



IAS

MAY 22-28, 2021

# REPRESENTATION THEORY: CATEGORIES & COMBINATORICS

## ORGANIZERS

SUN-YUNG ALICE CHANG Princeton University

MICHELLE HUGUENIN Institute for Advanced Study

DUSA MCDUFF Barnard College & Columbia University

ELIZABETH MILIĆEVIĆ Haverford College

WOMEN AND  
MATHEMATICS

## TERNG LECTURER REPRESENTATION THEORY & COMBINATORICS OF THE SYMMETRIC GROUP AND RELATED STRUCTURES

*Monica Vazirani, UC Davis*

**ABSTRACT:** With an eye toward coordinating with the advanced course, we will start with the representation theory of the symmetric group and related combinatorics. We will focus on the functors of induction and restriction. We will then consider related algebraic structures such as Hecke algebras. We can use diagrammatics to depict various elements, objects, morphisms, and so on, even in the setting of de-categorification.

**PREREQUISITES:** One year of algebra, including groups, group actions, rings, and modules. **Optional:** group algebras, bimodules, combinatorics of integer partitions or Young diagrams.

## UHLENBECK LECTURE REPRESENTATION THEORY & CATEGORIFICATION

*Catharina Stroppel, University of Bonn*

**ABSTRACT:** In modern representation theory we often study the category of modules over an algebra, in particular its intrinsic and combinatorial structures. Vice versa one can ask the question: which categories have a given combinatorics? This is the basic insight into the concept of categorification. Categorification is a recent development which often provides finer invariants and is used in different areas of mathematics (such as knot theory). We will explain a crucial ingredient in categorification: diagrammatics of tensor categories. We will focus on a few examples that arise in current research, such as Deligne categories.

This course provides a categorical framework for the structures studied in the elementary course.

**PREREQUISITES:** Strong background in algebra and some familiarity with categories (additive, abelian, etc.). **Optional:** categories of modules over (not necessarily commutative) rings.

**APPLICATION DEADLINE:** February 17, 2021

For more information visit: [math.ias.edu/wam/2021](https://math.ias.edu/wam/2021)



A Program of the Institute for Advanced Study  
 REPRESENTATION THEORY:  
 CATEGORIES & COMBINATORICS

IAS | WOMEN AND  
 MATHEMATICS

PLEASE POST: REPRESENTATION THEORY: CATEGORIES & COMBINATORICS

Program for Women and Mathematics  
 Institute for Advanced Study  
 1 Einstein Drive  
 Princeton, NJ 08540  
 (609) 734-8115  
 womensprogram@ias.edu

IAS | WOMEN AND  
 MATHEMATICS

