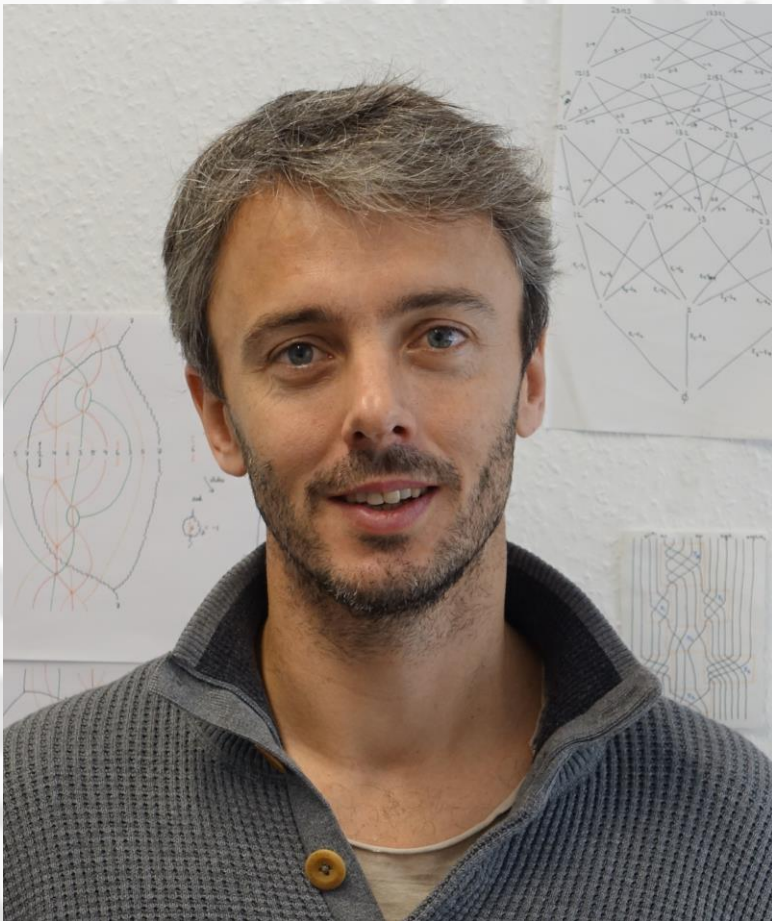# 2017 Distinguished Lecture Series
UCLA Department of Mathematics

Algebraic Representations, Constructible Sheaves and Higher Representation Theory

Geordie Williamson
University of Sydney

Lecture 1
Tuesday, May30, 2017
3:00 - 3:50 p.m.
MS 6627

Lecture 2
Wednesday, May 31, 2017
3:00 - 3:50 p.m.
MS 6627

Lecture 3
Thursday, June 1, 2017
3:00 – 3:50 p.m.
MS 6627

Lecture 1: *Algebraic representations*
This will be an introduction to the theory of algebraic representations. I will discuss the representation theory of SL_2, and general reductive algebraic groups, recalling the fundamental Steinberg tensor product and restriction theorems. I will then turn to Lusztig's character formula and its status.

Lecture 2: *Constructible sheaves*
I will discuss the geometric Satake equivalence and Finkelberg-Mirkovic conjecture. This provides a conceptually satisfying setting in which to understand Lusztig's conjecture. Understand Lusztig's conjecture for a fixed prime leads to subtle questions concerning torsion in intersection cohomology. I will discuss what is known and what remains to be understood.

Lecture 3: *Higher representation theory*
I will discuss the Hecke category in its constructible and diagrammatic incarnations, and state recent theorems and conjectures which suggest that the Hecke category completely controls algebraic representations (as a "module category" in the sense of higher representation theory). Finally, I will try to motivate a recent conjecture with Lusztig.

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