Vall d'Hebron
Institut de Recerca

Introduction to the course

Basics statistics for biomedical research course

UEB – VHIR & GRBIO

Mata Bofill[1], Jordi Cortes[1], Santiago Pérez-Hoyos[2,3],Álex Sánchez[2,3]

1 Departament d'Estadistica i Investigacio Operativa. UPC

2. Unitat d'Estadística i Bioinformàtica (UEB) VHIR

3 Departament de Genetica, Microbiologia i Estadistica UB

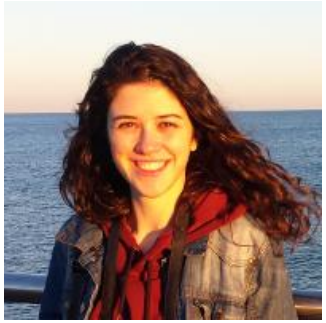
Vall d'Hebron Hospital · Generalitat de Catalunya Departament de Salut · Institut Català de la Salut · UAB Universitat Autònoma de Barcelona · Generalitat de Catalunya Departament d'Economia i Coneixement · Institució CERCA Centres de Recerca de Catalunya · ISC Instituto de Salud Carlos III · GRBIO

Contingut

- Who are we?
- What do we do?
- Where are we?
- Why this course
- Objectives
- Methods
- Contents
- Logistics

Who are we?

- This is a **joint** course taught by members of the Grup de Recerca en Bioestadistica i Bioinformatica (GRBIO) (http://grbio.upc.edu)



