COURSE: Machine Learning for Microscopy

GIOVANNI VOLPE and CARLO MANZO

February 20, 2023 to February 24, 2023
09:30 to 14:30
Seminar Room

The trainers will start by introducing basic dense neural networks and backpropagation t progressively move toward deep learning using the standard neural network packages suc as TensorFlow/Keras and PyTorch.
They will describe several advanced deep-learning architectures for different tasks, wit applications to real case studies

Target group: ICFO research
Available places: 12
Training content:

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

Trainers:

Prof. Giovanni Volpe

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 ICF alumnus. His research interests include soft matter, optical trapping and manipulation statistical mechanics, brain connectivity, and machine learning. He has authored more th n 100 articles and reviews on soft matter, statistical physics, optics, physics of comp ex systems, brain network analysis, and machine learning. He co-authored the bo ks "Optical Tweezers: Principles and Applications" (Cambridge University Press, 2015) and i¿½Simulation of Complex Systemsi¿½ (IOP Press, 2021). He has developed several software packages for optical tweezers (OTS - Optical Tweezers Softwar), brain connectivity (BRAPH-Brain Analysis Using Graph Theory), and microscopy enhanc d by deep learning (D

Prof. Carlo Manzo

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

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