GAIN HANDS-ON EXPERIENCE IN DATA-ANALYSIS
(A graduate-level course in applied statistics)

In Winter 2021, Prof. James Hanley is again offering a 4-credit course, with limited enrollment, where you will gain experience in applying the statistical techniques you have already met in courses, and learn how to approach data-analysis. The datasets will address a broad range of scientific topics.

Description

bios6xx [4 credits] Winter 2021 Topics in biostatistics: applications of statistics to data-analysis

Students will be guided through the statistical analysis of several datasets, so as to apply the statistical techniques they have already learned, and to learn how to approach new problems.

The evaluation will be based on class participation and the quality of the data-analyses carried out in and outside of class.

In-class, 3 hours once, or 2 hours twice, per week; time(s) to be decided.*

Prerequisites: Math533 and Math 523, or EPID621, or equivalents, as determined by instructor.

Further details

Students will work through many datasets that Prof. Hanley has collected/obtained over four decades of teaching and collaborative research, so as to become more confident in approaching data, translating scientific questions into statistical analyses, and communicating the results/answers through tables, figures and words. As for 'words': you will practice by writing abstracts, and in some cases writing statistical methods sections. The topics will not be limited to biology and medicine, but will cover a wide range of fields. (See Dataset Menu & Course Website from Winter 2020. Course # may change.)

The course is a prelude (or a prerequisite) to doing 'live' statistical consultations. Before you can consult live, you need to have done many (preferably guided) data-analyses, so that when it comes to a real consultation, you will have 'seen' many previous cases. It is a bit like a young doctor seeing the patient in person, making a diagnosis and treatment plan: the first cases handled on one's own, with no senior person to guide or to check with, are scary. Towards the end of the course, JH will 'replay' some consultations with former clients [see here for a consulting course he used to give in early 2020s].

There won't be much formal didactic content: instead, you will set up the work in class, and then in teams* outside of class, do the main work, and the professor will help guide you. Some datasets will be analyzed entirely within a class, but when we do so, you will be expected to have read the background material before and come to class with a 'plan'. [*New interdisciplinary teams each week].

(*Depending on interest, we might also read together some chapters in Clayton & Hills book, or the new book *Regression and Other Stories*, by Gelman, Hill and Vehtari.)

To keep numbers manageable, enrolment will be limited. Auditors don't make sense in a 'participation' course like this — we will 'learn by doing', as surgeons do*.

As for workload, this is not meant to a course that can take all your time, and infringes too much on your other courses or thesis/project work, and annoys your supervisor. [JH can speak with him/her if you are unsure]. But he will expect active participation and 3-6 hours work outside of class each week. [We can discuss whether it would be better as a Pass/Fail or letter grade course, and how much participation counts towards it.]

For any other information, or if you wish to have permission to join in, please e-mail Prof. Hanley at `james.hanley@mcgill.ca` . And pass this email on to interested others.

* I Hear, I Forget. I Do, I Understand: A Modified Moore-Method Mathematical Statistics Course (title of a very nice article by Horton in the American Statistician in 2013). Surgeons have 3 ways: SEE one, DO one, TEACH one.

https://jhanley.biostat.mcgill.ca