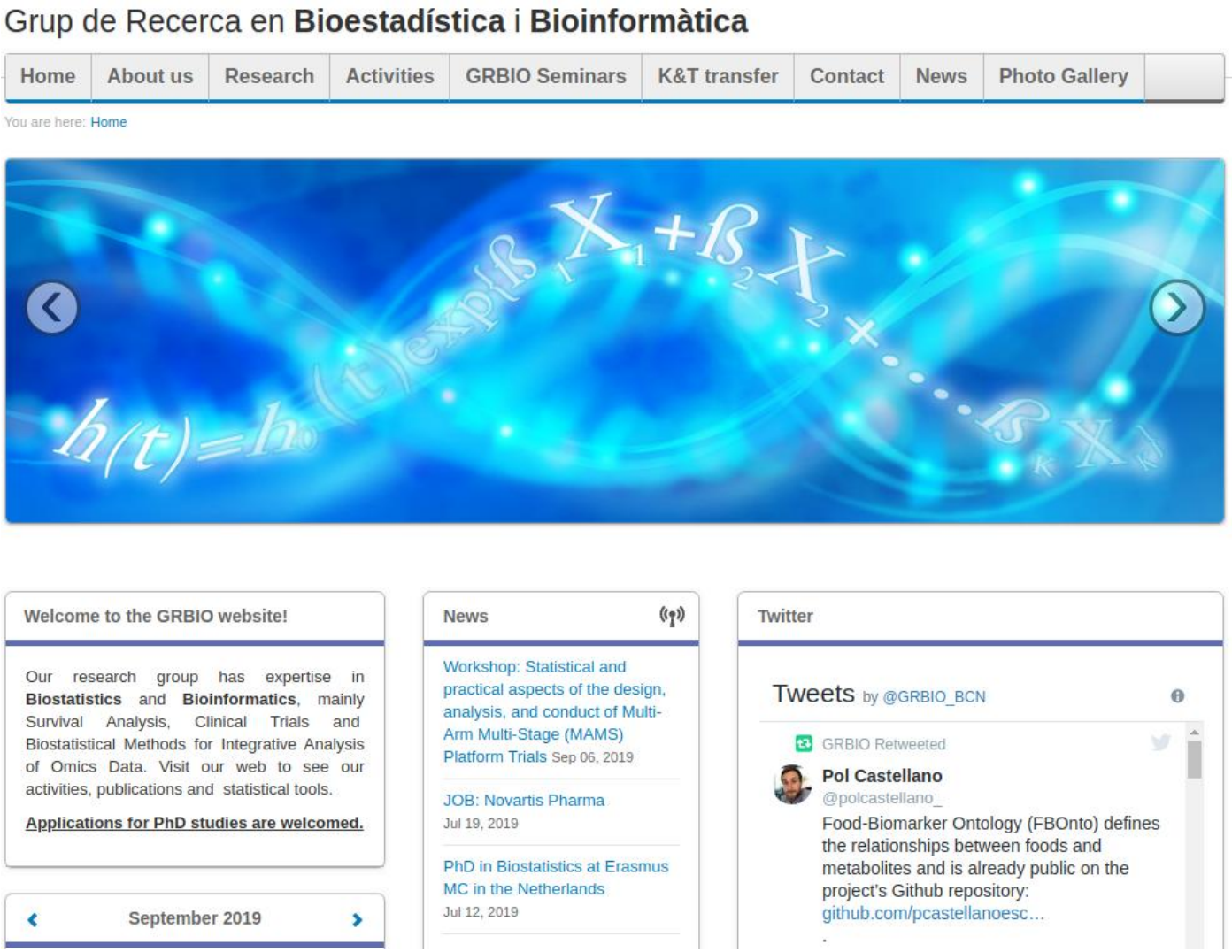

GRBIO

EIO, UPC

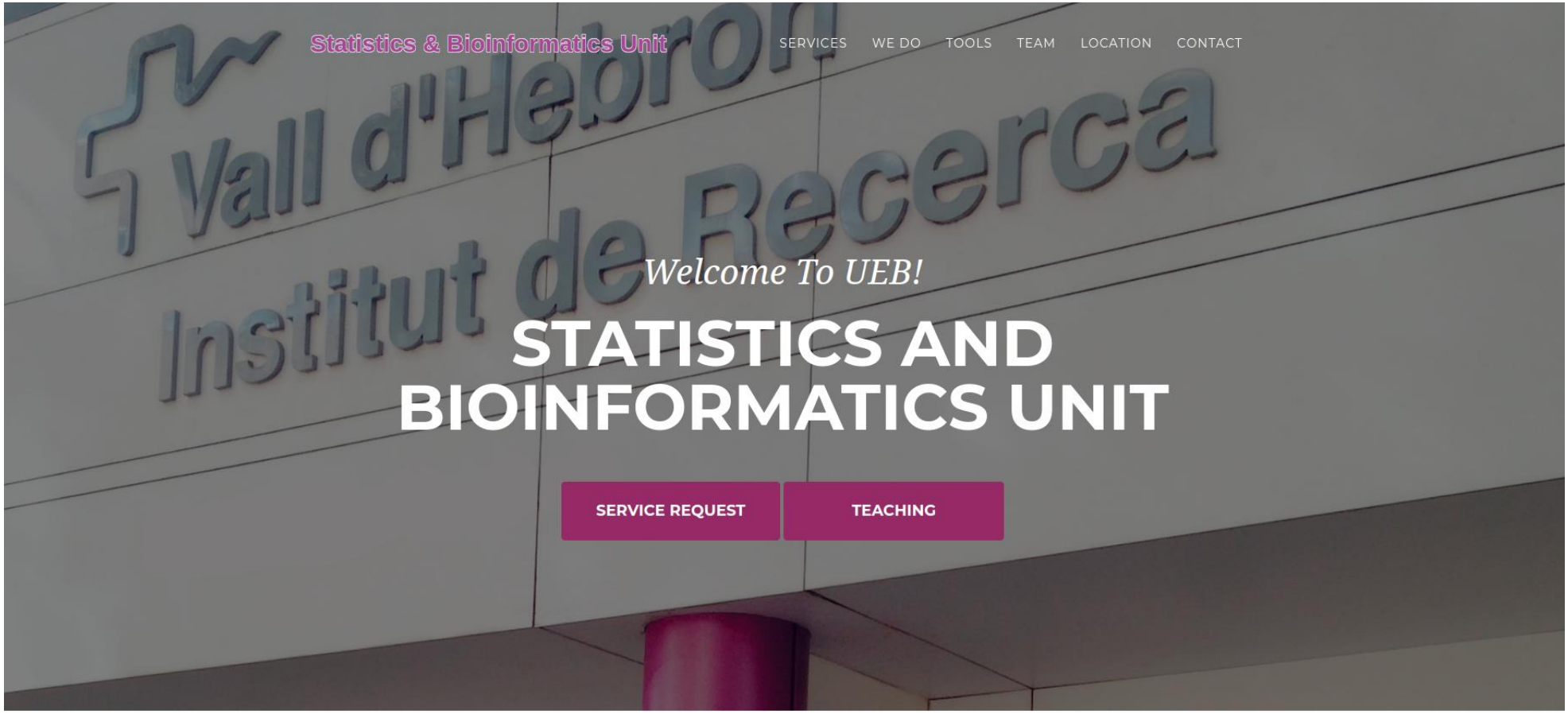
GME, UPC

UEB, VHIR

The GRBIO (http://grbio.upc.edu)



The UEB (http://ueb.vhir.org)



Why this course

- A huge quantity of, often complex, data is generated in clinical or lab research.
- In order to be able to extract information from data we must rely on statistics.
- Statistical methods and tool range from those that are relatively simple and accessible to more complex sophisticated models.
- The main goal of this course is to provide an overview which is good enough to
  - Help you to analyze your own data, when it makes sense
  - Suggests you to contact us (or other experrts) when it makes sense
  - Learn when to do each thing :-)

As the master said ...

"Hiring a statistician after de data has been collected is like hiring a physician when a patient is in the morgue: she might be able to tell you what went wrong , but she is unlikely to be able to fix it"

