ENBIS-15 Keynote Speakers

A number of distinguished keynote speakers will give plenary talks at ENBIS-15. The list includes:

Ronald Does

University of Amsterdam

(The Netherlands)

Process Improvement in Healthcare

Since 2000, IBIS UvA has been highly involved in improving processes in healthcare. We observe that a number of incidents that occurred in the last couple of years indicate that patient safety in hospitals is not satisfactory. Also, increasing costs, quality problems and long admission times are regular news items. Some people are of the opinion that hospitals are not in control of their operations and that they can learn a lot from car manufacturers, such as Toyota. Others think that hospitals cannot and should not be compared to a car factory. And then there are the numerous methods for improving the operation that have been offered to hospitals by consultancy agencies, such as Lean Six Sigma and the Theory of Constraints. In this talk, we explain our views of improving operational effectiveness in healthcare. The central mission of a healthcare organization is to deliver good healthcare to patients within financial restrictions posed by society. Good healthcare partly consists of effective methods for diagnosis and treatment. The required knowledge to design and apply these methods comes from medical science. We believe that medicine, including medical statistics, is a rather mature science. But in addition, these diagnostic and treatment methods have to be delivered to patients and this is done by various processes: medical processes, medical support processes, and non-medical support processes.

As medical science acquires knowledge about diagnostics and treatment, the science of operations management acquires the knowledge to design, control and improve processes. Operational effectiveness qualifies how well processes in an organization perform, and operational excellence expresses the ambition of organizations to do this extremely well. We believe that it is in healthcare operations management, rather than in medical science, that the fields of quality and industrial statistics can make a valuable contribution.

IBIS UvA has supported the implementation of Lean Six Sigma in many hospitals and we have seen tremendous improvements. More than 600 documented projects show that effective healthcare processes lead to more reliable, faster, flexible and cost-efficient healthcare. We have published these findings in leading international journals on subjects like: improvement of

the patient's clinical path; efficiency improvement of resources; measuring healthcare quality; increasing the efficiency of nursing departments; and classification of healthcare improvement projects. In this talk we discuss these issues.

Robin Willink

National Metrology Institute

(New Zealand)

The Statistics of Measurement Uncertainty

The evaluation of the `uncertainty' to be associated with the result of a typical measurement has long been problematic because of the presence of both systematic and random errors in the measurement procedure. The textbook frequentist field of conventional `error analysis' does not offer a solution except to recommend the use of worst-case values for systematic errors, which requires the errors to be bounded and leads to intervals of uncertainty that many analysts would consider to be too wide. The alternative is to associate variances with systematic errors, as was formally recommended in 1980, where it was suggested that systematic errors be regarded as originating from known distributions. This represented an extension of a frequentist analysis.

Despite that recommendation, the treatment of uncertainty in measurement has remained confused. This is partly because of a lack of statistical expertise among applied scientists, but it is also partly because the ensuing Guide to the Expression of Uncertainty in Measurement (the GUM), with was published in the mid 1990's failed to describe a coherent statistical basis for its practical algorithm. This error has been recognized, and the revision of the GUM is currently being undertaken in a manner that is broadly consistent with the practice of objective Bayesian statistics.

This talk will outline the history of the problem and will give one view of how the current situation arose. The strengths and weakness of the proposed Bayesian approach will be discussed, and some surprising logical difficulties with the relevant objective Bayesian techniques will be described. The properties of the modified frequentist approach will also be discussed.

Jeff Wu

Georgia Institute of Technology

(USA)

Computer Experiments: A User-Friendly Overview

Because of the advances in complex mathematical models and fast computer codes, experiments on a computer have become popular in engineering and scientific investigations. Computer simulations can be much faster or less costly than running/taking physical experiments/observations. Research on the design and analysis of computer experiments has

progressed rapidly in the last 10 years. In this talk I will give an overview of the field with emphasis on methodology and applications, rather than theoretical research. Difference from traditional physical experiments will be described. Some major development will be outlined. In parallel to and independent of the work in statistics, applied mathematicians have approached the same problem under the banner of uncertainty quantification (UQ). Thus UQ can be viewed as an interface between applied math and statistics. A cursory introduction to UQ will be made. Real examples will be given for illustration.

Geoffrey Vining

Virginia Polytechnic Institute and State University (USA)

Geoff is the 2015 George Box Award recipient.

The Legacy of George Box and the Future of Industrial Statistics

George Box was a true giant within statistics, especially within industrial statistics and quality engineering. He made truly significant contributions to experimentation, time series analysis, and process control.

His presence within our field continues today and into the future. This talk briefly reviews some of Box's seminal contributions to our field in the areas of experimental design, time series, and process control. It then projects how these contributions continue and evolve into the future. Specific topics include experimental design and analysis for reliability data and response surface methodology for functional data, such as profiles or time series. These developments essentially marry Box's three areas in order to address important real industrial statistics problems we face today and into the near future.