



# Lluís Borrás Ferris

## Biomedical Engineer | ML/DL/AI Engineer

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Biomedical Engineer with a robust background in deep learning and machine learning, specializing in medical imaging analysis and computer vision. Passionate about leveraging biomedical engineering expertise to analyze and interpret medical data. Over the past few years, I have improved my programming skills in Python, PyTorch, and TensorFlow, developing advanced algorithms for classification and segmentation for medical data analysis and computer vision. I containerize my algorithms to ensure portability with Docker.

## RELEVANT EXPERIENCE

### Researcher Assistant | Hes-SO Valais Wallis (Sierre, Switzerland)

09/2023 - Present

- HEREDITARY project:
  - Conducting research focused on leveraging genomic data to study Amyotrophic Lateral Sclerosis (ALS) and Multiple Sclerosis (MS) using Deep learning algorithms based on self-supervision learning mainly transformed-based models.
  - Finetuning the LLMs models (DNABert, HyenaDNA, Nucleotide Transformer) from Hugging Face to work on ALS data.
  - Searching and applying to obtain access to different public genomic datasets (AnswerALS and ProjectMine).
  - Supervising a bachelor's student in their thesis to continue the work I performed during my research internship.
- ITher project:
  - Utilized Hololens 2 for 3D reconstruction and instance segmentation of scenes, enhancing spatial data analysis.
  - Extracted Pointcloud and Mesh data from video and depth recordings using a modified hl2ss ([GitHub repository](#)).
  - Implemented a customized Mask3D ([Github repository](#)) to perform the 3D semantic instance segmentation of the recorded Pointcloud or Mesh using the Hololens 2 VR.
  - Containerized both algorithms to ensure portability and isolation across different systems using Docker Engine.

### Research Internship | Hes-SO Valais Wallis (Sierre, Switzerland)

01/2023 - 07/2023

- Developed Python scripts to automate experiments and data visualization processes.
- Employed self-supervision (MoCo v2) to pre-train a model on Whole Slide Images (digital biopsies) of the lung.
- Trained the pre-trained model using Multiple Instance Learning to classify four different lung cancer subtypes.
- Presented findings at the SPIE Medical Imaging 2024 conference in San Diego. ([GitHub repository](#)) ([Proceeding paper](#))
- Containerized the hlung model for portability, producing lung cancer predictions and visual heatmaps to illustrate model focus areas using Docker.

### Personal sabbatical | Ireland and Australia

10/2017 - 03/2020

- Worked as a chef in Ireland and Australia for two and a half years to broaden life experiences, explore different cultures, and enhance my English language skills.
- Continued collaborating with my bachelor's thesis supervisor, David Moratal, resulting in the publication: [Link-level functional connectivity neuroalterations in autism spectrum disorder: A developmental resting-state fMRI study](#).

## EDUCATION

### Master's Degree in Medical Imaging and Applications (MAIA) (European Erasmus Mundus Grant) | 2021 - 2023

Universitat de Girona (Spain), University of Burgundy (France) and UNICAS (Italy). Overall qualification: **9.25/10**

- Specialized in Image Analysis and Computer Vision using Artificial Intelligence, with a focus on Deep Learning and Machine Learning methods aimed at developing Computer-Aided Diagnosis (CAD) systems.
- Developed several academic projects, demonstrating expertise in medical image analysis. The main projects with Github repository can be found at [CAnDy\\_SkinLesion](#), [chest\\_ct\\_registration](#), [BrainTissueSegmentation\\_IBSR18](#).
- Research Internship at the Hes-SO Valais Wallis to develop my master's thesis.

### Bachelor's degree in Biomedical Engineering | 2013 - 2017

Universitat Politècnica de València (UPV). Overall qualification: **7.10/10**

## TECHNICAL SKILLS

- **Programming Languages:** Python, Bash, LaTeX, Matlab, SQL
- **Platforms and Tools:** Linux, Windows, Docker, Git
- **ML/DL Frameworks:** PyTorch, Hugging Face, TensorFlow, Scikit-learn, Albumentations, Monai, WandB
- **Image Analysis and Computer Vision Libraries:** OpenCV, Open3D, Openslides, SimpleITK, Scikit-image, QuPath
- **Data Analysis Libraries:** NumPy, SciPy, Pandas, Multiprocessing

## LANGUAGE PROFICIENCY

- **Spanish:** Native
- **Catalan:** Native
- **English:** Professional Competence (C1 level, APTIS)
- **Italian:** Intermediate
- **French:** Beginner