Vall d'Hebron
Institut de Recerca

Introduction to the course

Basics statistics for biomedical research

UEB – VHIR & GRBIO

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Contingut

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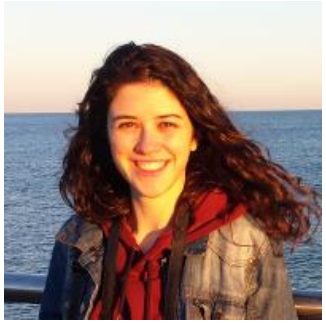
- Logistics

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)



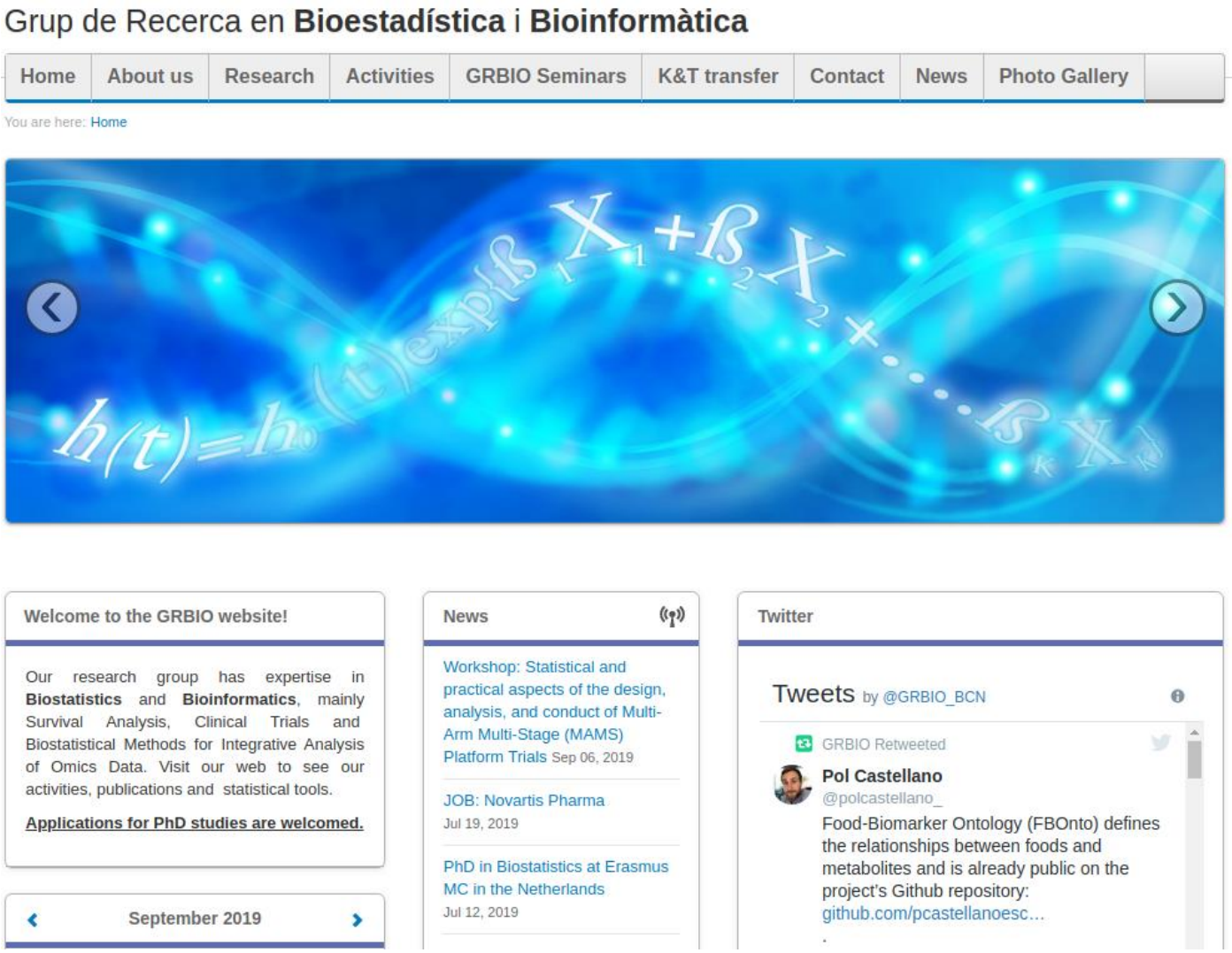

GRBIO

EIO, UPC

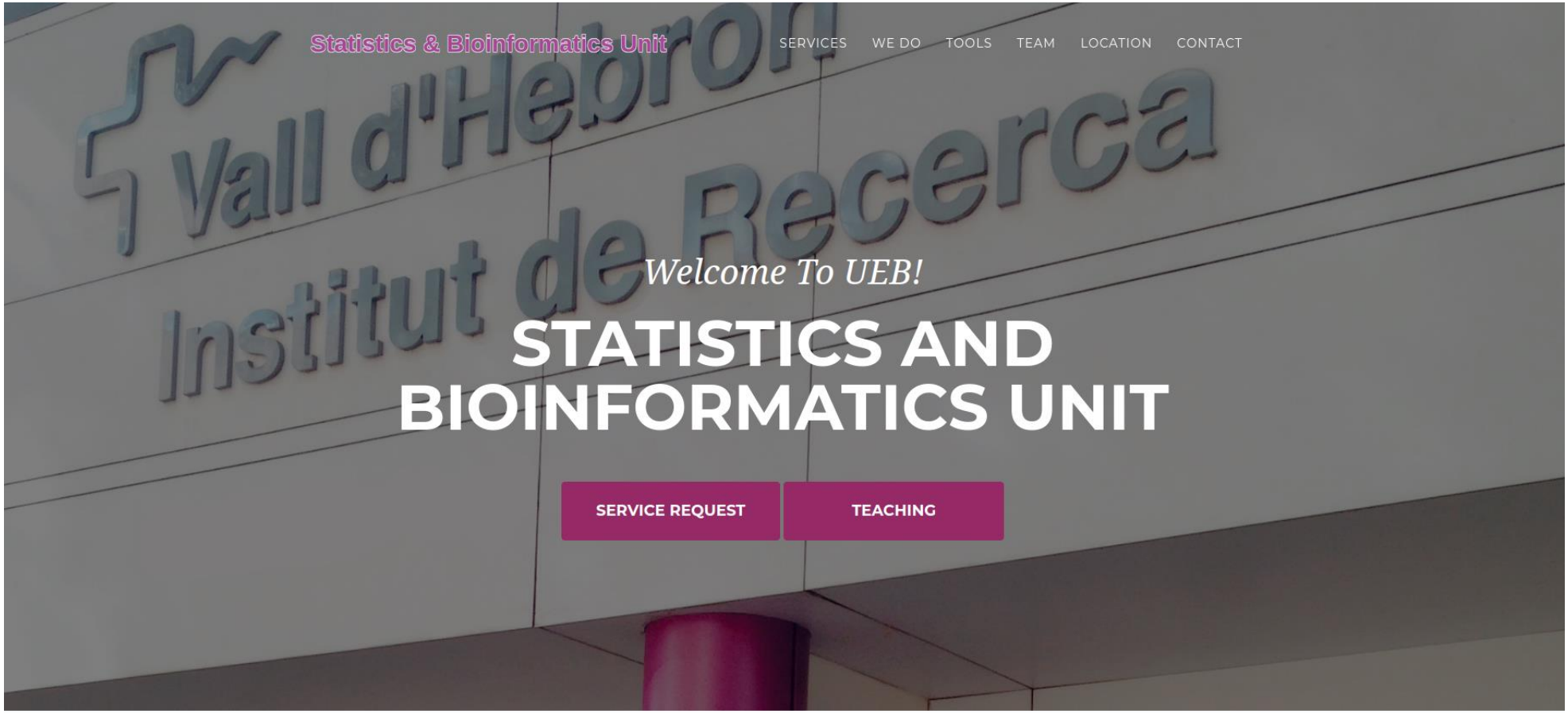
GME, UPC

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 tools range from those that are relatively simple and accessible to more complex sophisticated models.

So what?

