"Probability and Other Branches of Mathematics"

Abstract:
This lecture will be addressed to a wide audience: from undergraduate and graduate students in Mathematics, Statistics, Physics and Computer Science, to MSc and PhD students in these areas, and ... even to professionals. It will be shown that diverse and intriguing problems from branches of Mathematics such as Analysis, Combinatorics, Theory of Functions, Number Theory can be solved elegantly by using ideas and techniques from Probability. It is remarkable that sometime these are the only available solutions. A few of the topics listed below will be discussed in detail: Combinatorial and algebraic identities. Casino numbers. They are infinitely many. Bernoulli LLN and Weierstrass theorem by Bernstein polynomials. Old UspenskyœNß problem and its far extensions. Buridan Donkey story. Random walk in random environment. Many ways to interpret and solve the equation $X + Y = XY$. Values of the Riemann zeta functions via Cauchy distribution. Probability in other areas of Mathematics, a few exercises, one open problem. Questions/comments/suggestions from the audience during the lecture are very welcome!