



# Francesco Palandra

Nationality: Italian

## WORK EXPERIENCE

---

### Junior Researcher

**Sapienza University of Rome** [ 20/01/2024 – Current ]

City: Rome | Country: Italy

I am currently working on two different research projects inside my university:

- **'GS-Edit'**, a standout project with the collaboration of Professor Emanuele Rodolà and Geometry, Learning and Applied AI (GLADIA) Lab, leverages Gaussian Splatting for 3D object editing, blending image and text conditioning in a novel way. This work was submitted to ECCV 2024.
- As a winner of the honorable program, under the supervision of Professor Indro Spinelli, I joined the Perception and Intelligence Laboratory (PINLab) in a Virtual Human project aiming to generate natural human pose sequences from a prompt.

### App developer

**Sapienza University of Rome** [ 20/05/2022 – 31/03/2024 ]

City: Rome | Country: Italy

#### Project Description:

As part of a team of three, I developed a model utilizing Bluetooth Low Energy technology to predict the specific vehicle in which the user is located. This model was designed with the primary aim of improving the efficiency of the smart parking system, and it will be integrated into a smart parking application made by the Gamification Lab at the Department of Computer Science at the University of Rome La Sapienza. An application has been designed and developed by me in Swift to illustrate the various functional components.

#### Recent Developments:

Recently, I transitioned into the lead role for this project, especially as we moved towards patenting our innovative idea. With the project's evolution, our team expanded to include eight master's and bachelor's students. The team developed a new and improved version of the application. This iteration introduced additional functionalities, enhancing user experience and system efficiency.

### Classroom tutor

**Sapienza University of Rome** [ 10/03/2023 – 13/06/2023 ]

Assigned to teach Calculus Unit II, a first-year course in the Computer Science program that covers fundamental concepts of calculus, with a focus on integrals and differential equations. Responsible for instructing both English and Italian version of the course, with a classroom size of 40 students per class. Conducted exercises, addressed questions, and prepared students for their final exams.

### Classroom tutor

**Sapienza University of Rome** [ 20/09/2023 – 31/12/2024 ]

City: Rome | Country: Italy

- Teaching Assistant of Fundamentals of Programming, a first-year course of the Computer Science Bachelor program.
- As a tutor, my role is to assist students when they have doubts or questions, and especially to encourage and motivate them.

## EDUCATION AND TRAINING

---

### Bachelor Degree

**Sapienza University of Rome** [ 21/09/2019 – 20/10/2022 ]

Address: Piazzale Aldo Moro, 5, 00185 Roma (Italy) | Field(s) of study: Computer Science | Final grade: 108/110 | Level in EQF: EQF level 6 | Thesis: Vehicle Type Detection through BLE Device Scans

The main topic covered are Fundamentals of Computer Science and Calculus, Computer Architecture, Algorithms, Data structures, Graphics, Web and Software Architecture, Data Management and Analysis.

### Master Degree

**Sapienza University of Rome** [ 18/09/2022 – Current ]

Address: Piazzale Aldo Moro 5, 00185 Roma (Italy) | Field(s) of study: Computer Science and Artificial Intelligence | Level in EQF: EQF level 7

Data Science, Graphics and Vision, Knowledge Representation and Reasoning, Statistical Theory and Methods, Learning Skills through Case Studies, Artificial Intelligence, Machine Learning, Deep Learning, NLP and Statistical Learning.

GPA: 29.85/30 (4.00)

### Certificate in Challenge in Billion User Cloud Application

**Google, Bertinoro International Center for Informatics** [ 03/09/2023 – 08/09/2023 ]

City: Varenna | Country: Italy | Website: <https://buca23.bici.events/> | Field(s) of study: Cloud Computing ; Computer Science ; Artificial Intelligence ; Data Management

**Theme and Objective:** The summer school was an immersive educational experience centered on the complex challenges and pioneering solutions pertinent to constructing billion-user systems. It aimed to offer a profound understanding of the intricacies involved in developing and managing platforms at a massive scale, with a focus on addressing the unique obstacles that arise in such environments.