R.A. Fisher

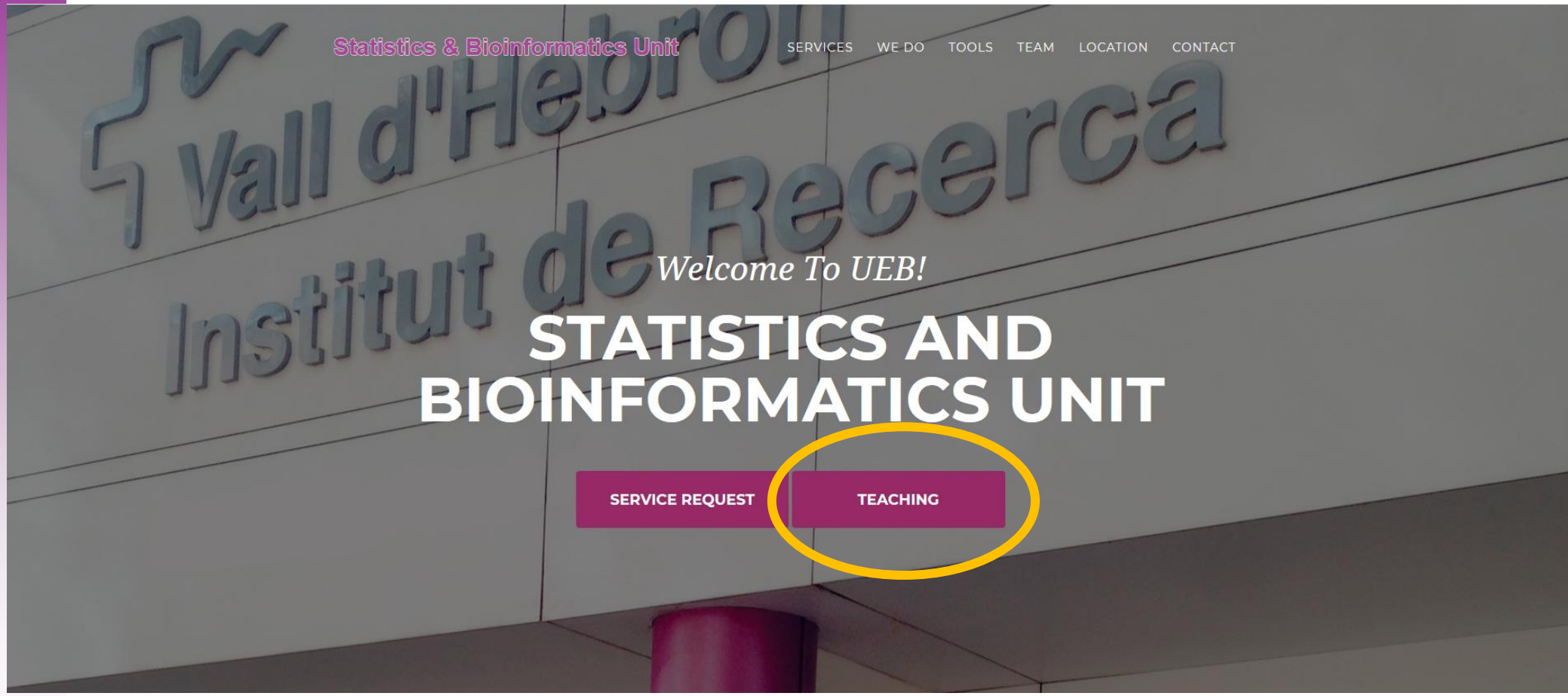
Objectives

- Main objective of the course is to provide a general overview of the principal statistical methods that can be useful in biomedical research and daily practise
- At the end of the course you should be able to...
  - Recognize the main problems from a statistical point of view
  - Identify the basic methods to solve these problems
  - To use basic tools to carry out properly their own analysis
  - Identify when to apply each method
  - Be able to ask a professional statistician using the proper terminology to understand the solutions when problems increase their complexity

