# Deep learning for biologists

## The course, the instructors, the participants

Filippo Biscarini
*Senior Scientist*
*CNR, Milan (Italy)*

Nelson Nazzicari
*Research fellow*
*CREA, Lodi (Italy)*

# **Welcome to Deep Learning for Biologists!**

- 5 days, from 14:00 to 20:00, two/three breaks per day
- mix of:
    - slides → lectures
    - jupyter notebooks → hands-on sessions
    - do-it-ourselves exercises (collaborative)

- introductory course aimed for:
    - biologists with little data analysis experience who wish to understand what all the fuss about DL is
    - more experienced biologists who wish to apply DL to their own research projects
    - a combination of the above

# Welcome to Deep Learning for Biologists!

- the two instructors will interchange during the 5 days in leading the lectures and practicals: the other will assist you if you have questions or technical problems (slack channels, etc.)
- questions are welcome at all times: don't be shy and ask if something is not clear!
- the do-it-together collaborative exercises will be a chance to practice what we learnt and discuss it together
- the Kahoot quiz will test our knowledge
- at the end of the course, usually doubts remain: if you are interested, next week the instructors will organise a 1.5 hrs Zoom session to answer your questions and discuss your DL projects

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- What is Deep Learning?
- The black box: a neural network for image recognition
- The building blocks of deep learning
- From logistic regression to neural networks: the not-so-black box
- Cross-validation and performance measures
- More building blocks: advanced stuff
- Convolutional neural networks
- Deep learning models for biological classification problems
- Transfer learning
- Deep learning for regression problems
- Recurrent Neural Networks
- Image segmentation

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detailed timetable here

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- This is the **second edition** of the course: some aspects still need to be fine tuned
- Your feedback will be particularly important: during the course, during the wrap-up discussion on Friday, or when we meet again next week for an aftermath discussion

# Filippo in a slide

- **Roma** (*born*)
- **Perugia** (*MSc degree*)
- **Cork, ICBF** (*Web-design & Database*)
- **Cremona, ANAFI** (*Quantitative Genetics*)
- **Guelph, CGIL** (*Visiting Scientist*)
- **Wageningen, WUR** (*PhD*)
- **Göttingen University** (*post-doctoral researcher*)
- **Lodi, PTP** (*'omics in animals, plants, humans*)
- **Milan - CNR** (*tenured researcher*)
- **Cardiff University** (*biostatistician*)
- **Milan - CNR** (*senior researcher*)
- **Bruxelles - ERC** (*seconded national expert*)

# Nelson in a slide

- **Tortona** (*born*)
- **Pavia** (*MSc computer engineering, PhD*)
- **Fairfax, GMU** (*informatics security*)
- **Lodi, PTP** (*database, biostatistician*)
- **Lodi**, **CREA** (*tenured researcher*)

# The participants

So, what about you?