#### Expert Instructors:

- **Dan Ardelean:** As the Area Tech Lead for Search Infrastructure and Vice President of Engineering at Google, Dan provided invaluable insights into the technological and managerial aspects of operating large-scale search infrastructures. His lectures delved into the evolution of search algorithms and the importance of scalable architecture in handling vast datasets.
- **Amer Diwan:** Leading the Forensics teams within Search Platforms, Amer, in his role as the Area Tech Lead for Performance and Capacity for Search Infrastructure, shared his expertise in system performance optimization and capacity planning. His sessions were particularly enlightening on the nuances of maintaining efficiency in data-intensive environments.
- **JJ Furman:** The founder and creator of Megastore, JJ Furman introduced us to the conceptualization and implementation of Megastore. His presentation of his groundbreaking paper on Megastore revealed the developmental journey of a system robust enough to support large-scale applications like Gmail and Drive. His insights into overcoming scalability challenges were a highlight of the program.

#### Format:

Mornings were dedicated to intensive learning sessions, where instructors shared their knowledge and experiences through lectures, case studies, and interactive discussions. Afternoons were reserved for hands-on group projects. These projects allowed us to apply the theoretical knowledge gained in practical scenarios, fostering teamwork, problem-solving, and innovation. The summer school emphasized the importance of networking, providing numerous opportunities to connect with professionals and fellow participants.

## LANGUAGE SKILLS

---

**Mother tongue(s):** Italian

## Other language(s):

### English

LISTENING C2 READING C1 WRITING B2

SPOKEN PRODUCTION B2 SPOKEN INTERACTION B2

### French

LISTENING B1 READING B1 WRITING A2

SPOKEN PRODUCTION B1 SPOKEN INTERACTION B1

*Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user*

## DIGITAL SKILLS

---

### Microsoft

Microsoft Word / Microsoft Powerpoint / Microsoft Excel / Microsoft Office

### Programming

Python / Git / Assembly / Deep Learning / PHP / Pandas / CSS / Swift / Jupyter

Notebook / Java / Numpy / SQL / MySQL / OpenCV / React / PyTorch / C++ / SwiftUI / Machine Learning / Linux / Object-Oriented Programming / Matplotlib / C / PostgreSQL / Tensorflow / HTML / R / Javascript / Data Science / Latex / Scikit-Learn / Neural Networks and Deep Learning

### Soft

Creativity / Adaptability / Problem Solving / Time Management / Interpersonal Interaction / Leadership / Teamwork

## HOBBIES AND INTERESTS

---

**Piano** Playing the piano has been my greatest passion for as long as I can remember. Ever since I was a child, I found myself captivated by the enchanting melodies of classical music, especially those performed by orchestras. At the age of 10, I embarked on formal piano lessons with a private instructor who not only taught me the fundamentals of music theory but also instilled in me a deep passion for music. I derive immense pleasure from playing a diverse repertoire, with a particular fondness for the masterpieces of Chopin. Whether it's the dazzling virtuosity or the romance of his compositions, each piece I play resonates deeply within me. However, if I were to choose a personal favorite, it would undoubtedly be Chopin's "Fantaisie-Impromptu." This piece seamlessly blends a thrilling and technically demanding opening with a heartfelt and introspective second movement, creating a captivating musical experience that never fails to move me.

**Drawing** Drawing has always been more than just a hobby for me; it's a quiet passion, something that connects me to my mother, who is an amazing painter. She introduced me to pencil drawing, and though I wouldn't call myself an expert, I've grown to love it.

There's something special about pulling out my sketchbook during a train ride or a long trip. In these moments of calm, I let my pencil wander over the page, capturing fragments of thoughts or scenes that catch my eye. These sketches are my way of unwinding, of embracing a peaceful moment in a busy life.

