(Mis)Use of Statistics in Science– Interview with PD Dr. Nicolai Bissantz

PD Dr. Nicolai Bissantz[1] is a mathematician at the Ruhr University Bochum, Germany. His research fields are applied and mathematical statistics, in particular with applications in science and engineering. Amongst these fields are applications of statistical inverse problems in astronomy and in image reconstruction. Such problems arise e.g., in the recovery of images from fluorescence microscopy imaging and in medical imaging devices such as PET (positron emission tomography).

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JUnQ: In your opinion, is it important that only mathematicians teach statistics?

PD Dr. Bissantz: Understanding the results from a statistical analysis requires both experience with the basics and advanced ideas behind the methods which are applied and some understanding of the field of application to understand the implications of the result. Hence, statistics for science should in my opinion be taught by mathematicians (or very closely related fields like, theoretical physics) who should have a good knowledge of the field of application.

JUnQ: Should students from different fields have the same statistics training or should this be individually adjusted for different fields (e.g. physics vs. biology)?

PD Dr. Bissantz: Statistics is statistics, i.e. the basic methods are globally the same. However, there are particular specialities and often rather different methods used in the different disciplines. Moreover, understanding statistics appears to be much more straightforward if the lecture is based on examples well known to the students. Hence, it is preferable to have specific lectures for the different fields. Nevertheless, e.g. students from science should all have some advantage from taking a lecture such as statistics for biology if it is of substantial quality (e.g. includes examples, focuses on the main ideas, etc.).

JUnQ: Do you teach statistics in your own discipline / in other disciplines? If yes, in which phase of the students' education?

PD Dr. Bissantz: Both for math and for students from geography and biology in the bachelor / master phase and as courses and as statistical consulting for students from all subjects with a focus on the MINT (math, informatics, science, engineering) subjects and psychology for bachelor, master, PhD thesis projects and advanced projects from postdocs etc.

JUnQ: To your mind, is statistics in general taught in an appropriate way in your discipline so that, e.g., PhD students are capable of applying statistics to the interpretation of their data in a correct way?

PD Dr. Bissantz: I hope (and think) that this is the case for our statistics lectures, in particular for students from other fields (of course also for mathematicians). At some universities, there may be, to my experience, lectures for non-mathematicians somewhat too much biased to a main subject math lecture.

JUnQ: Have you ever experienced misuse of statistics to make data appear better than it actually is?

PD Dr. Bissantz: Not in science and academics. However, obviously in the public discussion (in newspapers, TV news etc.) this is ubiquitous – some well-known popular books are full of examples collected from a variety of sources.

JUnQ: What do you think can be done on the educational level to improve good scientific practice regarding statistics?

PD Dr. Bissantz: Close collaboration with applied statisticians in research projects should start at an early phase, if possible in the phase of experimental design. In general, interdisciplinary teaching and research should be ranked high to attract, both from math and applied fields, high ranking teachers and researchers.

JUnQ: Thank you very much for this interview!

—Jennifer Heidrich