# Federico Calesella

GitHub | Google Scholar | Personal Website

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## SUMMARY

I am a data analyst in the field of computational cognitive neuroscience specialized in applying machine learning to biomedical and healthcare data. With over five years of experience, I have developed predictive models for clinical and behavioral outcomes, diagnosis identification, and treatment response. My technical proficiency spans Python, MATLAB, and R, with expertise in machine learning libraries like Scikit-learn, PyTorch, and Keras. Outside my technical work, I am passionate about translating complex data into actionable insights.

## KEY SKILLS

**Data Analysis & Machine Learning**
Expertise in developing predictive models, data preprocessing, feature engineering, and validation techniques.

**Programming & Tools**
Proficient in Python (Pandas, NumPy, Scikit-learn, PyTorch, Keras), R, MATLAB, and visualization libraries like Matplotlib.

**Statistical Analysis**
Experience in statistical modeling, hypothesis testing, and analysis of large, complex datasets.

**High-Performance Computing**
Skilled in leveraging HPC resources for large-scale computations, parallel processing, and optimizing workflows.

**Project Management**
Skilled in leading multidisciplinary teams, managing timelines, and delivering results in collaborative environments.

**Communication**
Strong ability to convey complex concepts to diverse audiences through written reports, presentations, and team interactions.

## EXPERIENCE

**Postdoctoral researcher**                                      Oct 2024 – Present
*Padova Neuroscience Center, University of Padova*                *Padova, Italy*

- Designed and implemented machine learning and deep learning models to predict behavioral outcomes in neurological populations.
- Collaborated with an interdisciplinary team of psychologists, neuroscientists, physicists, and engineers to deliver impactful research projects.
- Translated complex neuroscience problems into data-driven solutions using cutting-edge analytical techniques.

**Postdoctoral researcher**                                      Oct 2023 – Oct 2024
*Psychiatry and Clinical Psychobiology Unit, Division of Neuroscience, IRCCS San Raffaele Hospital*      *Milan, Italy*

- Developed machine learning models to predict behavioral patterns and clinical outcomes in psychiatric populations.
- Led interdisciplinary teams, managing timelines, delegating tasks, and ensuring successful project completion.
- Authored scientific papers and drafted reports and funding proposals.

## EDUCATION

**PhD – Cognitive Neuroscience**                                 Oct 2020 – Oct 2023
*Psychiatry and Clinical Psychobiology Unit, Vita Salute S. Raffaele University*      *Milan, Italy*

- Leveraged inferential statistics and machine learning techniques to analyze large multimodal biomedical datasets.
- Authored scientific papers and presented findings at international conferences.

**Vita Salute San Raffaele University**                          Milan, Italy
*Master's degree – Psychology, Cognitive Neuroscience*           *Sep 2016 – Feb 2019*

**Vita Salute San Raffaele University**                          Milan, Italy
*Bachelor's degree – Psychological Science and Techniques*       *Sep 2013 – Sep 2016*

## Projects

**Predicting Neuropsychological Deficits in Stroke Patients**    *Publication*    Source code
Developed a machine learning pipeline to predict neuropsychological deficits from resting-state functional connectivity data of stroke patients, optimizing feature extraction techniques for improved classification performance.

**Biomarkers for Suicide Risk Prediction in Bipolar Depression**    *Publication*    Source code
Created a machine learning model to identify depressed bipolar patients with a history of suicide attempts with 94% of accuracy by analyzing brain habituation patterns. Developed a Python package for brain-wise habituation analysis from fMRI data.

**Differentiation of Major Depressive and Bipolar Disorder Patients**    *Publication*    Source code
Developed classification models achieving 80% accuracy in differentiating major depression and bipolar disorder patients using multimodal datasets, including clinical, neuroimaging, and genetic markers.

**Machine Learning for Post-partum Depression Risk Prediction**    *EU Horizon project*    Results under embargo
Planned and conducted machine learning analysis on very large datasets of clinical health records (>500.000 patients) to predict the risk of postpartum depression, contributing to the development of a large-scale digital-health tool.

**Identification of Depressed Patients with Cognitive Deficits**    *Publication*
Applied machine learning techniques on peripheral inflammatory markers to identify cognitive impairments in depressed patients, achieving a performance between 76% and 89% for different cognitive domains.

## Professional Development

- Computational Psychiatry Course 2022, Translational Neuromodeling Unit, University of Zurich & ETH Zurich, 12-16 September 2022

- Neural Networks and Deep Learning, Dr. Alberto Testolin, University of Padova, 2019-2020

- Practical Course to Machine Learning in R, Luca Naso, Udemy, 2019

- Python for Computer Vision with OpenCV and Deep Learning, Jose Portilla, Udemy, 2019

## Languages

- English: C1 Level (IELTS 7.5)

- Italian: Native

## Additional information

**Publications**
Published multiple peer-reviewed articles on machine learning applications (h-index: 10).

**Awards**
Awarded three times "Excellence Award" at international conferences for research contributions.

**Teaching Activity**
Teaching assistant for courses about the application of machine learning techniques in neuroscience.

**Supervision Activity**
Supervised master theses and post-graduate trainees, guiding students through their research projects until completion.