

Department of Mathematics, BGU

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# Colloquium

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**On** *Tuesday, December ,12 2017*

**At** *14:15 – 17:00*

**In** *Math 101-*

Math-Physics meeting

will talk about

**TBA**

Abstract: 14:15-14:30-coffee break

14:30-14:40 Inna Entova

Title: Superalgebras and tensor categories

Abstract: I will briefly describe what are Lie superalgebras, and present some questions on their representations which have been studied in the last few years.

14:45-14:55 Daniel Berend

Title: Applied Probability.

Abstract: We will present an example of a problem in this area.

15:00-15:10 Shelomo Ben Abraham

Aperiodic tilings – an overflight

15:15-15:25 Yair Glasner

Title: A probabilistic Kesten theorem and counting periodic orbits in finite graphs.

Abstract: I will describe the notion of Invariant random subgroups and how we used it to give precise estimates on the asymptotic number of closed (non-backtracking) circuits in finite graphs.

15:30-15:40 Tom Meyerovitch

Title: Gibbs measures and Markov Random Fields

Abstract: From an abstract mathematical point of view, a Markov Random Field is a random function on the vertices of some (finite or countable) graph, with a certain conditional independence property. Every Gibbs measure (for a local interaction) is a Markov random Field. An old theorem due to Hammersley and Clifford establishes the converse, under some extra assumptions. I will present these notions and state some (slightly more) recent results and questions.

Coffee break

16:00-16:10 Doron Cohen

Title: Stochastic Processes and Quantum Chaos

Abstract: Our recent study considers the dynamics of stochastic and quantum models, in particular ring geometry: (a) with classical particles that perform random walk in disordered environment; (b) with quantum Bose particles whose dynamics is coherent. One theme that arises in both cases is the Anderson-type localization of the eigenstates.

16:15-16:25 Ilan Hirshberg

Title:  $C^*$ -dynamical systems and crossed products. Abstract: I'll briefly say a few words on what the words above mean, and loosely what kinds of problems I tend to look at.

16:30-16:40 Victor Vinnikov Noncommutative Function Theory

One of my main interests in recent years have been in developing a theory of functions of several noncommuting variables. It turns out, following the pioneering ideas of Joseph L. Taylor in the early 1970s, that such functions can be naturally viewed as functions on tuples of square matrices of all sizes that satisfy certain compatibility conditions as we vary the size of matrices. Noncommutative functions are related, among other things, to the theory of operator spaces (including such topics as complete positivity and matrix convexity) and to free probability.

Some other topics that I am interested in, and that I can discuss in case of interest, are function theory on the unit ball and on the polydisc in  $C^n$  and related operator theory, line and vector bundles on compact Riemann surface, especially theta functions and Cauchy kernels, determinantal representations of algebraic varieties, and various topics on convexity in real algebraic geometry related to hyperbolic polynomials.

16:45-16:55 David Eichler

Vortex-based, zero conflict routing in networks

Abstract: A novel approach is suggested for reducing traffic conflict in 2D spatial networks. Intersections without primary conflicts are defined as zero traffic conflict (ZTC) designs. A provably complete classification of maximal ZTC designs is presented. It is shown that there are 9 four-way and 3 three-way maximal ZTC intersection designs, to within mirror, rotation, and arrow reversal symmetry. Vortices are used to design networks where all or most intersections are ZTC. Increases in average travel distance, relative to unrestricted intersecting flow, are modest, and represent a worthwhile cost of reducing traffic conflict.

**Please Note the Unusual Time!**