

## Hands on Master Class in modern neural network programming

**27/11 – 06/12/2024**

We are happy to announce an 8-day hands on master class in coding neural networks **by Prof. Giovanni Volpe**.

**Speaker : Giovanni Volpe is Professor at the Physics Department at the University of Gothenburg** (Gothenburg, Sweden), where he has been leading the Soft Matter Lab since 2016 with an interdisciplinary research program that combines soft condensed matter, optical manipulation, nanotechnology, and machine learning. He is a co-founder of the startup companies Lucero Bio and IFLAI. More information can be found here: <https://softmatterlab.org/>

The course closely follows the book authored by Prof. Volpe and others, which in a pre-publication version can be seen here: <https://nostarch.com/deep-learning-crash-course>. Classes will be very hands on, i.e. including realtime coding of examples and exercises in Python using the PyTorch package.

### Course progress:

The class is targeting PhD student, postdocs, PIs, technicians and engineers.

**In person participation limited to 50 /** or the event will be streamed live, contact [daniel.brunner@femto-st.fr](mailto:daniel.brunner@femto-st.fr) for access to the stream.

### The principle content and outline if is:

1. AI basics
2. Convolutional neural networks for image applications
3. Auto encoders
4. The UNet architecture
5. Recurrent neural networks fort temporal sequence processing
6. Attention networks (e.g. transformers)
7. Generative adversarial networks
8. Diffusion models

### Requirements:

- Basic knowledge of the Python programming language.
- Python installed on your computer
- PyTorch package installed
- Some basic knowledge of PyTorch is recommended, this first days of the course are intense.
- Google Colab: Some of the models that we will code during the course are computationally heavy. For those who do not have GPU acceleration at hand, we recommend using free available computing resources via <https://colab.research.google.com/>. How to run PyTorch using Colab can be found here: <https://pytorch.org/tutorials/beginner/colab.html>

Registration required : [www.femto-st.fr](http://www.femto-st.fr)

Location: 1<sup>st</sup> week: AMPHI-B, UFR ST, campus la Bouloie.

2<sup>nd</sup> week: FEMTO-ST, TEMIS, 15B Avenue des Montboucons, room RDC-ACC-07&08

### Schedule:

Date	09:30 - 12	15:00 – 17:30	Location
Wednesday, 25/11/24	AI basics (ch 1) + Project 1 (just outline)	AI basics (ch 2) + Project 2 (just outline)	AMPHI-B, UFR ST, Campus la Bouloie
Thursday, 25/11/24	CNN (ch 3)	Project 3a	
Friday, 25/11/24	AE (ch 4) + Project 4a (VAE)	Unet (Ch 5)	
Monday, 02/12/24	Coding & questions	RNN (Ch 7)	TEMIS, RDC-ACC-07&08
Tuesday, 03/12/24	Project 7a	ATN (Ch 8)	
Wednesday, 04/12/24	Coding & questions	Project 8a	
Thursday, 05/12/24	GANs (Ch 9) + Project 9a	Diffusion Models (Ch 10) + Project 10a	
Friday, 06/12/24	Coding & questions	DeepDreams and Neural Style Transfer (Projects 3c and 3d)	