

# **Shifting Standards: Experiments in Particle Physics in the Twentieth Century**

**Allan Franklin**

University of Colorado

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**4:00 p.m. (coffee @ 3:30)**

**In this paper I will discuss changes in the presentation of experimental results from the early 20<sup>th</sup> century to the present and their implications. In particular I will look at the history of high-energy physics from the 1960s to the present to see the evolution of the five-standards deviation discovery criterion. This history will demonstrate that the use of standards deviations is not a mechanical application of a statistical formula, but demands knowledge, craft, and judgment. Questions have also been raised concerning the appropriate statistical formulas to use. How does one deal appropriately with the statistical noise? Episodes in which a statistically significant effect was initially seen, but which later disappeared, an unlikely event on probabilistic grounds will also be discussed. Other issues discussed will include: the exclusion and selection of data, the presentation of the history of previous measurements, the possibility of experimenter bias, and the inclusion of personal comments. Historical examples will include Edwin Hall's discussions of "Do Falling Bodies Move South?," and the "discovery" of the Pentaquark.**

**1 West**

**Discussion will continue in the Music Room of the User's Center immediately following the talk.**