Statistical principles, fundamentals and applications for Ph.D. students in natural science, 3 credits

The department of mathematics will arrange a course for PhD-students in the natural sciences covering the basics of mathematical statistics. Parts of the course will be based on practical applications. The course will be very much "hands on" and concentrate on the logic, understanding and interpretation of statistical methodologies. An overview of the most common models and methods will also be given.

Examples of topics that will be discussed are:

- randomness and basic concepts of statistics and probability
- introduction to experimental planning
- models and methods
- principles of statistical testing
- critical thinking

Examples from different research fields will be given.

The course will require an equivalent to two weeks full-time study. It will include lectures and computer labs. There will also be group exercises, where the students are going to have the opportunity to work on the more theoretical aspects of the material. The computer labs will take the form of short projects, where the students will be given different kinds of data sets to analyze using software of their own choice. The examination will be a take home exam. A passing grade on the homework (computer labs) will also be required.

The content of the course will be rather basic. Thus, it is primarily aimed for those that are either not familiar with statistical thinking or in a need of repetition. However, since it is a short course, the tempo will be rather high.

Literature: Parts of "Experimental design and data analysis for biologists" by Gerry Quinn and Michael Keough as course literature. Additionally, course notes will be handed out.

Time: The course will start on January the 11'nth and continue for approximately two-three weeks.