Most of these drawings remain unfinished, each a snapshot of a particular journey or mood. I often start anew with each trip, leaving a collection of these half-told stories. To me, they're more than just sketches; they're personal memories, each line a quiet reminder of a moment in time.

### Tennis

### Cinema

## PROJECTS

---

[ 01/01/2024 – 28/01/2024 ]

### **MetaFusion - A forgeable NFT Collection** *Blockchain and Distributed Ledger Technologies (MSc) (Best Project)*

- Metafusion is DApp that allows users to generate images harnessing the power of Stable Diffusion. A fully functional website has been developed in SvelteKit that allows users to exchange and forge NFTs.
- A hardhat node simulates the blockchain while an oracle and a tracker create and handle the NFTs creation and exchange.
- **Technical Skills:** Solidity, Svelte, SQLite.
- **Soft Skills:** Leadership, Teamwork, Documentation, Presentation skills, Report writing

[ 10/10/2023 – 10/12/2023 ]

### **GSEdit: Efficient Text-Guided Editing of 3D Objects via Gaussian Splatting** *Deep Learning and Applied Artificial Intelligence (MSc)*

- a novel approach that is capable of editing 3D objects based on image and text conditioning. This unlocks the possibility to edit the style and appearance of 3D objects without altering their main details.
- We tackle the problem by leveraging 2D diffusion models to generate variations and Gaussian Splatting to build the 3D model from those variations.
- **Technical Skills:** Pytorch, Transformers, OpenGL.
- **Soft Skills:** Leadership, Teamwork, Documentation, Presentation skills, Report writing.

[ 15/06/2023 – 05/07/2023 ]

### **Virtual Closet - Smart Mirror** *Human Computer Interaction (MSc) (Best Project)*

- In collaboration with a team of four, we engineered a 'smart mirror,' a virtual fitting room where users can virtually try on clothes. The interface was constructed utilizing fundamental HTML/CSS programming, augmented with MediaPipe to track facial and hand landmarks. This integration enabled user interaction with the mirror via hand gestures. Since the objective was to project only clothes and accessories onto the mirror, sans user image, we had to develop a proprietary positional system from the ground up. This system, built with three.js, allowed for the clothing to rotate synchronously with the user.
- **Technical Skills:** Three.js, HTML/CSS, RaspberryPi, Figma, Mediapipe, Arduino.
- **Soft Skills:** Leadership, Teamwork, Presentation skills, Creativity, Design.

[ 10/04/2023 – 10/06/2023 ]

### **Tweopic - Twitter Clustering** *Big Data Computing (MSc) (Best Project)*

Tweopic is a sophisticated neural network specifically designed to categorize and analyze tweets on Twitter. This system becomes particularly effective during instances of a 'tweet boom,' a phenomenon characterized by a massive influx of tweets following a specific event. Upon identification of a tweet boom, the relevant tweets are integrated into a processing pipeline that extracts embeddings using a multilingual, pretrained model known as XMLRoberta. Subsequently, a graph is constructed, where the weights of the edges are determined by word, hashtag, and sentence embeddings. A classifier is then employed to discern and sever the edges linking tweets pertaining to disparate topics. Ultimately, this process results in the isolation of connected components, each representing a unique topic of discussion during the tweet boom.

- This project has been assigned to a PhD student as his PhD thesis
- **Technical Skills:** PySpark, Numpy, Transformers, Pytorch, PySparkNLP.
- **Soft Skills:** Leadership, Teamwork, Time Management, Presentation skills, Documentation.

[ 01/05/2023 – 01/06/2023 ]

### **UAVs patrolling through a Genetic Q-learning Algorithm** *Internet of Things (MSc)*

In our quest to devise a solution for the issue of drone patrolling within specific time windows, we introduced a novel methodology that merges a random and clustering-based population generated by a multi-objective genetic algorithm (NSGA II) with a population established by a Q-learning algorithm. The Q-learning algorithm endeavors to discover the optimal path, thereby contributing to the efficiency and effectiveness of drone patrolling operations.

