

Department of Mathematics, BGU

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## Colloquium

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*On Tuesday, January, 10 2017*

*At 14:30 – 15:30*

*In Math 101-*

Percy Defit (NYU)

will talk about

### **Universality in numerical computations with random data. Case studies**

Abstract: This is joint work with Govind Menon, Sheehan Olver and Thomas Trogdon. The speaker will present evidence for universality in numerical computations with random data. Given a (possibly stochastic) numerical algorithm with random input data, the time (or number of iterations) to convergence (within a given tolerance) is a random variable, called the halting time. Two-component universality is observed for the fluctuations of the halting time, i.e., the

histogram for the halting times, centered by the sample average and scaled by the sample variance, collapses to a universal curve, independent of the input data distribution, as the dimension increases. Thus, up to two components,

the sample average and the sample variance, the statistics for the halting time are universally prescribed. The case studies include six standard numerical algorithms, as well as a model of neural computation and decision making.