Atlantic Association for Research in the Mathematical Sciences
Fields Institute for Research in Mathematical Sciences
Memorial University of Newfoundland
Atlantic Algebra Centre
Network of Ontario Lie Theorists

International Workshop

Hopf Algebras and Related Topics

August 11 – 15, 2025

Bonne Bay Aquarium & Research Station
Memorial University of Newfoundland
Norris Point, NL

Schedule and Abstracts

Organizing committee

Yevgenia Kashina

Mikhail Kochetov

Yorck Sommerhäuser

Kirill Zaynullin

St. John's, NL
2025

Monday, Aug 11, 2025

9:00	-	9:30	**Opening/Registration**
9:30	-	10:20	**Marcelo Aguiar** *Cornell University* Introduction to duoidal categories
10:30	-	11:00	**Coffee break**
11:00	-	11:50	**Nicolás Andruskiewitsch** *Universidad Nacional de Córdoba/CONICET* On the finite generation of the cohomology of abelian extensions of Hopf algebras
12:00	-	1:30	**Lunch Break**
1:30	-	2:20	**Sarah Witherspoon** *Texas A&M University* Support theory for Hopf algebras and tensor categories
2:30	-	3:20	**Julia Pevtsova** *University of Washington* Balmer spectrum for a small Nichols algebra
3:30	-	4:00	**Coffee Break**
4:00	-	4:20	**Javier Cóppola** *Universidad de la República* Graded braided commutativity arising from a duoid in Hochschild cohomology of Nichols algebras
4:30	-	4:50	**Justin Bloom** *University of Washington* Classifying Hopf algebras on a fixed finite algebra
5:00	-	5:20	**Dennis Hou** *Rutgers University — New Brunswick* Low-degree cohomology of Lie algebras over noncommutative rings

Tuesday, Aug 12, 2025

9:30	-	10:20	**Gabriella Böhm** *European Mathematical Society Press* Hopf algebroids: an approach via duoidal endohom categories
10:30	-	11:00	**Coffee break**
11:00	-	11:50	**Alberto Elduque** *Universidad de Zaragoza* From algebras to superalgebras via tensor categories
12:00	-	1:30	**Lunch Break**
1:30	-	2:20	**Stefan Gille** *University of Alberta* Rost nilpotence, direct sums, and PI algebras
2:30	-	3:20	**Dmitri Nikshych** *University of New Hampshire* New group-theoretical invariants of fusion categories
3:30	-	4:00	**Coffee Break**
4:00	-	4:20	**Thibault Décoppet** *Harvard University* Relative non-degeneracy conditions for finite braided tensor categories
4:30	-	4:50	**Harshit Yadav** *University of Alberta* Tensor functors with isomorphic left and right adjoints
5:00	-	5:20	**Alexander Betz** *North Carolina State University* Actions of fusion categories on path algebras

Wednesday, Aug 13, 2025

9:30	-	10:20	**Marcelo Aguiar** *Cornell University* Introduction to duoidal categories
10:30	-	11:00	**Coffee break**
11:00	-	11:50	**Gabriella Böhm** *European Mathematical Society Press* Hopf algebroids: an approach via duoidal endohom categories
12:00	-	1:30	**Lunch Break**
1:30	-	8:00	**Free time**
8:00			**Conference dinner**

Thursday, Aug 14, 2025

9:30	-	10:20	**Marcelo Aguiar** *Cornell University* Introduction to duoidal categories
10:30	-	11:00	**Coffee break**
11:00	-	11:50	**Siu-Hung Ng** *Louisiana State University* Generalizations of Frobenius-Schur indicators from invariants of 3-manifolds
12:00	-	1:30	**Lunch Break**
1:30	-	2:20	**Zhenghan Wang** *University of California — Santa Barbara* Gauging weak Hopf symmetries of 2D topological phases of matter
2:30	-	2:50	**Agustina Czenky** *University of Southern California* Extended Frobenius algebras and unoriented 2-TQFTs
3:00	-	3:20	**Andrew Schopieray** *SUNY Plattsburgh* Modular data with few twists
3:30	-	4:00	**Coffee Break**
4:00	-	4:20	**Qing Zhang** *University of Manitoba* Modular data of non-semisimple modular categories
4:30	-	4:50	**Quinn Kolt** *University of California — Santa Barbara* Invariants of non-semisimple modular categories
5:00	-	5:20	**Nicolas Alexander Bridges** *Purdue University* Involutory Hopf group-coalgebras and invariants of flat bundles over 4-manifolds

