

# **How to be uncertain (and how to be less uncertain)**

A O'Hagan

*Department of Probability and Statistics, University of Sheffield, United Kingdom*

## **ABSTRACT**

In this talk I will address some principles for the quantification of measurement uncertainty.

First, I will consider the proper way to express uncertainty. I will argue that classical frequentist tools are unsuitable and explain why it is necessary to adopt instead the personal definition of probability and Bayesian tools. I will also ask whether we need to express "uncertainty about uncertainty".

Second, I will present the ideas of elaboration, which provide a general, unifying framework for discussing how uncertainties enter into different modes of measurement.

This will lead to consideration of how to identify the principal sources of uncertainty. By targeting research effort at these sources we can efficiently reduce uncertainty in the measurand.