Anna Beliakova

Hennings Invariants and Modified Traces

Abstract: Modified traces is an important tool developed by Geer and Patureau to define invariants of links colored with projective modules. We show that for finite dimensional pivotal Hopf algebras these traces are completely determined by the integral. Furthermore, we use them to extend the Kerler-Lyubashenko invariants of 3-manifolds.
This is joint work with C. Blanchet and A. Gainutdinov.

Jonathan Brundan

Standardly stratified categories revisited

Twenty years ago, Dlab, Cline-Parshall-Scott and others discovered a very natural generalization of the notion of highest weight category, called standardly stratified category. However, unlike highest weight categories which are ubiquitous in representation theory, it seemed that there were not so many examples "in nature," until the work of Webster and Losev on tensor product categorifications. I will do what my title says in the light of these and other recent developments.
This is joint work with Catharina Stroppel.

Kevin Coulembier

Ideals in monoidal categories

The notion of a tensor ideal on the level of objects in a monoidal category categorifies the notion of an ideal in a ring. On the other hand, those tensor ideals are only the shadow of the tensor ideals on the level of morphisms. I will discuss some general and specialised techniques for classifying the latter type of ideals. Then I will focus on the examples coming from tilting modules for quantum and algebraic groups and Deligne's universal monoidal categories.

Michael Ehrig

Categorification and the periplectic Brauer category

In the talk I will discuss the periplectic Brauer category. We will discuss how this category relates to the periplectic Lie superalgebra and how one goes about classifying thick ideals in it. Finally we will go into more detail on how a specialization of the Temperley-Lieb algebra actson this category. This is joint work with Kevin Coulembier.

Matthew Hogancamp

Soergel bimodules, polygraphs, and Hilbert schemes

I will discuss joint work with Eugene Gorsky in which we construct a deformation (which we dub ``y-ification'') of triply graded Khovanov-Rozansky link homology. Our main result is a computation of the Khovanov-Rozansky homology (both deformed and undeformed) of certain special links in terms of Haiman's polygraph rings. By work of Haiman, these rings are intimately related to Hilbert schemes of points in C^2, and as a result we obtain a functor from the Soergel category to a category of sheaves on the Hilbert scheme. This is a first step toward a proof of the conjectures of Gorsky-Neguţ-Rasmussen.

Mikhail Khovanov

A categorification of the ring of integers with two inverted

We explain a construction of tensor triangulated category with the Grothendieck ring isomorphic to Z with two inverted. The category is idempotent complete. This is a joint work with Yin Tian.

Alexander Kleshchev

Blocks of symmetric groups and generalized Schur algebras

We discuss a “schurification” procedure which associates to any quasihereditary (resp. cellular) algebra the corresponding generalized Schur algebra which is again quasihereditary (resp. cellular). A special case corresponding to zigzag algebras appears in Turner’s conjecture providing local description of blocks of symmetric groups up to derived equivalence. We sketch a proof of Turner’s conjecture and discuss its possible generalizations. The talk is based on joint work with A. Evseev and R. Muth.

Nicolas Libedinsky

Parabolic Kazhdan-Lusztig polynomials

I will explain how to prove the positivity of parabolic Kazhdan-Lusztig polynomials in full generality (i.e. for any Coxeter system and any choice of a parabolic subgroup). For this, we have to give a light leaves basis of the "anti-spherical category" and generalize the "infinite twist" to any finitary Coxeter group.

Anthony Licata

Artin-Tits braid groups, stability conditions, and categorification

Groups which act faithfully on "finite-dimensional" linear triangulated categories should have a structure somewhat analogous to that of linear groups, that is, groups which act faithfully on finite-dimensional vector spaces.
The goal of this talk will be to explain what kind of structure one might expect to find by considering the braid groups associated to simply-laced Coxeter groups.

Marco Mackaay

Di- and trihedral (2-)representation theory, part II

In the second talk, I will explain what happens for the next "rank". The role of dihedral Soergel bimodules is now played by what we call trihedral Hecke algebras and Soergel bimodules. By the quantum Satake correspondence, these are closely related to quantum sl_3 at roots of unity. We do not have a complete classification of their 2-simples, but there is a striking connection with tricolored, generalized ADE Dynkin diagrams.

Joint with Volodymyr Mazorchuk, Vanessa Miemietz and Daniel Tubbenhauer

Peter McNamara

Geometric aspects of KLR algebras

We will talk about some aspects of the representation theory of KLR algebras where geometry plays a significant role. In particular we will discuss the categorification of the braid group action on the quantum group by monoidal equivalences, as well as discuss some methods for falsifying overly optimistic conjectures.

Vanessa Miemietz

Analogues of centraliser subalgebras for fiat 2-categories

I will explain how we can reduce the classification of simple transitive 2-representations of a fiat 2-category to the case of strict monoidal categories with only one non-identity left and one non-identity right cell. In particular, I will explain what all of those words mean.

You Qi

Categorification of cyclotomic rings

For any natural number $n \geq 2$, we construct a triangulated monoidal category whose Grothendieck ring is isomorphic to the ring of cyclotomic integers O_n. This is joint work with Robert Laugwitz.

Hoel Queffelec

Surface skein algebras and categorification

Skein modules are a natural extension of the Jones polynomial to 3-manifolds. In the case where the manifold is a thickened surface, they naturally come with a (usually) non-commutative multiplicative structure. I'll review basic definitions, formulas and conjectures about these skein modules, before discussing their categorification by foams. We will study simplicity properties, and explain the difference between the torus, where I will give an almost-proven categorified Frohman-Gelca formula, and other surfaces, where we will discuss reformulations of the Fock-Goncharov-Thurston positivity conjecture. This is joint work with Paul Wedrich.

