"Open Science & reproducibility" workshop series

Recent studies have shown that worldwide, between 51% to 89% of published preclinical and clinical research is not reproducible, with consequent losses estimated around $100 billions/year in biomedical research[1,2,3]. A series of recurring problems have been highlighted, including the lack of sufficient repetition of the number of experiments, the absence of adequate controls, the lack of reagent validation, lack of transparency and standards while reporting research results and not using appropriate statistical tests.

The **"Open Science & reproducibility" workshop series initiative supported by the Data Management Unit at FBM/CHUV Library and the Lemanic Neuroscience Doctoral School** should be a unique opportunity for PhD students to discuss and learn Open Science best practices and standards. **A series of four 1-day workshops will take place in 2017 at UNIL/CHUV and EPFL**. For each workshop session, researchers as well as scientific information specialists will provide you with new knowledge and skills in **systematic literature search and bias assessment (Workshop I)**, **experimental design and statistics (Workshop II)**, **data management and data sharing (Workshops III & IV)** to support high quality and reproducible studies.

You will discover specialized services from numerous partners at UNIL/CHUV, EPFL, Vital-IT/SIB, Scientific Information School, Biotelligences, datasets repositories (figshare / Zenodo), and learn more about funding agencies (SNFS) and publishers (PloS, NPG) expectations concerning Data management and Open Data.

Workshops I & II & IV will be reserved to FBM-UNIL and Lemanic neuroscience doctoral students, while Workshop III will be open to researchers at all career stages.

For more information, have a look at the detailed program of the lectures and workshops.

[1]Begley, C G, and Ioannidis, J. PA. "Reproducibility in science improving the standard for basic and preclinical research." *Circulation research. 2015; 116.1: 116-126.*
[2]Freedman LP, Cockburn IM, Simcoe TS. The Economics of Reproducibility in Preclinical Research. *PLoS Biol. 2015;13(6): e1002165.*
[3]Howells, D. W., Sena E.S., and Macleod, M.R. Bringing rigour to translational medicine. *Nat Rev Neurol. 2014 Jan;10(1):37-43.*

Workshop I – "Animal Systematic Review and bias detection as tools for informed experimental design decisions"

17 March 2017 - 2 hrs lecture and 4 hrs practical - 0.5 ECTS

The morning *lecture* is aimed to discuss SYRCLE Animal Systematic Review and publication risk of bias as tools for taking informed experimental decisions for the setting of a laboratory experimentation as a step for valid, robust and reproducible research.

The afternoon workshop will focus on individual *practice* of systematic search applied to participant information need (Boolean operators, MesH terms, fast search string building with text editor). Participant groups will evaluate the risk of bias of 2 preselected papers by trainers with criteria derived from ARRIVES check list to recreate experimental time line (allocation concealment, blinding, randomization, sample size, specification of outcome variable, statistical analysis etc). Finally, participants will apply these criteria on their own key reference article, and discuss their findings within the whole group.

Teachers: Lucile Vogt and Dr Sylvie Vullioud
Neuroscientist expert: Dr Cécile Lebrand https://orcid.org/0000-0002-2750-3164

Location :
Salle de formation de la Bibliothèque du CHUV
Bâtiment hospitalier BH 08 CHUV
Metro M2 stop "CHUV"
Lausanne

Workshop II – "Improving experimental design in basic and clinical research for increased science reproducibility".

<u>7 June 2017</u>, 2 hrs lecture and 4 hrs practical, 0.5 ECTS

The first course will give basic concepts of biostatistics and experimental design. Covered topics will include a general introduction to null hypothesis testing, sampling methodologies, independence of measurements, reduction of systematic error/bias, power/sample size calculation, danger of data dredging and the impact of *null* results in publication bias.

The second half of the workshop will address the issue, constraints and specificities of design in experimental and in clinical science separately. A thorough understanding of mechanisms leading to irreproducibility through false positives or negatives, confounding variables or uncontrolled bias in both research context will be presented, as well as the solution to prevent them.

A large part of the workshop will be dedicated to practical activities where attendees can apply their newfound skills in critically assessing the quality of designs, presenting their design in grant application and publications as well as using software and online tools.

Teacher: Dr Romain-Daniel Gosselin

Location :
Salle de formation de la Bibliothèque du CHUV
Bâtiment hospitalier BH 08 CHUV
Metro M2 stop "CHUV"
Lausanne

Workshop III - "Data management & Open Data"

22 May 2017, 6 hrs lecture, 0.5 ECTS

During the first part of this workshop day, researchers and professionals involved in Big Data management at VitalIT/SIB as well as in Data Management Plan preparation at EPFL will teach you best practices in data management and how to collect, describe, store, secure and archive research data. Researchers will also be introduced to the need for a Data Management Plan (DMP) preparation, an evolving document reporting how the research data will be managed during and after a research project.

The second half of the workshop will be dedicated to Open Data. This cession will provide researchers with guidance on how to share their data to increase the visibility of their work. You will discovered what are the journal (PloS, Nature Publishing Group) guidelines and the SNFS funding agency policies concerning data sharing. You will learn about data paper (Scientific Data-Nature) and Zenodo, figshare, two adapted data repositories to meet journal requirements for publishing research data underlying their publication. We will present how making published works and their accompanying datasets freely accessible through Open Access can benefit both researchers and the scientific community.

This workshop will provide you with tools to generate robust and excellent quality studies that are reproducible and reusable. Importantly, it will provide you with effective support to produce high quality publications complying with the guidelines established by journal publishers and funding agencies.

Location :
Department of Fundamental Neurosciences (DNF)
Rue du Bugnon 9
Metro M2 stop "OURS"
Lausanne

Workshop IV - "Data management & Open Data"

Regular practical workshops under preparation at EPFL and at FBM/CHUV

2 x 3 hrs practical, 0.5 ECTS

During the practical workshop on Data management, PhDs will learn how to fill a Data Management Plan corresponding to their thesis project research.

Putting in place a DMP (data management plan), makes possible to:
- respond to the requirements of the financing agencies such as the FNS (starting in April 2017) and H2020, which requires a DMP to be put in place
- anticipate in detail the management of research data, specifying how this data is going to be analysed, organised, stored, secured and shared,
- specify the type of data that is going to be created and indicate who will be responsible for the organisation of the developed plan,
- indicate the process to be followed in respect of the budget, intellectual property, and monitoring over time

During the practical workshop on Open Data, we will present how making published works and their accompanying datasets freely accessible through Open Access can benefit both researchers and the scientific community. You will be initiated with data deposit, Open Access issues, metadata standards for datasets, file formats for long term datasets storage and re-use, data copyright, licenses and self-archiving rules.

Location and further details to be announced soon.