Department of Mathematics, BGU

BGU Probability and Ergodic Theory (PET) seminar

On *Thursday, July ,6 2023*

At *14:00 – 15:00*

In *101-*

Naftali Smith (Ben Gurion University of the Negev, Israel)

will talk about

Large deviations in chaotic systems.

Abstract: Despite their potentially signfiicant and dramatic consequences, large deviations in chaotic dynamics have been studied very little, with few existing theoretical results. We study large deviations of series of finite lengths N generated by chaotic maps. The distributions generally display an exponential decay with N, associated with large-deviation (rate) functions. We calculate the exact rate functions analytically for the doubling, tent, and logistic maps, and numerically for the cat map. In the latter case, we uncover a remarkable singularity of the rate function that we interpret as a second order dynamical phase transition. Furthermore, we develop a numerical tool for efficiently simulating atypical realizations of sequences fi the chaotic map is not invertible, and we apply it to the tent and logistic maps. Our research lays the groundwork for the study of unusual trends of long duration in chaotic systems, such as heatwaves or droughts in climate models, or unusual mean growth rate of a pandemic over

a long period of time. The talk is based on the recent work [N. R. Smith, Phys. Rev. E ,106 L042202 .[(2022)

Please Note the Unusual Time!