- **Technical Skills:** ROS, Gazebo, Python, Deap
- **Soft Skills:** Documentation, Creativity, Teamwork, Presentation skills, Report writing

[ 20/01/2023 – 10/02/2023 ]

#### **Person ReID with Few Shot Learning** *Biometric System (MSc)*

- I led a group of master students and developed an advanced model for person re-identification (ReID) with Few-Shot Learning utilizing Locally Aware Transformers. The developed model has a competitive edge in terms of its state-of-the-art performance.
- Conducted a comprehensive analysis of the state of the art in Few Shot Learning Tracking, reviewing and comparing existing techniques and approaches, and identifying gaps and opportunities for future research.
- Submitted the paper to the International Joint Conference on Biometrics (IJCB) held in Ljubljana, with the aim of presenting and discussing the proposed method with a broader audience of researchers and practitioners in the field of biometrics and computer vision.
- **Technical Skills:** Numpy, Transformers, Pytorch, Pandas, scikit-learn.
- **Soft Skills:** Leadership, Teamwork, Time Management, Presentation skills, Report writing.

[ 10/12/2022 – 12/01/2023 ]

#### **QMR and Q-FANET algorithm** *Autonomous Networking (MSc)*

- Developed a Q-learning based Multi-objective optimization Routing protocol (QMR) for Flying Ad Hoc Networks (FANETs) of drones, which aims to minimize packet delivery delay and drone energy consumption. The QMR algorithm is implemented as a three-block system that involves location acquisition, routing neighbor discovery, and routing decision, each with a specific function and role in the overall protocol.
- Implemented the QMR algorithm in a simulator environment, allowing for the evaluation of its performance under various scenarios and conditions. The simulator already included the location acquisition and routing neighbor discovery modules, while the QMR algorithm was developed and integrated into the routing decision block.
- Conducted a comparative evaluation of the QMR algorithm with existing state-of-the-art algorithms for FANET routing in order to demonstrate the efficiency and effectiveness of the algorithm in minimizing packet delivery delay and drone energy consumption.
- **Technical Skills:** Python, Network Algorithms, LaTeX
- **Soft Skills:** Time Management, Teamwork, Presentation skills, Report writing.

[ 10/11/2021 – 31/01/2022 ]

#### **Physically-based Renderer** *Fundamentals of Computer Graphics (MSc) (top 1% in the class)*

- Implemented a physically-based renderer with ray tracing, which allows for accurate and realistic simulations of light behavior in a virtual scene, including features such as reflections, refractions, and shadows.
- Included support for volumetric media rendering, allowing for the creation of realistic effects such as fog, smoke, and clouds, through the use of advanced techniques such as null scatter path integral formulation
- The renderer was developed using C++ and the Yocto/GL library, which enabled the implementation of both the rendering pipeline and the simulation foundations using mass-spring and position-based dynamics (PBD).
- **Technical Skills:** NanoVDB, OpenGL, YoctoGL, C++.
- **Soft Skills:** Problem Solving, Time Management, Documentation, Creativity.

[ 2023 ]

#### **Word Sense Disambiguation model for MNLP**

[ 2023 ]

**Event Detection for MNLP**

[ 2022 ]

**Machine Learning Model for ASL recognition**

[ 2022 ]

**Social Network Application for Sapienza students**

[ 2021 ]

**Chat-room in C**

[ 2020 ]

**Database for a Covid Hotel**

## **HONOURS AND AWARDS**

---

[ 19/02/2024 ] Sapienza University of Rome

**Honourous Programme Scholarship** Awarded with the honourous programme that involves working with the prestigious Perception and Intelligence Laboratory (PINLab) in the field of Virtual Humans with the aim of generating natural human pose sequences from a prompt