

ALESSIA SAPORITA

Curriculum Vitae

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Personal Information



Alessia Saporita

PhD Candidate in Data Science and Computation

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Place of birth: Modena, Italy

Date of birth: 1 December 2000

Education

PhD in Data Science and Computation

Nov. 2024–expected 2027

Department of Electrical, Electronic, and Information Engineering, University of Bologna

Supervisors: Prof. Andrea Acquaviva and Prof. Elisa Ficarra

Master's Degree in Computer Engineering

July 2024

University of Modena and Reggio Emilia

Final grade: 110/110 cum laude

Master's thesis: *"Tackling Unseen Modalities in Vision and Language via Feature Projection"*

Advisors: Prof. Lorenzo Baraldi and Dr. Vittorio Pipoli

Bachelor's Degree in Computer Engineering

July 2022

University of Modena and Reggio Emilia

Final grade: 109/110

Bachelor's thesis: *"Convolutional Neural Networks and Explainability Techniques for Image Classification"*

Research Experience

Research Fellow in Multimodal Learning

Sep.–Oct. 2024

Department of Engineering "Enzo Ferrari", University of Modena and Reggio Emilia

Developed multimodal large language models designed to operate robustly when one or more input modalities are unavailable.

Research Intern in Multimodal Learning

Dec. 2023–May 2024

Department of Engineering "Enzo Ferrari", University of Modena and Reggio Emilia

Developed multimodal foundation models for vision-and-language tasks involving missing and previously unseen modalities.

Research Intern in Computer Vision

Mar.–June 2022

Department of Engineering "Enzo Ferrari", University of Modena and Reggio Emilia

Developed convolutional neural networks for image classification and applied explainability methods to analyze model predictions.

Publications

PathoClass-BRCA: Reframing Pathology Report Generation as Guideline-Aligned Multi-Task Classification

Alessia Saporita, Vittorio Pipoli, Federico Bolelli, Andrea Acquaviva, Elisa Ficarra.
British Machine Vision Conference (BMVC), 2026.

FG-TRACER: Tracing Information Flow in Multimodal Large Language Models in Free-Form Generation

Alessia Saporita, Vittorio Pipoli, Federico Bolelli, Lorenzo Baraldi, Andrea Acquaviva, Elisa Ficarra.
IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), 2026.
Paper Code

MissRAG: Addressing the Missing Modality Challenge in Multimodal Large Language Models

Alessia Saporita, Vittorio Pipoli, Federico Bolelli, Lorenzo Baraldi, Costantino Grana, Rita Cucchiara, Elisa Ficarra.
IEEE/CVF International Conference on Computer Vision (ICCV), 2025.
Paper Code

IM-Fuse: A Mamba-Based Fusion Block for Brain Tumor Segmentation with Incomplete Modalities

Alessia Saporita, Vittorio Pipoli, Kevin Marchesini, Costantino Grana, Elisa Ficarra, Federico Bolelli.
International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI), 2025.
Paper Code

Tracing Information Flow in LLaMA Vision: A Step Toward Multimodal Understanding

Alessia Saporita, Vittorio Pipoli, Federico Bolelli, Lorenzo Baraldi, Andrea Acquaviva, Elisa Ficarra.
International Conference on Computer Analysis of Images and Patterns (CAIP), 2025.
Paper Code

Manuscripts Under Review

A Systematic Review of Multimodal MRI Brain Tumor Segmentation under Missing Modalities: Benchmarking with MiMoSe

Alessia Saporita, Kevin Marchesini, Omar Carpentiero, Vittorio Pipoli, Andrea Acquaviva, Elisa Ficarra, Costantino Grana, Federico Bolelli.

Ongoing Research Activities

Multimodal Integration of Spatial and Single-Cell Omics *March 2026–Present* Development of deep learning methodologies for the integration of spatial and non-spatial omic data in cancer research. The project aims to characterize cell-type composition and spatial and molecular tumor heterogeneity through the integration of complementary omic data, while mitigating batch effects and inter-sample technical variability to ensure robust analysis across heterogeneous biological samples and datasets. Conducted in collaboration with the *Laboratory of Multi-omic Integrative Bioinformatics*, KU Leuven, Leuven, Belgium.

Research Topics

Multimodal Learning for Biomedical Data Integration

Jan. 2024–Present

Development of multimodal architectures for integrating heterogeneous biomedical data, including histopathology, radiological imaging, and clinical text. Applications include multimodal brain tumor segmentation and pathology report generation.

Robust Multimodal Learning under Missing Modalities

May 2024–Present

Development of multimodal learning frameworks that remain robust when one or more input modalities are unavailable during training or inference. Applications include vision-language and audio-video-language understanding under missing modalities, as well as brain tumor segmentation from incomplete multimodal imaging.

Multi-Omics Integration

March. 2026–Present

Development of deep learning methods for integrating complementary omic modalities, with a focus on bridging spatial and non-spatial measurements to characterize tumor heterogeneity.

Explainable Artificial Intelligence

Mar. 2025–Present

Development of methods for interpreting multimodal models, with a focus on tracing cross-modal information flow and understanding how multimodal large language models integrate different modalities during generation.

Other Research Projects

A New Approach to Image Generation in Fashion Using Natural Language

Developed a system that retrieves a textual representation of a garment and uses it to synthesize an image of a model wearing it. Code

MCAT-HViT

Developed a weakly supervised multimodal framework combining whole-slide histopathology images and gene-expression data for survival prediction. Code

Harvest Easy

Designed a smart waste management system to predict bin filling levels, optimize waste collection routes, and monitor bin status in real time through an interactive city map. Code

Languages

Italian	Native
English	B2, Cambridge First Certificate

Technical and Soft Skills

Programming Languages: Python, C/C++, SQL

Tools and Frameworks: PyTorch, Git, LaTeX

Biomedical Data: MRI, whole-slide images, spatial transcriptomics, single-cell RNA sequencing, clinical reports

Other Data Modalities: Video, audio, natural images, and textual data

Soft Skills: Problem solving, teamwork, adaptability, communication