

# Matteo Ceradini

AI engineer | Computer Scientist



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## About me

I am an Italian **computer scientist** currently completing a PhD in Biorobotics at the Sant'Anna School of Advanced Studies. My research focuses on **Brain-Computer Interface (BCI)** and **neuroengineering**, where I apply advanced **deep learning** and **machine learning** techniques—including transformer-based architectures—for neural signal processing and decoding.

I am an aspiring **AI engineer** seeking to apply strong theoretical and practical expertise in deep learning and neural data analysis gained through **academic**, **research**, and **industry experience**.

## Tech stack

Python - Advanced	C# - Intermediate	Tensorflow - Basic
Pytorch - Advanced	C++ - Intermediate	Docker - Basic
Matlab - Advanced	Unity 3D - Intermediate	MongoDB - Basic
GitHub - Advanced		NodeJS - Basic
PhP - Advanced		ReactJS - Basic

## Major skills

**AI Engineering**  
deep learning & transformers

**AI driven neural engineering**  
deep learning & machine learning

**Electrophysiological data analysis**  
like EEG and EMG

## Education

- **PhD in Biorobotics** – Sant'Anna School of Advanced Studies Sep 2021 – estimate Dec 2025  
**Main research topics:**
  - non-invasive Brain and Body Machine Interfaces (BMI) using EEG and EMG for neuroprosthetics applications
  - development of immersive virtual reality environments to train and evaluate different control strategies for BMI applications targeting individuals with spinal cord injury
- **Master of Computer Science** (spec. Artificial Intelligence) – University of Torino Oct 2018 – Apr 2021  
**Grade:** 110/110 with honors and distinction  
**Thesis:** Porting of DeepLabCut, a neural network for animal pose estimation, to an embedded system for real-time acquisition
- **Bachelor of Computer Science** – University of Padova Oct 2015 – Sep 2018  
**Grade:** 110/110 with honors and distinction  
**Thesis:** Spam email classification using neural networks

## Experiences

**PhD in Biorobotics** – Sant'Anna School of Advanced Studies  
Oct 2021 – Oct 2025

Worked on the development of **Brain and Body Machine Interfaces for neuroprosthetic applications** in individuals with spinal cord injury, **combining neural signal decoding with online feedback systems**. Main activities included:

- Online decoding of upper-limb movement intentions from EEG signals.
- Online decoding of grasp patterns and individual finger movements from EMG signals recorded in SCI patients.
- Designed an immersive VR protocol to test and compare BMI strategies in clinical settings.

**Visiting PhD Biomedical engineering** – University of Michigan  
Jul 2024 – Feb 2025

Visiting research period in the Chestek Lab, focused on the development of Brain and Body Machine Interfaces using **implantable signals from non-human primates**.

Main activities included online **decoding of individual fingers movements** from implanted EMG signal and **evaluation and explainability of Transformer networks** for EMG-based decoding.

## Skills learned

- - Neural signal analysis
- Design and training of deep learning models
- Neural signal analysis and decoding
- Development of serious games using immersive virtual reality
- Scientific communication (verbal and written)
- Project planning and time management
- - Deep understanding of Transformers networks and other deep learning models
- Hands on experience working with non-human primates
- Exposure to collaborative research in an international, high impact US laboratory

Experiences

AI engineer – Cynexo & SISSA  
May 2021 – Sep 2021

In collaboration with the Time Perception Lab at SISSA research center, I contributed to two main projects. The first involved **implementing DeeplabCut for real-time tracking** and behavioral tracking of mice in neuroscientific experiments. The second focused on **developing a proof-of-concept closed-loop system integrating deep learning models** for real-time EEG signal decoding and Transcranial Magnetic Stimulation (TMS) control.

AI engineer intern – Cynexo & SISSA  
Sep 2020 – Mar 2021

In this period I conducted my master’s thesis in collaboration with the startup Cynexo and the Visual Neuroscience Lab at SISSA, focusing on **porting of the DeeplabCut neural network for animal pose estimation to an embedded platform**. I explored and implemented various deployment strategies to optimize performance and developed a real-time application for pose extraction from live video.  
[Thesis available here:bit.ly/39LngwC]

AI engineer intern – Zextras  
Jul 2018 – Ago 2018

Two-month internship at Zextras during my bachelor’s thesis. I conducted research to test the effectiveness of a **spam filter using deep learning**, successfully implementing a functioning prototype with high accurate rate in spam detection.

Web developer – Tecnobit  
Jun 2016 – Sep 2020

From 2016 to 2020, while completing my bachelor’s and master’s degrees, I worked part-time as a **full-stack web developer**. My responsibilities included both front-end and back-end tasks, using PHP frameworks such as Codeigniter and Laravel. During this time, I maintained and developed websites such as sketchupitalia.it, corsigeometri.it, topgeometri.it, and others.

Other experiences

Summer internships  
Jun-Sep 2013 and Jun-Sep 2014

Summer internships at Margraf Project and Industrie Metalpress (2013–2014). At Margraf, I worked as a marble operator on polishing and finishing tasks. At Metalpress, I worked on the company intranet and developed a C#/.NET application for network activity monitoring via SNMP.

Publications

The Effect of User Learning for Online EEG Decoding of Upper-Limb Movement Intention

Ceradini et. al. 2025  
IEEE Transactions on Medical Robotics and Bionics

A Virtual Reality-Based Protocol to Determine the Preferred Control Strategy for Hand Neuroprostheses in People With Paralysis

Losanno\*, Ceradini\* et. al. 2024 (\* equally contributing)  
IEEE Transactions on Neural Systems and Rehabilitation Engineering

Immersive VR for upper-extremity rehabilitation in patients with neurological disorders: a scoping review

Ceradini et. al. 2024  
Journal of NeuroEngineering and Rehabilitation

Skills learned

- Neural signal analysis and decoding with deep learning
- Integration of AI models into neuroscience pipelines
- Containerized deployment of applications using Docker
- Animal pose estimation using deep learning models
- Deployment of deep learning models on an embedded system
- Technical communication and collaboration with industry and academic partners
- Deep learning models design
- Natural Language Processing for deep learning applications
- Front-end web design and implementation
- Back-end development and relational database integration
- Independent project management and development
- Clients communication and requirements gathering

Languages

Italian – Native  
English – Fluent (C1 level)

Awards & Fellowships

Best paper presented by a young researcher  
IEEE MetroXRaine 2023 Conference

Zegna Scholarship Fellowship  
Recipient of the Zegna Scholarship, funding an 8-month research stay at the University of Michigan on Brain and Body Machine Interfaces using implantable signals for neuroprosthetic applications.