ . In the second part, I will describe how this gives a kind of "analytic continuation" of a family of quantum modular forms (the generalized Kontsevich-Zagier series). If time permits, I will also discuss how formulas for the colored Jones polynomial lead to  $q$ -hypergeometric and Hecke-type formulas for certain families of unified WRT invariants.

## Speaker Biography

Dr. Jeremy Lovejoy received his PhD in 2000 under the direction of Professors George E. Andrews and Ken Ono at the Pennsylvania State University. He is currently a researcher for the Centre National de la Recherche Scientifique at the Université Paris Diderot in France.

He studies basic hypergeometric series and modular forms and their applications in number theory and combinatorics. He has made a number of important contributions to areas such as partitions and overpartitions, Ramanujan's mock theta functions, and Bailey pairs. His current interests are partition identities arising from affine Lie algebras and the connection between Bailey pairs and the colored Jones polynomial in quantum topology.

**Host: Associate Professor Chan Song Heng, School of Physical and Mathematical Sciences**