Friday, Aug 15, 2025

9:30	-	10:20	**Gabriella Böhm** *European Mathematical Society Press* Hopf algebroids: an approach via duoidal endohom categories
10:30	-	11:00	**Coffee break**
11:00	-	11:50	**Julia Plavnik** *Indiana University Bloomington/Vrije Universiteit Brussel* Exact factorizations and bicrossed product of fusion categories
12:00	-	1:30	**Lunch Break**
1:30	-	2:20	**Mitja Mastnak** *Saint Mary's University* The 12-dimensional Fomin–Kirilov algebra and its cousins
2:30	-	2:50	**Vishal Yadav** *Memorial University of Newfoundland* Automorphisms and gradings of classical simple Lie algebras in prime characteristic
3:00	-	3:20	**Serhii Koval** *Memorial University of Newfoundland* Generic graded contractions of Lie algebras
3:30	-	4:00	**Coffee Break**
4:00	-	4:20	**Trisha Kothavale** *Rutgers University* Kac–Moody groups for the Monster Lie algebra
4:30	-	4:50	**Abigail Watkins** *Indiana University Bloomington* Functorial Properties of the Bicrossed Product of Fusion Categories
5:00	-	5:20	**Andrew Riesen** *Massachusetts Institute of Technology* Interpolating Feigin-Frenkel duality at the critical level

Mini-courses

Marcelo Aguiar

Cornell University, USA

Introduction to duoidal categories

Duoidal categories carry two compatible monoidal structures. We will go over basic definitions and examples and then focus on algebraic structures in the ambient of a duoidal category. We will draw from joint works with Swapneel Mahajan (2010), Jacob White (2012), and Javier Cóppola (2025), both published and unpublished. Familiarity with monoidal categories and monoidal functors will be helpful.

Lecture 1: Definition and examples of duoidal categories. Functors.

Lecture 2: Rings in duoidal categories.

Lecture 3: Duoids and commutativity in duoidal categories.

∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞

Gabriella Böhm

European Mathematical Society Press, Germany

Hopf algebroids: an approach via duoidal endohom categories

By Baez's *microcosm principle*, algebraic structures can be defined internally in a category equipped with suitable additional structure. In the classical example, monoids and comonoids can be defined in – not necessarily strong – monoidal categories: one can view comonoids with respect to a lax, and monoids with respect to an oplax monoidal structure (possibly on the same category). The definition of bimonoids – that is, structures combining monoids and comonoids compatibly – requires a compatibility between the two monoidal structures, such as a symmetry or, more generally, a duoidal structure. The aim of these lectures is to present (Hopf) bialgebroids and their variants as (Hopf) bimonoids in (lax) duoidal categories.

We will systematically discuss three increasingly restrictive levels of generality:

- *Lax duoidal categories*, i.e., categories equipped with a lax and an oplax monoidal structure, such that each monoidal structure is monoidal with respect to the other;
- Proper duoidal categories (referred to as *duoidal categories* from now on), where both monoidal structures are strong, though their compatibility morphism need not be;
- Duoidal categories equipped with an additional coherent strong duoidal autoequivalence, called a *reversion*.

Bimonoids can already be defined at the first and most general level. There are several natural candidate conditions for defining Hopf monoids at the second level. At the third level (when a reversion structure is present), these conditions become interrelated, and can also be linked to the existence of an antipode.

The planned schedule is as follows.

The first lecture will be devoted to developing the abstract framework of the above variants of duoidal categories and the theory of (Hopf) bimonoids in them.

The second lecture will explain how, based on ideas by Street, a broad class of duoidal categories arises as endohom categories of pseudomonoids in a monoidal bicategory possessing certain internal homs. Without additional assumptions on the pseudomonoid, the resulting endohom category is lax duoidal. When the multiplication and unit 1-cells of the pseudomonoid admit (say, left) adjoints – such pseudomonoids are called *map pseudomonoids* – both monoidal structures become strong. Finally, if a map pseudomonoid satisfies López Franco's natural Frobenius condition, the endohom category acquires a reversion.