- 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 contact us (or other experts) when it makes sense.
  - Learn when to do either 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 (*or was it George Box?)*

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 your 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,

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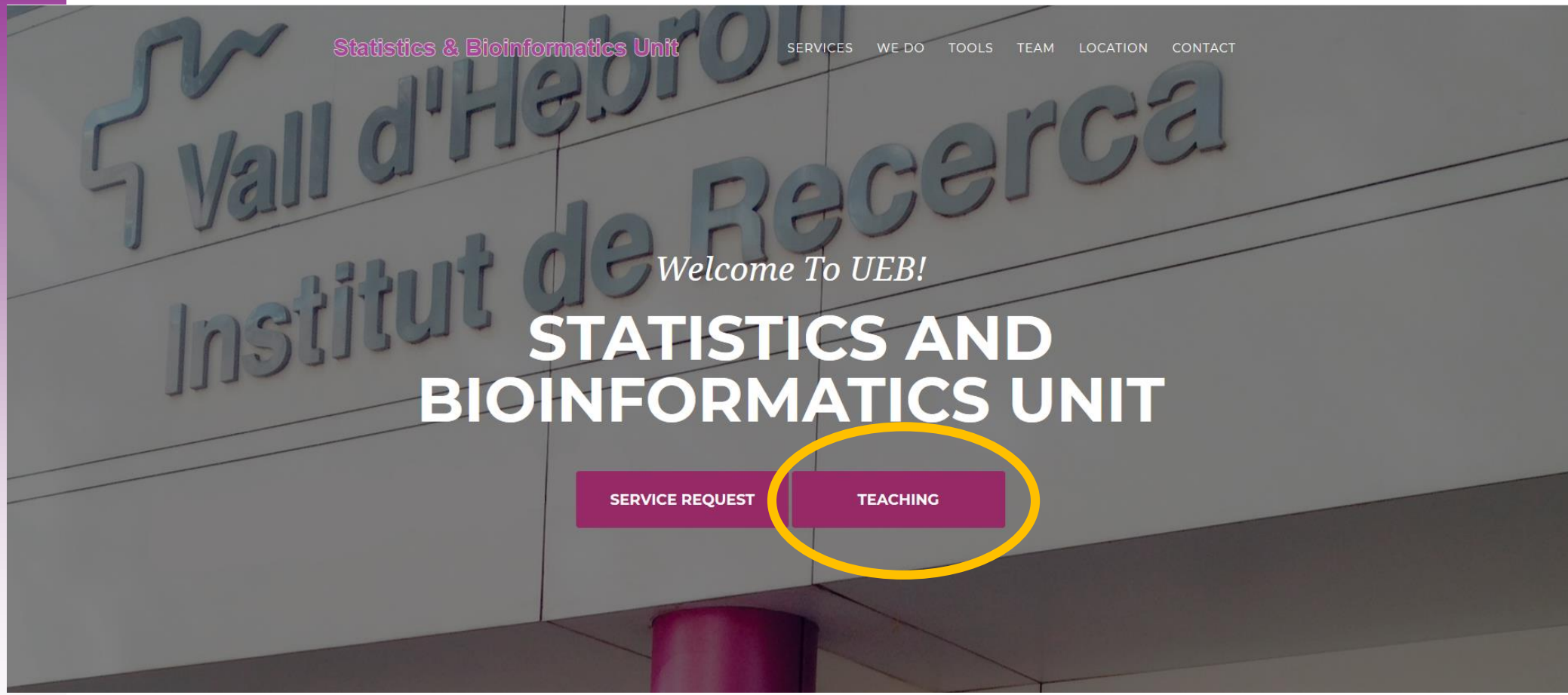
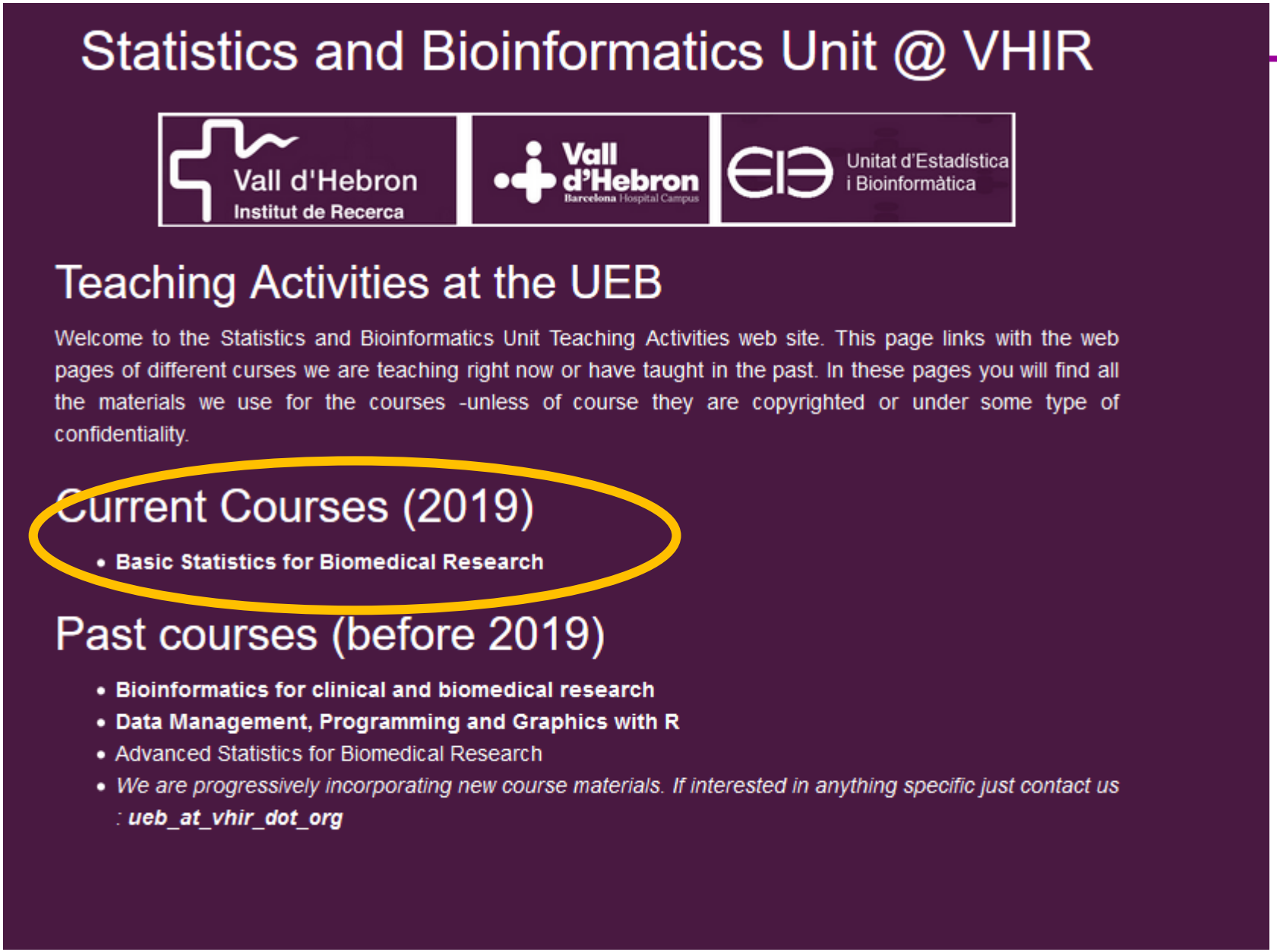
BIOINFORMÀTICA

