Department of Mathematics, BGU

Operator Algebras

On *Thursday, June ,18 2020*

At *14:10 – 15:00*

In *Online*

Victor Vinnikov (BGU)

will talk about

Free noncommutative kernels: Jordan decomposition, Arveson extension, kernel domination

Abstract: There is a general approach that emerged in several dffierent areas of mathematics over last several decades for passing from the commutative setting to the free noncommutative setting. This approach that is sometimes referred to as quantization replaces the original object of study (e.g., a vector space) by square matrices of all sizes over this object. A notable example in the area of functional analysis is the theory of operator algebras, operator systems, and operator spaces. Another example is the so called free noncommutative function theory that originated in the pioneering work of J.L. Taylor on noncommutative spectral theory in the 1970s (as well as the earlier work of Takesaki on the noncommutative version of Gefland's theory for C^* algebras) and was vigorously developed in recent years.

In this talk I will discuss completely positive free noncommutative (cp nc) kernels which are the analogue in the setting of free noncommutative function theory of the usual positive kernel functions that played a prominent role in complex analysis and operator theory since the foundational work of Aronszajn, and that also generalize completely positive maps as well as more recent completely positive kernels of Barreto–Bhat–Liebscher–Skeide. More specfiically I will discuss three problems: (a) extending the values of a cp nc kernel from maps defined on an operator system to maps defined on a C^* algebra (the Arveson extension); (b) representing a completely bounded hermitian free noncommutative kernel as a linear combination of cp nc kernels (the Jordan decomposition); (c) giving certfiicates for one hermitian kernel to be positive at all the points where another one is positive (analogously to the Positivstellensaetze of commutative and noncommutative real algebraic geometry).

This is a joint work with Joe Ball and Gregory Marx.