In the final lecture, we will reinterpret various (more or less) well-known algebraic gadgets as bimonoids in suitable duoidal categories. These include categories themselves as basic examples, and – most importantly to this course – Takeuchi's bialgebroids over arbitrary base algebras. While general bialgebroids are bimonoids in a lax duoidal category (of bimodules over the enveloping algebra of the base algebra), important special cases such as weak bialgebras and Ravenel's bialgebroids over central commutative base algebras live in duoidal categories with reversion.

Presentations

Nicolás Andruskiewitsch

Universidad Nacional de Córdoba/CONICET, Argentina

On the finite generation of the cohomology of abelian extensions of Hopf algebras

A finite-dimensional Hopf algebra is called quasi-split if it is Morita equivalent to a split abelian extension of Hopf algebras. Combining results of Schauenburg and Negron, it is shown that every quasi-split finite-dimensional Hopf algebra satisfies the finite generation cohomology conjecture of Etingof and Ostrik. This is applied to a family of pointed Hopf algebras in odd characteristic introduced by Angiono, Heckenberger and the speaker, proving that they satisfy the aforementioned conjecture.

∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞

Alexander Betz

North Carolina State University, USA

Actions of Fusion Categories on Path Algebras

Hopf algebra actions on associative algebras have long been studied in the literature. We introduce the notion of a based action of a fusion category on an algebra. These actions fully generalize Hopf algebra actions on algebras. We will build some general theory to motivate based actions, and then apply this theory to understand based actions of fusion categories on path algebras $\mathbb{K}Q$. Our results demonstrate that a separable idempotent split based action of a fusion category C on a path algebra $\mathbb{K}Q$ can be characterized in terms of C-module categories and their associated module endofunctors.

Justin Bloom

University of Washington, USA

Classifying Hopf algebras on a fixed finite algebra

We will review techniques for finding isomorphism classes of small dimensional Hopf algebras sharing an underlying algebra structure. When we fix an algebra structure to consider the moduli of compatible cocommutative Hopf algebra structures, we equivalently fix an underlying abelian category with a functor to vector spaces, and consider the moduli of symmetric tensor category structures fibered via the functor. We will explore some results on cohomological constructions that give information about different symmetric tensor categories independent of choice of Hopf algebra structure.

∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞

Nicolas Alexander Bridges

Purdue University, USA

Involutory Hopf group-coalgebras and invariants of flat bundles over 4-manifolds

We give invariants of flat bundles over 4-manifolds generalizing a result by Chaidez, Cotler, and Cui [*Algebr. Geom. Topol.* **22** (2022), pp. 3747–3807]. We utilize a structure called a Hopf G-triplet for G a group, which generalizes the notion of a Hopf triplet by Chaidez, Cotler, and Cui. In our construction, we present flat bundles over 4-manifolds using colored trisection diagrams: a direct analogue of colored Heegaard diagrams as described by Virelizier. Our main result is that involutory Hopf G-triplets of finite type yield well-defined invariants of G-colored trisection diagrams, and that if the monodromy of a flat bundle has image in G we obtain invariants of flat bundles. We also show that a special Hopf G-triplet yields the invariant from Hopf G-algebras described by Mochida, thus generalizing the construction.

Javier Cóppola

Universidad de la República, Uruguay

Graded braided commutativity arising from a duoid in Hochschild cohomology of Nichols algebras

It is known (Farinati-Solotar, Taillefer, Suárez Álvarez) that the Hochschild cohomology with trivial coefficients of a Hopf algebra is a graded commutative ring. Mastnak-Pevtsova-Schauenburg-Witherspoon proved a braided analogue of this statement for the Hochschild cohomology with trivial coefficients of Nichols algebras that are either finite-dimensional or realizable over a finite-dimensional Hopf algebra. A possible way to generalize this result is to visualize some projective resolutions of a Nichols algebra as duoids in the duoidal category of chain complexes of its bimodules, modulo homotopy. This can be done in a context with less finiteness conditions, that includes the Jordan and super Jordan planes, as well as many other Nichols algebras over abelian groups appearing in the classification by Andruskiewitsch-Angiono-Heckenberger. This is a joint work with Andrea Solotar.

∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞

Agustina Czenky

University of Southern California, USA

Extended Frobenius algebras and unoriented 2-TQFTs

A classical result in quantum topology is that oriented 2-dimensional topological quantum field theories (2-TQFTs) are fully classified by commutative Frobenius algebras. In 2006, Turaev and Turner introduced extended Frobenius algebras, which are commutative Frobenius algebras with additional structure, to classify unoriented 2-TQFTs. In this talk, we will explore the relation between (extended) Frobenius algebras and (unoriented) TQFTs, and look at some examples, classification results, and general constructions of extended Frobenius algebras.

Thibault Décoppet

Harvard University, USA

Relative non-degeneracy conditions for finite braided tensor categories

Shimizu gave four equivalent characterizations of the non-degeneracy of a finite braided tensor category. I will discuss the relative version of this result. More precisely, fixing a finite symmetric tensor category $\mathcal{E}$, we will consider a finite braided tensor category $\mathcal{A}$ equipped with a tensor embedding $H\colon \mathcal{E} \hookrightarrow \mathcal{Z}_{(2)}(\mathcal{A})$ into its symmetric center. Associated to this data, there is an exact sequence of Hopf algebras $\mathbb{F}_{\mathcal{E}} \hookrightarrow \mathbb{F}_{\mathcal{A}} \twoheadrightarrow \mathbb{F}_{\mathcal{E}/\mathcal{A}}$ in $\mathcal{A}$. Moreover, the canonical pairing $\omega_{\mathcal{A}}$ on $\mathbb{F}_{\mathcal{A}}$ descends to a pairing $\omega_{\mathcal{E}/\mathcal{A}}$ on $\mathbb{F}_{\mathcal{E}/\mathcal{A}}$. I will show that the pairing $\omega_{\mathcal{E}/\mathcal{A}}$ is non-degenerate if and only if H is an equivalence if and only if $\mathcal{A}$ is $\mathcal{E}$-factorizable. Finally, I will explain the higher algebraic interpretation of this result as a relative invertibility condition, and, time permitting, I will give some applications.

$\infty\ \infty\ \infty\ \infty\ \infty\ \infty\ \infty\ \infty\ \infty\ \infty$

Alberto Elduque

Universidad de Zaragoza, Spain

From algebras to superalgebras via tensor categories

The symmetric tensor category of representations of the cyclic group of order p over a field of characteristic p is not semisimple. Its semisimplification is the Verlinde category Ver_p, which contains a full subcategory equivalent to the category of vector superspaces.

This allows us to obtain a superalgebra out of any algebra over a field of characteristic p endowed with an automorphism of order p (or a nilpotent derivation of degree at most p). This process will be explained with some detail and examples of interesting Lie and Jordan superalgebras obtained in this way will be shown.

Stefan Gille

University of Alberta, Canada

Rost nilpotence, direct sums, and PI algebras

Whether Rost nilpotence is a birational invariant is closely related to the following question: Does Rost nilpotence hold for a finite direct sum if it is true for all the summands? This problem has connections to ring theoretic questions, as e.g. Köthe's conjecture. It also hints to a stronger version of Rost nilpotence, which turns out to hold in all cases where the usual Rost nilpotence is known. This circle of ideas will be discussed in the second half of the talk following a short and down-to-earth introduction to Chow motives and Rost nilpotence.

∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞

Dennis Hou

Rutgers University — New Brunswick, USA

Low-degree cohomology of Lie algebras over noncommutative rings

We consider Lie algebras over noncommutative rings, regarded as Lie closures of tensor products of Lie algebras with associative algebras. Their universal enveloping algebra can be given the structure of a Hopf algebroid. We compute low-degree (co)homology in the case where their underlying Lie algebra is semisimple, and compare with the Hopf-cyclic (co)homology of their universal enveloping algebras.

Quinn Kolt

University of California — Santa Barbara, USA

Invariants of non-semisimple modular categories

The classification of semisimple modular categories has made rapid progress in recent years. As in most classification programs, invariants played a critical role in its success. Applications to low-dimensional topology have motivated a study of non-semisimple modular categories. The purpose of this talk is to discuss progress towards generalizing some of the most important invariants of semisimple modular categories, including modular data, to the non-semisimple case. We further discuss which properties generalize or fail in the non-semisimple case. We will consider representation categories of Hopf algebras as examples. This talk is based on joint work with Liang Chang, Zhenghan Wang, and Qing Zhang.

∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞

Trisha Kothavale

Rutgers University — New Brunswick, USA

Kac–Moody groups for the Monster Lie algebra

From any finite-dimensional Lie algebra, one can construct an associated Lie group using a variety of methods. In infinite dimensions, many of these methods break down, but it is still possible to construct these Lie group analogs. We will discuss a technique of constructing a Kac-Moody group associated to the Monster Lie algebra, a particular infinite-dimensional Lie algebra, that involves analyzing the Hopf algebra structure on the dual space of the universal enveloping algebra.

Serhii Koval

Memorial University of Newfoundland, Canada

Generic graded contractions of Lie algebras

Contractions and degenerations of Lie algebras have been extensively studied since the 1950s. The idea is to pass from one Lie algebra to another by some kind of limit process. Another type of contractions was introduced by de Montigny and Patera (1991) in the context of Lie algebras over a field $\mathbb{F}$ equipped with a grading by an abelian group G. This type of contractions consists in modifying the Lie bracket of $\mathfrak{L} = \bigoplus_{g\in G} \mathfrak{L}_g$ by a scalar factor $\varepsilon(g, h)$, $g, h \in G$, as follows:

$$[x, y]^\varepsilon := \varepsilon(g, h)[x, y] \quad \text{for all} \quad x \in \mathfrak{L}_g, y \in \mathfrak{L}_h.$$

The function $\varepsilon\colon G \times G \to \mathbb{F}$ must satisfy certain conditions to ensure that the new bracket satisfies the antisymmetry and Jacobi identity.

We are interested in *generic* graded contractions, i.e., those that produce a new Lie bracket for any G-graded Lie algebra. They can be viewed as lax monoidal structures on the identity endofunctor of the category of G-graded vector spaces. We show that generic graded contractions with a fixed support S are classified by a certain abelian group $\mathrm{H}^2_S(\mathbb{F}^\times)$, which we explicitly describe. We also analyze which generic graded contractions define graded degenerations of a given G-graded Lie algebra. This talk is based on a joint work with M. Kochetov.

∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞

Mitja Mastnak

Saint Mary's University, Canada

The 12-dimensional Fomin–Kirillov algebra and its cousins

This talk is based on joint work with Gastón García. We study the structure of Hopf algebras whose coradical is a semisimple Hopf algebra obtained as a cocentral extension of a group algebra by a dual group algebra. We describe the simple Yetter-Drinfeld modules, compute the fusion rules, and determine the finite-dimensional Nichols algebras for some of them. In particular, the well-known 12-dimensional Fomin-Kirillov algebra makes an appearance. Surprisingly we also encounter a Nichols algebra that is twist-equivalent, but not isomorphic, to it. I will also discuss work in progress, where we describe liftings of some of the objects mentioned above.

Siu-Hung Ng

Louisiana State University, USA

Generalizations of Frobenius-Schur indicators from invariants of 3-manifolds

In this talk, we introduce some generalizations of higher Frobenius-Schur indicators of Hopf algebras from Kuperberg invariants of framed 3-manifolds. The higher Frobenius-Schur indicators for semisimple Hopf algebras over complex numbers are indeed Kuperberg invariants of lens spaces. However, these Kuperberg invariants for nonsemisimple Hopf algebras involve some higher powers of the antipode, which are completely determined by the framed lens spaces. Moreover, these generalizations of Frobenius-Schur indicators from framed lens spaces and some genus 2 framed 3-manifolds are shown to be the invariants of the tensor categories of representations of the underlying Hopf algebras. This talk is based on a joint work with Liang Chang and Yilong Wang.

∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞

Dmitri Nikshych

Louisiana State University, USA

New group-theoretical invariants of fusion categories

This is a report on joint work with Jason Green. We define a canonical Tannakian subcategory of a braided fusion category $\mathcal{B}$, namely, the intersection of all its maximal Tannakian subcategories, and call it the *Tannakian radical* of $\mathcal{B}$. This leads to a canonical realization of $\mathcal{B}$ as a group gauging of a smaller braided category, known as the *mantle of* $\mathcal{B}$. In this talk, I will discuss properties of the radical and mantle and apply them to the classification of group-theoretical fusion categories and quasi-Hopf algebras.