Course web page



Course web page



Materials del curs

Sessió 0 : Presentació del curs

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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.

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

-

Sessió 5: Disseny i mida mostral..

-

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

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

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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.

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Bases de Dades per exercicis

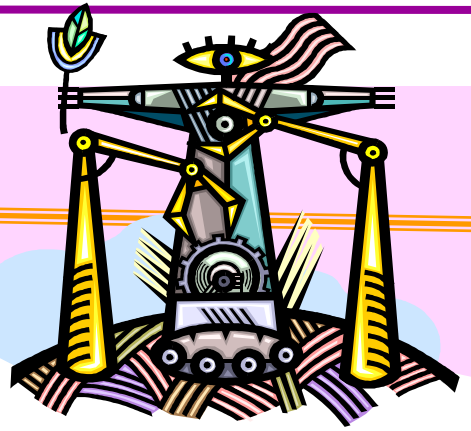
-

Methodology

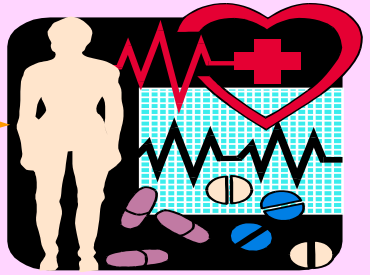
- This course is about applied statistics
- We work with real data examples
- Data analysis with **R** and **R commander.**
- Theory is important , but discussion of real problems is what leads to understanding.
- Program is flexible and may be adapted to your needs.

The statistical (scientifical?) process

Nature

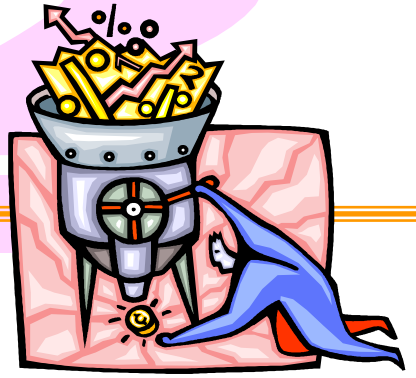


generates ...