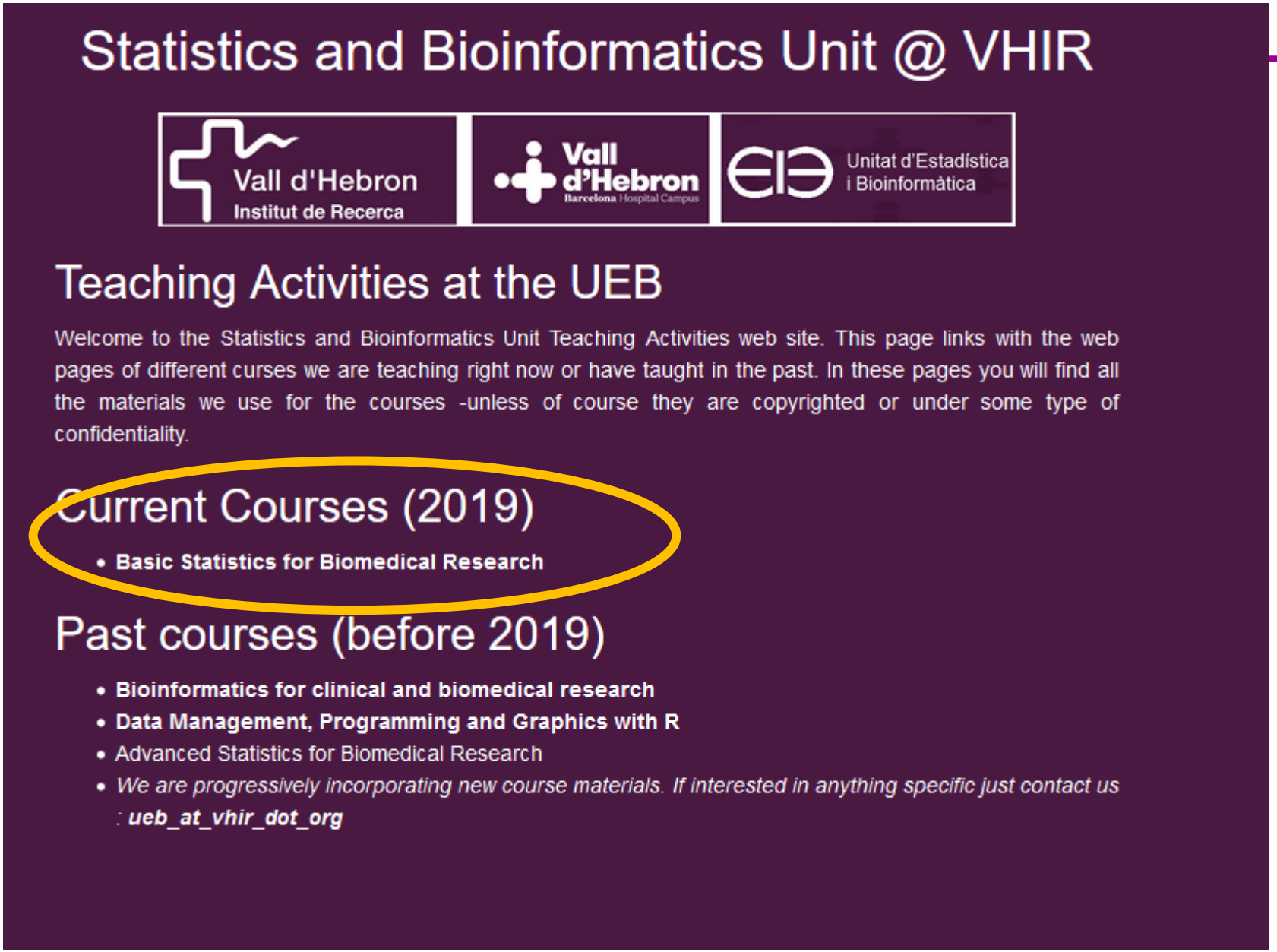
Vall d'Hebron
Institut de Recerca

ueb.vhir.org

UNITAT
D'ESTADÍSTICA I
BIOINFORMÀTICA



Course web access



Materials del curs

Sessió 0 : Presentació del curs

-

Sessió 1 : Introducció a R i R commander

- Presentation

Sessió 2 : Estadística descriptiva I: Resums numèrics, taules i gràfics

- Univariate Descriptive_analysis

Sessió 3: Estadística descriptiva II: Bivariant.

-

Sessió 4: Introducció a la inferència estadística. Intervals de confiança.

-

Sessió 5: Disseny i mida mostral..

-

Sessió 6: Proves d'hipòtesis I: Conceptes bàsics.

-

Sessió 7: Proves d'hipòtesis II: Variables quantitatives.

-

Sessió 8: Proves d'hipòtesis III: Taules de contingència, Khi²

-

Sessió 9: Tests diagnòstics: Sensibilitat, especificitat i corbes ROC.

-

Sessió 10: Exercici de análisis de dades reals.

-

Bases de Dades per exercicis

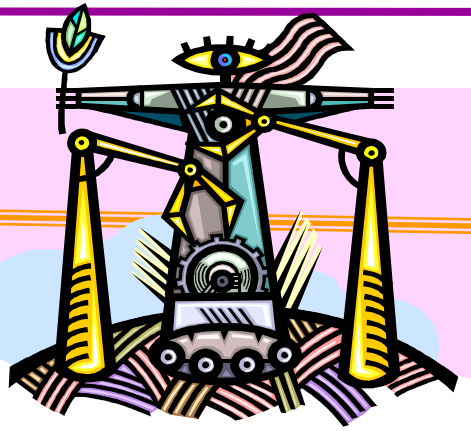
-

Methodology

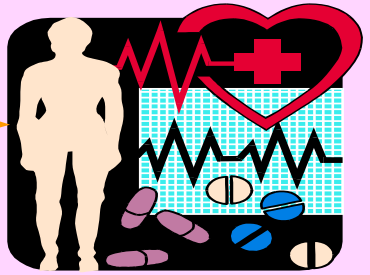
- This course is about applied statistics
- We work with real data examples
- Data analysis with **R** and **R commander.**
- Theory is important , but discussion of real problems is what leads to understanding.
- Program is flexible and may be adapted to your needs.