Julia Pevtsova

University of Washington, USA

Balmer spectrum for a small Nichols algebra

Tensor triangular (tt-) geometry associates a geometric invariant — the Spectrum — to a tensor triangulated category, such as the stable category of representations of a finite dimensional Hopf algebra. This invariant carries a lot of global structural information about the category; but the calculations are typically not straightforward. I will give a brief introduction to tt-geometry and describe “the fiber functor” technique which proved to be helpful for calculating spectra in various settings. Then I will focus on a specific example of a small Nichols algebra of super type $A(2|1)$ which is part of an ongoing project with Guillermo Sanmarco and Sarah Witherspoon.

∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞

Julia Plavnik

University of Washington, USA / Vrije Universiteit Brussel, Belgium

Exact factorizations and bicrossed product of fusion categories

Finding new examples of fusion categories is important for the advancement of their theory. One way to look for them is by considering new constructions.

In this talk, we will start by presenting the definition of exact factorization of fusion categories and some of their properties and examples. We will introduce the notion of a matched pair of fusion categories and use it to define the bicrossed product of fusion categories, for which we have explicit formulas for the associativities. We will show the relation of this new construction with exact factorizations. This talk is based on joint work with M. Müller and H.M. Peña Pollastri.

Andrew Riesen

Massachusetts Institute of Technology, USA

Interpolating Feigin-Frenkel Duality at the Critical Level

Feigin-Frenkel duality at rank n at the critical level states that the universal affine vertex algebra $V^{-h}(gl_n)$ has a large center and that this center is isomorphic to the Gelfand-Dickey algebra W_n. In this talk, I will explain how one can make sense of this at complex rank.

$\infty\ \infty\ \infty\ \infty\ \infty\ \infty\ \infty\ \infty\ \infty\ \infty$

Andrew Schopieray

State University of New York — Plattsburgh, USA

Modular data with few twists

The modular data of a modular fusion (tensor) category lies in a cyclotomic field dictated by the roots of unity which are the full (ribbon) twists of the simple objects. As the ingredients used to cook up the modular data, it is natural to consider what modular data can be produced with the fewest ingredients. With one root of unity (one itself) only the trivial category is possible, but for two more roots of unity the list is infinite, including the doubles of finite groups of small exponent. We classify all modular fusion categories having only 2 or 3 twists. Surprisingly, with the subcategories of the doubles of finite groups of exponent 2 and 3 removed from consideration, respectively, there are only finitely many examples up to braided equivalence. More surprisingly, these are precisely the examples whose twists do not form a complete set of roots of unity of some order.

Zhenghan Wang

University of California — Santa Barbara, USA

Gauging weak Hopf symmetries of 2D topological phases of matter

2D topological phases are modeled by anyon models (unitary modular tensor categories). Gauging finite group G symmetries is the inverse of condensing $\mathsf{Rep}(G)$. We are interested in a generalization from $\mathsf{Rep}(G)$ to a general condensable algebra A in an anyon model. We will argue that the inverse to condensing a general A is the gauging of a weak Hopf monad symmetry of an anyon model.

∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞

Abigail Watkins

Indiana University Bloomington, USA

Functorial Properties of the Bicrossed Product of Fusion Categories

The study of fusion categories is young and a problem at the forefront of the field is to develop a robust catalog of examples on which to test our intuition. Last year, M. Müller, J. Plavnik, and H. Peña Pollastri introduced a construction of fusion categories called the bicrossed product. In this talk, we aim to better understand this construction by giving a classification of functors out of bicrossed products of fusion categories. This classification will then allow us to describe fiber functors and module categories over bicrossed products of fusion categories. This talk is based on ongoing joint work with Monique Müller, Héctor Peña Pollastri, and Julia Plavnik.

Sarah Witherspoon

Texas A&M University, USA

Support theory for Hopf algebras and tensor categories

We will introduce two types of spaces associated to modules for finite dimensional Hopf algebras (and more generally to objects of finite tensor categories). These spaces are the Balmer support and the cohomological support. They can be important tools for understanding the modules and the categories, especially in the best understood classical settings of finite group representations and cocommutative Hopf algebras. Much is known beyond these settings, while there are still many open questions. We will include some illuminative examples and recent results.

∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞ ∞

Harshit Yadav

University of Alberta, Canada

Tensor functors with isomorphic left and right adjoints

Just as tensor categories generalize Hopf algebras, tensor functors extend the notion of bialgebra maps between Hopf algebras. In this broader setting, the classical concept of Frobenius extensions of Hopf algebras corresponds to tensor functors whose left and right adjoints are isomorphic — these are known as Frobenius functors. In this talk, I will present two related classes of tensor functors which are natural from the categorical point of view, explain their meaning in the context of bialgebra maps and discuss some applications. This is based on joint work with David Jaklitsch.

Vishal Yadav

Memorial University of Newfoundland, Canada

Automorphisms and gradings of classical simple Lie algebras in prime characteristic

Gradings by finite cyclic groups on finite-dimensional simple Lie algebras were first classified by V. Kac over an algebraically closed field of characteristic 0, using infinite-dimensional Lie algebras. Another proof, essentially going back to F. Gantmakher and presented by E. Vinberg and A. Onishchik in the Encyclopaedia of Mathematical Sciences, uses complex Lie groups. We modify this latter approach to make it work with algebraic groups over an algebraically closed field of any characteristic.

$\infty \infty \infty \infty \infty \infty \infty \infty \infty \infty$

Qing Zhang

University of Manitoba, Canada

Modular data of non-semisimple modular categories

A braided finite tensor category is called modular if it is nondegenerate and ribbon. We aim to extend the well-understood theory of semisimple modular categories to the non-semisimple setting, using representations of factorizable ribbon Hopf algebras as a case study. In this talk, we will discuss the Cohen–Westreich modular data, which arises from the Lyubashenko–Majid modular representation restricted to the Higman ideal of a factorizable ribbon Hopf algebra. The Cohen–Westreich S-matrix diagonalizes the mixed fusion rules and reduces to the usual S-matrix in the semisimple case. We will discuss examples including small quantum groups $u_q(\mathfrak{sl}_2)$ and the Drinfeld doubles of Nichols Hopf algebras, focusing on the $\mathrm{SL}(2, \mathbb{Z})$-representation on their centers, the Cohen–Westreich modular data, and the validity of the congruence kernel theorem.

<table>
<tr><th></th><th>Monday,
August 11</th><th>Tuesday,
August 12</th><th>Wednesday,
August 13</th><th>Thursday,
August 14</th><th>Friday,
August 15</th></tr>
<tr><td>09:30–10:20</td><td>Aguiar</td><td>Böhm</td><td>Aguiar</td><td>Aguiar</td><td>Böhm</td></tr>
<tr><td>10:30–11:00</td><td>Coffee Break</td><td>Coffee Break</td><td>Coffee Break</td><td>Coffee Break</td><td>Coffee Break</td></tr>
<tr><td>11:00–11:50</td><td>Andruskiewitsch</td><td>Elduque</td><td>Böhm</td><td>Ng</td><td>Plavnik</td></tr>
<tr><td>12:00–13:30</td><td>Lunch</td><td>Lunch</td><td>Lunch</td><td>Lunch</td><td>Lunch</td></tr>
<tr><td>13:30–14:20</td><td>Witherspoon</td><td>Gille</td><td rowspan="8"></td><td>Wang</td><td>Mastnak</td></tr>
<tr><td>14:30–14:50</td><td rowspan="2">Pevtsova</td><td rowspan="2">Nikshych</td><td>Czenky</td><td>V. Yadav</td></tr>
<tr><td>15:00–15:20</td><td>Schopieray</td><td>Koval</td></tr>
<tr><td>15:30–16:00</td><td>Coffee Break</td><td>Coffee Break</td><td>Coffee Break</td><td>Coffee Break</td></tr>
<tr><td>16:00–16:20</td><td>Cóppola</td><td>Décoppet</td><td>Zhang</td><td>Kothavale</td></tr>
<tr><td>16:30–16:50</td><td>Bloom</td><td>H. Yadav</td><td>Kolt</td><td>Watkins</td></tr>
<tr><td>17:00–17:20</td><td>Hou</td><td>Betz</td><td>Bridges</td><td>Riesen</td></tr>
</table>