The Algebra Seminar

The seminar will meet in-person on Tuesdays in room WH-100E at 2:50 p.m. There should be refreshments served at 4:00 in room WH-102. Masks are optional.

Anyone wishing to give a talk in the Algebra Seminar this semester is requested to contact the organizers at least one week ahead of time, to provide a title and abstract. If a speaker prefers to give a zoom talk, the organizers will need to be notified at least one week ahead of time, and a link will be posted on this page.

If needed, the following link would be used for a zoom meeting (Meeting ID: 93487611842) of the Algebra Seminar:

Algebra Seminar Zoom Meeting Link

Organizers: Alex Feingold, Daniel Studenmund and Hung Tong-Viet

To receive announcements of seminar talks by email, please join the seminar's mailing list.

Spring 2024

- **January 16**
  No Meeting
- **January 23**
  Organizational Meeting

  Please think about giving a talk in the Algebra Seminar, or inviting an outside speaker.
- **January 30**
  Dikran Karagueuzian (Binghamton University)
  You Were Always Studying Cohomology

  Abstract: We will discuss the observation that carrying, as taught in grade-school arithmetic, is a cohomology class. This observation is something of a folk theorem. It was surely known to Eilenberg and MacLane, but the earliest written record I can find is an internet post from the 90s by Dolan.
- **February 6**

Daniel Studenmund (Binghamton University)

Finite generation of lattices and Kazhdan's Property (T)

Abstract: Lattices in semisimple Lie groups form an important and rich class of finitely generated infinite groups. But it is not immediately obvious from their definition that lattices are finitely generated. This was first proved for a large class of lattices by Kazhdan using a property now known as (T). In this expository talk I will introduce the definition of Property (T) and discuss its relationship to amenability and finite generation.

- **February 13**

  Hung Tong-Viet (Binghamton University)

  Conditional characterization of solvability and nilpotency of finite groups

  Abstract: As a consequence of the classification of nonsolvable N-groups, Thompson proved in 1968 that a finite group G is solvable if and only if every two-generated subgroup of G is solvable. Various extensions of this theorem have been obtained over the years. In this talk, I will survey some of these results and discuss new characterizations of finite solvable and nilpotent groups using certain restriction on the two-generated subgroups. I will end the talk with applications to the solvable conjugacy class graph of groups.

- **February 20**

  No Meeting

- **February 27**

  No Meeting

- **March 5**

  No Algebra Seminar - Spring Break

- **March 12**

  Inna Sysoeva (Binghamton University)

  Irreducible $n-$dimensional representations of the group of conjugating automorphisms of a free group on n generators

  Abstract: Let F_n be the free group on n generators $x_1, \dots ,x_n.$ The group of conjugating automorphisms C_n is a subgroup of $Aut(F_n)$ consisting of those automorphisms which map every free group generator x_i into a word of the form $W_i^{-1}(x_1 , \dots x_n)x_{\pi(i)} W_i(x_1 , \dots x_n),$ where $W_i(x_1 , \dots x_n)\in F_n$ and π is some permutation of indices, $\pi\in S_n.$ The subgroup of C_n that preserves the product $x_1\dots x_n$ is isomorphic to the braid group on n strings, $B_n.$ In this talk I am going to describe my new results on the extensions of the irreducible $n-$dimensional representations of the braid group B_n to the group of conjugating automorphisms C_n of a free group $F_n.$ I will cover all relevant background material on the above-mentioned groups and their representations, so no previous knowledge of the subject is expected.

- **March 19**

  No Meeting

- **March 26**

No Meeting

- **April 2**

  Omar Saldarriaga (Highpoint University) presented on Zoom

  The Lie algebra of the transformation group of certain affine homogeneous manifolds

  Abstract: In this talk we will show that, under certain algebraic conditions, a bi-invariant linear connection ∇^+ on a Lie group G induces an invariant linear connection ∇ on a homogeneous space G/H so that the projection $\pi:G\to G/H$ is an affine map. We will also show that if the subgroup H is discrete, there is a method to compute the Lie algebra of the group of affine transformations of G/H preserving the connection ∇. As an application, we will exhibit the Lie algebra of the group of affine transformations of the orientable flat affine surfaces.

- **April 9**

  Luna Elliott (Binghamton University)

  How semigroup people think about (inverse) semigroups

  Abstract: I will give a beginner friendly introduction to semigroups, inverse semigroups and the concepts which are well-known and heavily used by people in these areas. These include green's relations free objects, wagner-preston and special subclasses of these objects. I'm very open to going on tangents if people want me to talk more about anything in particular.

- **April 16**

  Rachel Skipper (University of Utah)

  Computing Scale in Neretin's group

  Abstract: For an automorphism of a totally disconnected, locally compact (tdlc) group, Willis introduced the notion of scale which arose in the development of the general theory of these groups. In this talk, we will discuss the setting where the tdlc group is Neretin's group and where the automorphism comes from conjugation in the group. This is an ongoing joint work with Michal Ferov and George Willis at the University of Newcastle.

- **April 23**

  No Algebra Seminar - Passover Break

- **April 30**

  Andrew Velasquez-Berroteran (Binghamton University)

  Neuroscience: An Algebraic and Topological Viewpoint

  Abstract: Neuroscience is the study of the nervous system, and one popular aspect of the nervous system is the brain. Many fields of mathematics have contributed to neuroscience research which include but are not limited to statistics, partial differential equations, dynamics and mathematical physics, etc. In this talk, I will talk about a brief overview of how algebra and topology has recently been used in the study of the brain. We will primarily be looking at neural coding, and at the end talk about what’s known as the neural ring and neural ideal. I will present under the assumption that attendees will have basic ring theory and topology knowledge but no background knowledge in neuroscience.

- **May 7**
  No Algebra Seminar - Finals Week

- Pre-2014 semesters
- Fall 2014
- Spring 2015
- Fall 2015
- Spring 2016
- Fall 2016
- Spring 2017
- Fall 2017
- Spring 2018
- Fall 2018
- Spring 2019
- Fall 2019
- Spring 2020
- Fall 2020
- Spring 2021
- Fall 2021
- Spring 2022
- Fall 2022
- Spring 2023
- Fall 2023