The statistical (scientifical?) process

Nature

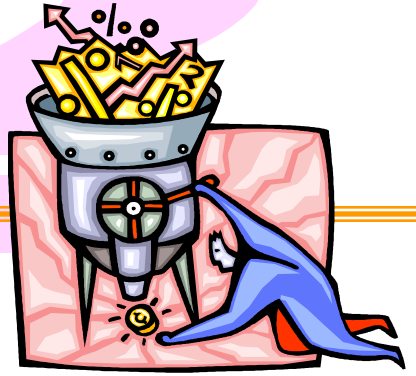


Generate

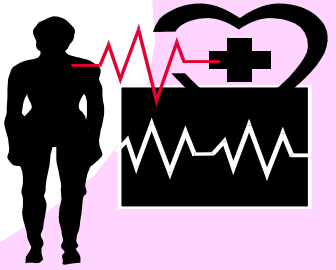


Real data

"Studied nature"



Statistical methods



Observed data

Statistical approaches

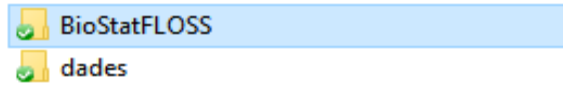
Descript ⟺ ***Estimation***

Summary measures. Graphs. CIs

Compare ⟺ ***Hypothesis testing***

Relate or predict ⟺ ***Modelling or Regression***

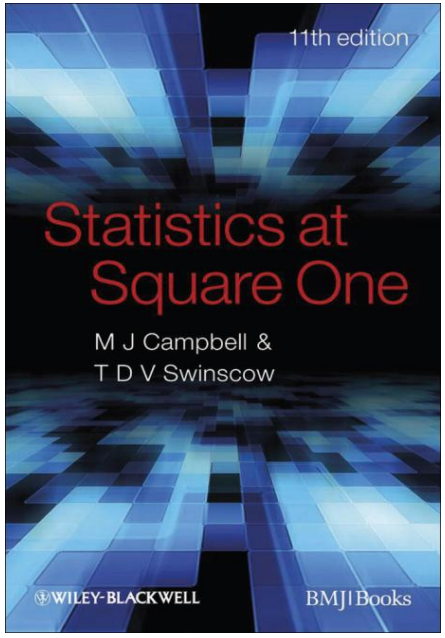
Materials

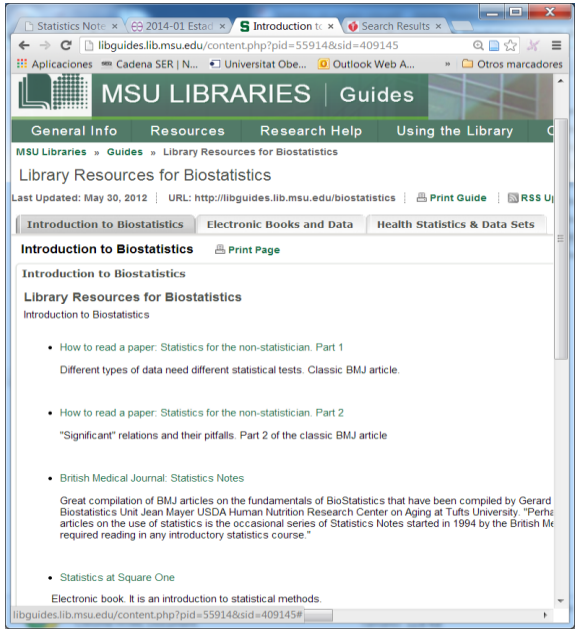

BioStatFLOSS
dades


BioStatFLOSS Portable
BioStatFLOSS es un entorno homogéneo de ejecución, bajo Windows, de una recopilación de programas, ya preparados para su uso, de utilidad para la realización de estudios (bioestadísticos, epidemiológicos y de salud en general), investigación biomédica y/o formación bioestadística.
BioStatFLOSS
2.0
Ofimática
Firefox
Writer
Calc
Impress
Base
Math
Draw
R
R
R Commander
R Studio
R Deducer
Tinn-R
Bioestadística
PSPP
SofaStats
SciLab
FreeMat
Octave
gretl
Epidemiología
EPIDAT
EPI INFO
Open EPI
WinBUGS
Salir

Resources

- R and R-commander: Free software
- Resources about basic statitistics
  - Course slides and exercise *datasets*
  - *Some text or reference material*





Have a good course !!!!

"Data don't make any sense,
we will have to resort to statistics."