Experimental design and biostatistics for life-scientists: good practices, misuse and pitfalls.

Organizer(s) 
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1 ECTS

Summary 
The course aims to explain the importance of biostatistics for science reproducibility/reliability and teach good practices. The lectures are tailored to biologists and concentrate on logic thinking: no heavy mathematics. Particular emphasis will be placed on experimental design (power, independence, randomization), analysis (multiple comparisons, repeated measures, limitations of p-values, choosing the appropriate tests) and presentation (graphical display, errors, principal information to disclose) and statistics in grant writing.

Course schedule & location in 2020

- **Session 1** – February 17: 9-13h
- **Session 2** – February 18: 9-13h
- **Session 3** – February 24: 9-13h

All course sessions will take place in Lausanne, Rue Bugnon 7 (UNIL Physiology building) in the seminar room on the 6th floor. In case the access door is closed, please ring the doorbell. Please consider waiting for at least one more course participant to ease the work of the person who needs to let you enter ...

Content of course sessions

- **Session 1:**
  - Introduction and statistical design
    - A digestible introduction to biostatistics
    - Design: sampling and independence
    - Design: power
  - Analysis 1
    - P-values and tests: misconceptions, misuse and good practices
    - Multiple comparisons: The ANOVA family and beyond
    - Problem-based learning (collective)

- **Session 2:**
  - Analysis 2
    - Correlation and regression (linear, logistic)
    - The Chi² family
    - Bits of odds-ratios and related concepts
    - Problem-based learning

Presentation and reporting

- Graphs and text: *the dos and don’ts*
• Overview of existing statistical guidelines
• Problem-based learning
• Biostatistics in grant writing

• Session 3: Unexpected/bothersome amendments in real-life research
  • Handling missing values and outliers
  • Covariates 1: ANCOVA
  • Covariates 2: Multiple regression
  • Problem-based learning

Evaluation
Collective and group-organized problem-based learning (PBL) with made-up examples during the course. Collective PBL will be cases we will all discuss together. For group-based PBL, groups will have 10 min to prepare a case and 5 min to present it.

Registration
The course is limited to 20 participants. Register before January 31, 2020 by writing a mail to ulrike.toepel@unil.ch (with your supervisor in copy) and stating the course title as subject.