Program i-Bio Banyuls 2023

<u>Courses (9h-12h)</u>

<u>Practicals (Mon, Tues: 16h-19h: Wed, Thurs, Fri: 13h-16h)</u>
Group 1 : Matteo Dommanget-Kott and Leonardo Demarchi
Data: zebrafish navigation and whole-brain imaging
Group 2 : Tulio Fernandez de Almeida, Mehdi Fallahnezhad, Julien Fournier, Nicolas Gervasi and Gabrielle Girardeau
Data: Extracellular recordings in the rat hippocampus during navigation

Monday

9h-12h: Summer school and participants presentations
- Presentation of the school objectives
- Presentation of the instructors
- Description of the datasets used during the practicals
- 5 minutes per participants to present their current project (part 1)
  10h30-10h45: Coffee break
- 5 minutes per participants to present their current project (part 2)

12h-13h: Lunch

13h-15h45: free time
15h45-16h: Coffee break

16h-19h: Data preprocessing, subsetting and plotting
 Group 1: Zebrafish navigation and whole-brain imaging
 Group 2: Extracellular recordings in the rat hippocampus during navigation

19h30: Dinner

Tuesday

9h-12h: Regression methods and decoding
- Rémi Monasson (theory)
  10h30-10h45: Coffee break
- Brice Bathellier (experimental)

12h-13h: Lunch

13h-15h45: free time

15h45-16h: Coffee break

16h-19h: Practicals
> *Group 1: Correlation and multiple linear regression*
> *Group 2: Place fields, GLMs and model comparison*

19h30: Dinner

Wednesday

9h-12h: Dimensionality reduction and clustering
- Simona Cocco (theory)
  10h30-10h45: Coffee break
- Gabrielle Girardeau (experimental)

12h-13h: Lunch

13h-15h45: Practicals
> *Group 1: KMean, Hierarchical Clustering, PCA, t-SNE(+dangers)*
> *Group 2: Bayesian decoding and PCA/ICA*

15h45-16h: Coffee break
16h-19h30: free time

19h30: Dinner

Thursday

9h-12h: Time series analysis
- Rémi Monasson (theory)
  10h30-10h45: Coffee break
- Georges Debrégeas (experimental)
  > *Unveiling temporal structure in behavioral and neural datasets.*
  > *I will present various implementations of HMM to the analysis of*
  > *behavioral sequences and neural circuits dynamics.*

12h-13h: Lunch

13h-15h45: Practicals

> *Group 1: Markov chains, Hidden Markov Models, (Gaussian Mixture Model)*
> *Group 2: Time frequency analysis, Coherence, Phase coupling between spikes and oscillations*

15h45-16h: Coffee break
16h-19h30: free time

19h30: Dinner

Friday

9h-10h30: Computational modeling of behavioral data

- Benoit Girard

10h30-10h45: Coffee break

10h45-12h: Report preparation

12h-13h: Lunch

13h-15h45: Reporting on practicals and school assessment
15h45-16h: Coffee break

16h-19h30: free time

19h30: Dinner