David Rose

gl_n homologies, annular evaluation, and symmetric webs

We construct a link homology theory categorifying the quantum gl_n link invariant for all non-zero values of n (including negative values!). To do so, we employ the technique of annular evaluation, which uses categorical traces to define and characterize type A link homology theories in terms of a choice of an endomorphism of the invariant of the unknot. Of particular interest is the case of negative n, which gives a categorification of the "symmetric webs" presentation of the type A Reshetikhin-Turaev invariant, and which produces novel categorifications thereof (i.e. distinct from the Khovanov-Rozansky theory).

Alistair Savage

Frobenius Heisenberg categorification

The Heisenberg algebra plays a vital role in many areas of mathematics and physics. In this talk, we will discuss recent advances related to its categorification. In particular, we will explain how one can unify and generalize many existing modifications of Khovanov's original Heisenberg category. This unification involves defining a Heisenberg category depending on a choice of graded Frobenius superalgebra and "central charge". We will then discuss work in progress with Jon Brundan on a quantum analogue of these general Heisenberg categories.

Peng Shan

G_1T-modules and affine Springer fiber

We will explain some relationship between the center of G_1T-modules and the cohomology of certain affine Springer fibre. This is based on a joint project in progress with Bezrukavnikov, Qi and Vasserot.

Marko Stosic

Knots-quivers correspondence, torus knots and lattice paths

In this talk I shall present the knots-quivers correspondence, as well as some applications in combinatorics involving counting of lattice paths and number theory. The knots-quivers correspondence relates the colored HOMFLY-PT invariants of a knot with the motivic Donaldson-Thomas invariants of the corresponding quiver. This correspondence is made completely explicit at the level of generating series. The motivation for this relationship comes from topological string theory, BPS (LMOV) invariants, as well as categorification of colored HOMFLY-PT polynomials and A-polynomials. We compute quivers for various classes of knots, including twist knots, rational knots and torus knots. One of the surprising outcomes of this correspondence is that from the information of the colored HOMFLY-PT polynomials of certain knots we get novel explicit expressions for the classical combinatorial problem of counting lattice paths under the lines with rational slopes, as well as new integrality/divisibility properties.

Based on joint works with P. Sulkowski, M. Reineke, P. Kucharski, M. Panfil and P. Wedrich.

Joshua Sussan

Hopfological finiteness

The program of hopfological algebra was initiated by Khovanov in an attempt to categorify quantum groups and their representations at a root of unity. Categorifications of the Jones-Wenzl projector at generic values of q usually involve unbounded complexes. We will give an example of this construction in the context of hopfological algebra which leads to a bounded complex. This is joint work with You Qi.

Anne-Laure Thiel

On some generalizations of the category of Soergel bimodules

The category of Soergel bimodules plays an essential role in (higher) representation theory and for the construction of homological invariants in knot theory. The aim of this talk is to present a generalization of Soergel category attached to a Coxeter group of type A_2. While Soergel category counts a generating bimodule per simple reflection, this generalization is obtained by taking one generator per reflection. I will give a complete description of this category through a classification of its indecomposable objects and study its split Grothendieck ring. This gives rise to an algebra which is a quotient of the corresponding affine Hecke algebra of type A_2, that can be presented by generators and relations. This is joint work with Thomas Gobet.

Daniel Tubbenhauer

Di- and trihedral (2-)representation theory, part I

The 2-representation theory of dihedral Hecke algebras and Soergel bimodules has an interesting classification: the (graded) 2-simples correspond bijectively to bicolored ADE Dynkin diagrams. By the quantum Satake correspondence, this classification turns out to be closely related to the analogous one for the semisimplified quotient of the representation category of quantum sl_2 at roots of unity. This will be the topic of the first of two talks

Joint with Marco Mackaay, Volodymyr Mazorchuk and Vanessa Miemietz

Pedro Vaz

DG-enhanced cyclotomic KLR algebras and categorification of Verma modules

In this talk I will present DG-enhanced versions of cyclotomic Khovanov-Lauda-Rouquier algebras and explain how to use them to categorify parabolic Verma modules for (symmetrizable) quantum Kac-Moody algebras.

Paul Wedrich

Spectral sequences between surface link homologies

Khovanov homology and its cousins are usually defined as functorial invariants of links in R^3. Embracing their reliance on link projections as a virtue, they admit an extension to links in thickened surfaces, and, thus, categorify surface skein modules and, conjecturally, their algebra structures. I will introduce the main tool in this construction, a category of foams over the surface, and then show how it can be used to recover a variant of the Asaeda-Przytycki-Sikora surface link homologies. As an application, I will describe how embeddings of surfaces give rise to spectral sequences between these link homologies, generalizing the spectral sequence from annular to planar Khovanov homology. This is joint work with Hoel Queffelec.

Oded Yacobi

On the category O for affine Grassmannian slices and tensor product categorifications

Affine grassmannian slices are varieties which appear naturally in geometric representation theory. Their quantisations are given by truncated shifted Yangians. I will describe a recent result which gives an equivalence between the category O for truncated shifted Yangians and modules over Khovanov-Lauda-Rouquier-Webster algebras.

We use this theorem to
a) resolve a conjecture describing the highest weights of truncated shifted Yangians, and
b) prove the so-called "symplectic duality" between affine Grassmannian slices and Nakajima quiver varieties.
The latter result provides a link between two very different geometric models for representations of semisimple Lie algebras.

This work is joint with Kamnitzer, Tingley, Webster, and Weekes.