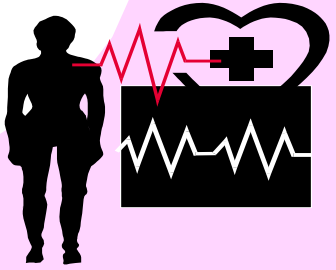


Real data

"Studied nature"



Statistical methods

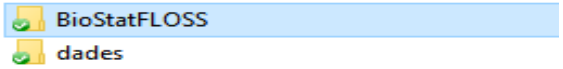


Observed data

Statistical approaches

Goal		*Statistics*
Descript	⟺	Estimation *Summary measures, Graphics, Confidence Intervals*
Compare	⟺	Hypothesis testing
Relate or predict	⟺	Modelling or Regression

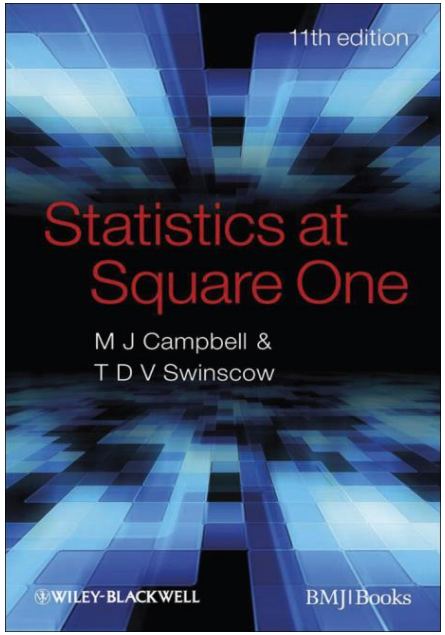
Materials

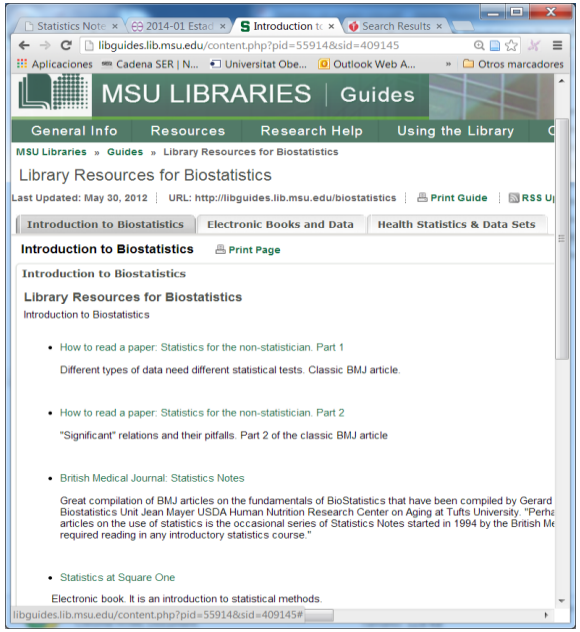

BioStatFLOSS
dades

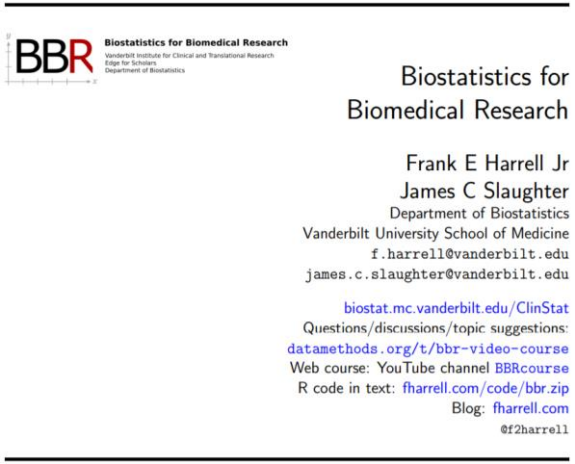

BioStatFLOSS Portable
BioStatFLOSS es un entorno homogéneo de ejecución, bajo Windows, de una recopilación de programas, ya preparados para su uso, de utilidad para la realización de estudios (bioestadísticos, epidemiológicos y de salud en general), investigación biomédica y/o formación bioestadística.
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 statistics
  - Course slides and exercise *datasets*
  - *Free books and other reference materials*







Enjoy the course !!!

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