Abstracts

Abed Abedelfatah, Braude College

Hilbert functions, Complete intersections and EGH

Abstract:

This talk is about Hilbert functions of standard graded algebras. I will begin with basic definitions and with Macaulay's theorem, one of the fundamental results on possible Hilbert functions. Then I will discuss complete intersections and the special behaviour of their Hilbert functions. In the final part, I will turn to the Eisenbud-Green-Harris conjecture, which concerns ideals containing regular sequences.

Dan Abramovich, Brown University

The space of lines in the plane

Abstract:

This is joint work in progress with Rahul Pandharipande and Dhruv Ranganathan.

The moduli space of stable pointed curves of genus 0 is the model moduli space par excellence, and every direction of generalization is interesting.

In this talk we consider the generalization to the moduli space of configurations of lines in the plane. We provide a compactification that carries a rich virtual intersection theory.

Two ingredients of note, moduli spaces of stable logarithmic maps and tropical degeneration, come from the Gross-Siebert program. Other ingredients are work of Alexeev, Hacking-Keel-Tevelev, and Lafforgue.

Ariel Amsalem, University of Haifa

The Mackey analysis for Hilbert bundles over Fell bundles

Abstract:

We unify the analytic and algebraic approaches to the Mackey analysis by introducing Hilbert bundles as the analytic counterpart to graded modules. We construct a Mackey obstruction map for Hilbert bundles and prove that it is multiplicative. By that we extend the Mackey analysis of *-representations beyond the saturated case.

Adam Chapman, Tel Aviv-Yaffo academic college

Amitsur-Small Rings

Abstract:

Amitsur and Small asked in 1978 whether given a division ring D, for any maximal left ideal L in $D[x_1,\dots,x_n]$, the intersection $L \cap D[x_1,\dots,x_{n-1}]$ must be a maximal ideal in $D[x_1,\dots,x_{n-1}]$.
A negative answer was provided in 2025 by Elad Paran and the speaker, by showing that quaternion division algebras over fields that are not Pythagorean do not satisfy this property.
This result was later extended by Ilan Levin, Marco Zaninelli and the speaker to cyclic division algebras of odd prime degree, that never satisfy this property as well.
In this talk we shall discuss the proof of this statement and some other related questions.

Mikhailo Dokuchaev, Universidade de São Paulo

Partial actions and inverse semialgebras

Abstract:

Groups act globally on algebras by automorphisms and partially by isomorphisms between ideals (partial isomorphisms). Lie algebras act on algebras by derivations, and it is natural to define partial actions of Lie algebras using partially defined derivations. What kind of algebraic structure do these partial derivations form? It is easy to see that, additively, they form a commutative inverse semigroup. We single out some of their properties and introduce the notion of a not necessarily distributive inverse Lie semialgebra. More generally, we define not necessarily associative inverse semialgebras over a field. The associative case is inspired by the set of all partially defined linear maps on a vector space, the set of all regular functions defined on open subsets of an algebraic variety and the set of all smooth real-valued functions defined on open subsets of a smooth manifold. We will present some results on partial actions and inverse semialgebras. The latter are particular instances of more general concepts arising in the unified approach to algebraic structures developed by Louis Rowen and other authors, since, being additive commutative inverse semigroups, they possess a negation map and a surpassing relation.

Matyas Domokos, Alfréd Rényi Institute

Degree bounds for polynomial invariants of finite groups

Abstract:

A classical theorem of Emmy Noether asserts that the algebra of invariant polynomial functions on a finite dimensional complex vector space endowed with a linear action of a finite group is generated by homogeneous elements whose degree is bounded by the order of the group. Motivated by this result, the maximal possible degree of an indecomposable invariant of a given finite group is called the Noether number of the group. In the talk we shall survey some results relating the Noether number and its variants that received attention in recent years.

Inna Entova, Ben Gurion University

Oligomorphic groups and representation stability

Abstract:

Let G be a group acting faithfully on a set X. If G has finitely many orbits on any power of X, the pair (G, X) is called oligomorphic. One can then equip G with a topology coming from X and consider "good" measures on smooth G-sets. In the recent years, Harman and Snowden have developed a fascinating theory of representations of an oligomorphic group G equipped with a suitable measure on the G-sets, further developed by Harman, Snowden and others. In my talk, I will give an introduction to this theory and describe an ongoing project with Th. Heidersdorf concerning oligomorphic groups and stabilization of representations of finite groups.

Evgeny Feigin, Tel Aviv University

Projective and injective representations of Dynkin quivers and quiver Grassmannians

Abstract:

Points of quiver Grassmannians parametrize submodules of representations of a quiver. We introduce a family of nice PrIncipal quiver Grassmannians, which correspond to the representations given as a direct sum of projective and injective summands. We provide various examples of PrIncipal quiver Grassmannians for Dynkin quivers and describe their geometric properties in representation-theoretic terms. Based on joint works with Giovanni Cerulli Irelli, Stanislav Fedotov, and Markus Reineke.

Anton Khoroshkin, University of Haifa

Cauchy Identities and Howe Duality for Staircase Matrices

Abstract:

The classic Cauchy identity allows us to write a product of terms $\left(1 - x_i y_j\right)^{-1}$ over the entries of a rectangular matrix as a sum of products of Schur polynomials in x and y. This famous formula is a direct result of Howe duality, which describes the decomposition into irreducibles of the polynomial ring of rectangular matrices as a $(\mathrm{gl}_m, \mathrm{gl}_n)$-bimodule.

In this talk, we move beyond rectangles to explore staircase-shaped matrices. By studying how upper-triangular (Borel) matrices act on these shapes, we find a new, more general version of the Cauchy identity. I will explain this generalized Howe duality and show how the terms in our new sum reveal a rich and surprising connection to the (parabolic) Bruhat graph of the symmetric group and the Bubble sort algorithm.

The talk is based on joint projects with Ie. Makedonskyi and E.Feigin (details can be found in arxiv:2502.21184 and in arxiv:2411.03117).

Danny Neftin, The Technion

Reducibility of the Curves f(X)=g(Y) and Polynomial Monodromy

Abstract:

Curves of the form *f(X)=g(Y),* and in particular elliptic curves $Y^2=X^3+aX+b$, play a major role in number theory and beyond. The classical Davenport–Lewis–Schinzel (DLS) problem concerns their reducibility, i.e. when is *f(X)-g(Y)* reducible as a polynomial in two variables? The heart of this and related problems lies in studying the monodromy groups of polynomial maps. This involves studying their actions on trees, the Fano plane, and several other interesting geometries. We shall explain how polynomial monodromy is used to resolve the DLS problem, and discuss further open questions.
Based on joint work with Angelot Behajaina and Joachim König.

Eyal Subag, Bar-Ilan University

Dirac operators for algebraic families

Abstract:

In this talk, I will discuss Dirac operators and Dirac cohomology for algebraic families associated with a real reductive Lie group. The main example will be the deformation family interpolating between the real reductive Lie group and its Cartan motion group. I will explain how to construct algebraic families of Dirac operators in this setting, and formulate a family version of Vogan's conjecture, relating the infinitesimal character of an algebraic family of Harish-Chandra modules to its Dirac cohomology. No prior knowledge of algebraic families or Dirac theory will be assumed. This is joint work with S. Afentoulidis-Almpanis.