



**Chris Lloyd**

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## **Second order inference for discrete data models - comparing $r^*$ and parametric bootstrap**

In this talk I will give an overview of the two main methods for second order inference in parametric discrete data models- the bootstrap and the modified likelihood root  $r^*$ . For discrete models, the waters are muddied because it is not clear whether good conditional or unconditional properties are required and, unlike continuous models, good conditional properties do not imply good unconditional properties. I will investigate numerically the performance of the two methods for testing non-inferiority hypotheses in clinical trials. In terms of size accuracy, pivotality and consequently in terms of power, bootstrap P-values are unconditionally better than those based on  $r^*$ . The error rates for both methods appear to be  $O(1/n)$  but test performance is just as much determined by non-asymptotic as asymptotic effects. Bootstrap P-values are starkly superior in terms of their worst case error.

**About the speaker:** Chris Lloyd is Professor at the Melbourne Business School. His current research interests are in exact testing and exact confidence limits, in higher order asymptotics and in biostatistical applications.

**Time:** 4pm, Friday, 31st July

**Location:** Room RC4082

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