Continuous Goodness of Fit Testing: Old Problem, New Ideas

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In this talk we consider continuous goodness of fit testing - one of the most fundamental and classical hypothesis testing problems in statistics. Given n iid observations, $x_1,...,x_n$, the goodness of fit problem is to assess whether the data comes from a known continuous density $p(x)$.

By far, the most popular goodness of fit statistic is the Kolmogorov-Smirnov (KS) test. Unfortunately, KS lacks power at the tails of the distribution.

In this talk we'll present a new principled approach to continuous goodness of fit testing, and propose a novel test statistic, denoted Calibrated KS, which enjoys detection power throughout the entire range of X. Furthermore we derive a novel computationally efficient method to compute its p-values, also applicable to KS and other similar test statistics.

Finally, we'll present some relations between our test statistic and previous suggestions such as the Higher Criticism test, and the Berk-Jones test.

Joint work with Amit Moscovich Eiger (WIS) and with Clifford Spiegelman (Texas A&M).