

1125-62-1304 **Susan Holmes*** (susan@stat.stanford.edu), Statistics Dept, Sequoia Hall, 390 Serra Mall, Stanford, CA 94305. *Statistical proof and the problem of irreproducibility.*

Data currently generated in the fields of ecology, medicine, climate science and neuroscience often contain tens of thousands of measured variables. Statistical analyses can result in publications whose results are irreproducibile.

The field of modern statistics has had to revisit the standard hypothesis testing paradigm. A first step has consisted in the correction for multiplicity in the number of possible variables selected as significant using multiple hypotheses correction and FDR control (Benjamini, Hochberg, 1995). However this does not solve the problem of post-selection inference where the same data is used to choose models and evaluate them. Recent work by groups at the Wharton school (Brown et al.) and at Stanford (Taylor et al.) address these issues.

It remains that the complexity of software and flexibility of choices in tuning parameters can bias the output towards inflation of significant results; neuroscientists recently revisited the problem in the context of fMRI studies.

Formal correction methods cannot accomodate the flexibility available to today's statisticians. I will also present ways that open source tools (Huber, 2015) and publication of code and data can enhance reproducibility. (Received September 16, 2016)