Jiarui Fei
University of California, Riverside

Title: Moduli of Representations

Abstract: My main interests are on the (GIT) moduli spaces of representations of quivers with relations, including

1. Classification of moduli of quiver representations
2. Wall crossing formulas for spaces and their coherent sheaves
3. Counting formulas including non-commutative DT-invariants.

I would like to understand their geometry from a categorical point of view. The theory has applications in representation theory, cluster algebra, Schubert calculus, algebraic geometry, and number theory. In series of paper "Moduli and tilting", I use birational geometry and tilting theory to study 1 and 2. In another series "Counting using Hall algebras", I focus on 3 with many applications.

Mee Seong Im
University of Illinois at Urbana-Champaign

Title: Invariants and Semi-invariants of Arbitrary Filtered Quiver Varieties

Abstract: When one studies the $GL_n(\mathbb{C})$-action on $\mathfrak{gl}_n$ by conjugation, it is equivalent to putting an $n \times n$ matrix into its Jordan canonical form, up to a permutation of its elementary blocks. The orbit space $\mathfrak{gl}_n/GL_n(\mathbb{C})$ does not exist but in order to remedy this, we may construct affine and GIT quotients with invariant and semi-invariant polynomials being basic tools in such constructions.

Now consider a Borel B acting on its Lie algebra $\mathfrak{b}$. Then how should one study and manage B-orbits on $\mathfrak{b}$? More interestingly, how should one produce invariant and semi-invariant polynomials for the B-action on $T^*(\mathfrak{b} \times \mathbb{C}^n)$? This latter variety is important in representation theory and is known as the Grothendieck-Springer resolution. I will define the notion of filtered quivers and answer above questions.

Natasha Rozhkovskaya
Kansas State University

Title: Commutative Subalgebras coming from Duality of Actions

Abstract: The classical Schur-Weyl duality establishes relations between representations of the general linear group and of the symmetric group. There are several analogues of this important theorem that describe duality between actions of algebraic structures, for example between the actions of classical Lie algebras and of the Brauer algebra. This connection gives insight into the structures of the involved algebras and can be used to construct remarkable commutative subalgebras. We define a family of commutative subalgebras in Brauer algebras coming from duality of actions and give recursive combinatorial formula for computation of generators of these subalgebras.