

# Curriculum Vitae

Carlo Masone

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## Personal Information

**Date of birth** October 22<sup>nd</sup>, 1983  
**Place of birth** Rome (RM), Italy  
**Citizenship** Italian

## Contacts and pages

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## Work Experience

- 11/2022 - ongoing**     **Co-founder** at **FocoosAI**.
- 10/2022 - ongoing**     **Assistant Professor non tenured (RTD-A)** at **Politecnico di Torino**.
- 06/2021 - 09/2022**     **Postdoctoral researcher** at the **Consorzio Interuniversitario Nazionale per l'Informatica** (CINI), working within the Visual and Multimodal Applied Learning laboratory led by Prof. Barbara Caputo.
- 08/2020 - 05/2021**     **Postdoctoral researcher** at the **Italian Institute of Technology** (IIT), working within the Visual and Multimodal Applied Learning laboratory led by Prof. Barbara Caputo.
- 07/2017 - 07/2020**     **Autonomous Driving Specialist** at **Italdesign Giugiaro S.p.a.**
- 04/2014 - 05/2017**     **Postdoctoral researcher** at the **Max Planck Institute for Biological Cybernetics**, (Tübingen, Germany) within the Autonomous Robotics and Human-Machine Systems research group.

## Education

- 02/2010 - 03/2014**     **Ph.D.** in Systems Engineering, at the **Max Planck Institute for Biological Cybernetics** (Tübingen, Germany), directed by [Prof. Heinrich H. Bülthoff](#) and under the co-supervision of [Paolo Robuffo Giordano](#) and [Prof. Antonio Franchi](#), and at the **University of Stuttgart** (Stuttgart, Germany), under the supervision of [Prof. Dr.-Ing. Frank Allgöwer](#). Title of the thesis: "Planning and control for robotic tasks with a human-in-the-loop", available at the University

online library at <http://dx.doi.org/10.18419/opus-4589>. The oral examination was held on July 16<sup>th</sup> 2014. Final grade: **magna cum laude**.

**07/2011 - 07/2011** Robotics summer School on “Autonomous Micro Aerial Vehicles: Design, Perception and Control” at ETH Zurich.

**07/2010 - 07/2010** “Telerobotics summer School” at Technische Universität München (TUM)

**04/2006 - 01/2010** **Master degree** in Systems Engineering from the **Sapienza University of Rome** (Rome, Italy). Title of the thesis: “Design, implementation and evaluation of a washout algorithm for a motion simulator using an anthropomorphic manipulator”. Final grade: **110 cum laude**.

**10/2002 - 03/2006** **Bachelor degree** in Systems and Automation Engineering from the **Sapienza University of Rome** (Rome, Italy). Final grade: **110 cum laude**.

**09/1997 - 07/2002** **Scientific High School diploma** within the National Informatics Program at the “Augusto Righi” high school (Rome, Italy). Final grade: **100 cum laude**.

## Research Interests and Activities

### Current research

My current research spans the fields of computer vision and pattern recognition, machine learning and robotics, and it can be projected along two main axis:

- **Spatial intelligence:** the concept of spatial intelligence may be defined as the “computational capacity that provides the ability or mental skill to solve spatial problems of navigation, visualization of objects from different angles and space, faces or scenes recognition, or to notice fine details”. I am interested in developing advanced solutions that provide spatial intelligence capabilities to embodied agents, with a particular focus on two areas:
  - **Self localization:** this refers to the problem of placing an observation from onboard sensors (e.g., an image) in a suitable representation of space (e.g., a database of observation, a 3D map, etcetera). This problem entails a wide spectrum of tasks, such as visual place recognition, image retrieval, visual localization, pose estimation, 3D reconstruction, novel view synthesis, image matching, keypoint detection and description, etcetera.
  - **Fine scene understanding:** this refers to the ability to extract fine information from observations of the world, e.g., the semantic information of individual pixels in an image or the relation among different entities in an observation/scene. This is particularly important to enable complex interactions with the world. Examples of this include activities on driving scenes and aerial/satellite imagery.
- **Efficient and reliable learning:** although machine learning models are becoming more powerful and advanced, transferring them to real world applications requires making them reliable (for example to domain changes) and efficient (in terms of computation, hardware utilization, scalability, data, ...). To this aim, I am working on different tasks:
  - **Anomaly detection and uncertainty quantification:** the concept of anomalies refers to patterns in the data that are outside the normality of operations. Detecting these anomalous

