Crash course in deep learning

GIOVANNI VOLPE & CARLO MANZO

January 19, 2026 to September 15, 2026
10:00 to 17:00
Mir-Puig Seminar Room (MPSMR) (MP210)

The trainers will start by introducing basic dense neural networks and backpropagation?to progressively move toward deep learning using the standard neural network packages such as TensorFlow/Keras and PyTorch

They will describe several advanced deep-learning architectures for?different tasks, ith applications to real case studie

Dates: January 19, 20, 21 // April 27, 28 // June 1, 2 // September 14, 15
Hour: 10-13h to 15-17h
Place: Mir-Puig Seminar Room (MPSMR) (MP210)
Target Group: ICFO researchers?

Schedule:

- **Day 1**: Neural Networks?for Classification?
- **Day 2**: Neural Networks for Regression?
- **Day 3**: Convolutional Neural Networks?
- **Day 4**: Encoders-Decoders?
- **Day 5**: U-Net?

- **Day 6**: Recurrent Neural Networks, Attention and Transformers
? - **Day 7**: Graph Neural Networks?
- **Day 8**: Generative Adversarial Networks?
- **Day 9**: Diffusion Models?

Trainers: ?

Prof. Giovanni Volpe (University of Gothenburg):

Giovanni Volpe is a Full Professor at the Physics Department of the University of Gothenburg University, where he leads the Soft Matter Lab (http://softmatterlab.org) - and an ICFO alumnus. His research interests include soft matter, optical trapping and manipulation statistical mechanics, brain connectivity, and machine learning. He has authored more tha 100 articles and reviews on soft matter, statistical physics, optics, physics of comple systems, brain network analysis, and machine learning. He co-authored the books "Optica Tweezers: Principles and Applications" (Cambridge University Press, 2015) and i¿½Simulat on of Complex Systemsi¿½ (IOP Press, 2021). He has developed several software package for optical tweezers (OTS - Optical Tweezers Software), brain connectivity (BRAPH-Brain Ana ysis Using Graph Theory), and microscopy enhanced by deep learning (DeepTra

Prof. Carlo Manzo (University of Vic):

Carlo Manzo is an Associate Professor at the Universitat de Vic (UVic-UCC), where he lea s the Quantitative BioImaging lab (https://mon.uvic.cat/qubilab/). His research aim at providing a quantitative view of biophysical processes through the combinat on of single-molecule microscopy, machine learning, and statistical mechanics. He authore more than 50 articles in optics, biophysics, machine learning, and cell biology. He is the org nizer of the Anomalous Diffusion challenge (AnDi, www.andi-challenge.org).

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