Course title: Biostatistics for non-statisticians: good practices, misuse and pitfalls.

Organizer(s): Romain-Daniel Gosselin, Biotelligences LLC

ECTS: 1

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 2017:
- Session 1 - December 13: 13.30-17.30h in Bugnon 21, Salle de seminaire 7
- Session 2 - December 15: 9-13h in CHUV, main building, Salle de seminaire 2
- Session 3 - December 15: 14-18h in CHUV, main building, Salle de seminaire 2

Content of course sessions:
- Session 1:
  Introduction and statistical design
  - Good biostatistics: why bother?
  - A short (and digestible) introduction to biostatistics
  - Intro to statistical inference: testing a hypothesis
  - Design: sampling
  - Design: power
  - Design: independence
  - Problem-based learning (collective)

- Analysis
  - Misconceptions and misuse of p-values and tests
  - Parametric vs. non-parametric tests
  - Multiple comparisons: The ANOVA family and beyond
  - Problem-based learning (collective)

- Session 2:
  Analysis
  - Correlation and regression
  - The Chi^2 family
  - Logistic regression
  - Problem-based learning (group)

Presentation and reporting:
- Graphical display: graphs and error-bars: the dos and don'ts
- Which information to disclose?
- Overview of existing statistical guidelines
- Problem-based learning (group)
- 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 (groups)

**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 November 30, 2017 by writing a mail to [Indscourses@gmail.com](mailto:Indscourses@gmail.com) (with your supervisor in copy) and stating the course title as subject.