Published in *Contemp. Phys.* **51**, 188-189 (2010).

**Missing data in longitudinal studies: strategies for Bayesian modeling and sensitivity analysis** by Michael J. Daniels and Joseph W. Hogan, Chapman and Hall/CRC, 2008, pp. xx + 303. Scope: research monograph. Level: professional statisticians and PhD students.

Longitudinal studies are almost always plagued by missing data. Examples include research data in public health, medicine, life and social sciences, as well as in environmental and geophysical studies of ice ages and the past climate. In the case of data involving people over a period of time there are usually some drop-outs due to e.g. moving away, or death, or simply disinclination to continue. Similarly, some physical measurements in a historic time series may be corrupted or missing. In such cases it may be impossible to repeat the measurements, or the survey, so that the best that can be done is to find a way of accommodating the lacunæ such that they do minimal damage to the reliability of any conclusions.

The problem with missing data is that they may, or may not, be typical. They can be missing at random (MAR) or missing not at random (MNAR). Thus assumptions are needed about the distribution of the missing responses, and these assumptions will be subjective because they cannot be tested against data. The authors view is that "...analysis of incomplete data cries out for the Bayesian approach", because the subjective component of the inference can then be formalized. The idea is to exploit the theorem introduced by 18th century mathematician and Presbyterian minister Thomas Bayes. It relates the conditional and marginal probabilities of two random events and is ideally suited to utilization by statisticians. The authors point out that, although the idea has been around for over 30 years, it is surprisingly underutilized. Their book is evidently intended to correct this deficiency.

There are ten chapters, taking the reader through motivating statistical examples, regression models, the fundamentals of Bayesian inference, worked examples for cases with complete data, and then five chapters on how to treat problems with missing data. The numerous case studies are described succinctly albeit in considerable detail. The style is tight and economical, with no wasted words, and the intended readersip seems to be mainly mathematicians and statisticians. The book may also be of interest to physicists and other scientists, given the widespread and increasing use of Bayesian methods in e.g. high energy physics, field theory, computing, network analysis and ecology.

Peter V. E. McClintock
Lancaster University.