Department of Mathematics, BGU

BGU Probability and Ergodic Theory (PET) seminar

On *Thursday, June ,2 2022*

At *11:10 – 12:00*

In *room ,106 building 28*

Adam Śpiewak (Bar-Ilan University)

will talk about

Probabilistic Takens time-delay embeddings

Abstract: Consider a dynamical system (X,T) consisting of a compact set X in the Euclidean space and a transformation T on X. Takens-type time-delay embedding theorems state that for a generic real-valued observable h on X, one can reconstruct uniquely the initial state x of the system from a sequence of values of h(x), h(Tx), ,... h(T^{k-1} x), provided that k is large enough. In the deterministic setting, the number of measurements k has to be at least twice the dimension of the state space X. This was proved in several categories and can be seen as dynamical versions of the classical (non-dynamical) embedding theorems. We provide a probabilistic counterpart of this theory, in which one is interested in reconstructing almost every state x, subject to a given probability measure. We prove that in this setting it suffices to take k greater than the Hausdorff dimension of the considered measure, hence reducing the number of measurements at least twice. Using this, we prove a related conjecture of Shroer, Sauer, Ott and

Yorke in the ergodic case. We also construct an example showing that the conjecture does not hold in its original formulation. This is based on joint works with Krzysztof Barański and Yonatan Gutman.

Please Note the Unusual Place!