observations and patterns is important to understand when the models are observing unexpected occurrences, so that safe fallback plans could be taken and the anomalous data could be further analyzed or used for active learning. This is also related to the concept of the uncertainty in the models' predictions.

- **Federated and distributed learning:** there are many practical cases that require using a distributed learning framework, where a single model (or several variations of the model) is learned cooperatively across multiple nodes/clients. An example of this, is to enable training of massive models on enormous collections of data in large data-centers. Another case is to enable training a model when the data is decentralized across different clients, and neither the data nor the local copies of the model can be shared due to privacy constraints (federated learning).
- **Edge AI:** in certain applications AI models must be deployed on devices with limited computational and memory resources and they must perform inference locally, in often cases with strict latency requirements. These edge AI scenarios require creating suitable models that must be lightweight while maintaining much of the performance of the vanilla models. Moreover, often the target hardware only supports a subset of the operations from standard machine learning frameworks, thus requiring to revisit entirely the model architecture. We are working in this area, also with collaborations with industrial partners, such as STMicroelectronics.
- **Continuous kernels and implicit representations:** much of the neural networks designed today use tensor operations, which are highly optimized for parallel execution, to encode interactions across the input data and learn a functional mapping. Inspired by the long standing field of implicit function approximations, we are seeking alternative architectures that directly learn continuous kernels using a finite number of parameters. These solutions not only can be more efficient in terms of number of parameters, but also are very flexible and have a great representation power.

## Past research

My past research (until 2014) was related to the fields of robotics and control theory. The problems I worked on include:

- **Cooperative aerial transportation:** Development of a system for aerial transportation and manipulation of a payload suspended by cables. I authored one of the first studies in this field (which now has grown to a highly researched topic) and more importantly I authored the first study that highlighted the parallelism between an aerial transportation system and a reconfigurable cable-driven parallel robot.
- **Modeling and control for the CableRobot simulator:** Development of model-based control algorithms for the CableRobot simulator, the world's first cable robot for passengers.
- **Robust control for robotic platforms:** Application of robust controllers to various robotic systems (cable-driven parallel robot, micro aerial vehicle) using sliding mode control algorithms and feedback linearization.
- **Shared planning and control for aerial robots:** Development of shared control algorithms for robotics applications with a human in the loop. I developed several shared control strategies acting at different levels (motion control, motion planning) and devising novel blending functions to combine the control inputs coming from the different systems.

- **Modeling and control for the CyberMotion simulator:** Development of model-based control algorithms for the CyberMotion simulator, a motion simulator based on an anthropomorphic industrial robot arm.

## Projects

### Financed Projects

**26/03/2024-17/09/2025** Research subcontract (*contratto per conto terzi per attività di ricerca*) for the [MAPP](#) project, which is supported by a competitive award from the [NODES](#) program. The NODES program is financed by National Recovery and Resilience Plan (PNRR) – NextGenerationEU (Grant agreement Cod. n.ECS00000036). Assignment from the firm Aditus srl.  
**Role: Principal Investigator.**

**17/10/2023-16/07/2024** Research subcontract (*contratto per conto terzi per attività di ricerca*) on the topic of visual geolocation using aerial images and 3D data. Assignment from CINI - Consorzio Interuniversitario Nazionale per l'Informatica.  
**Role: Principal Investigator.**

### Competitive Projects by Attributed by Peer Review

**07/2023-07/2025** Project Future AI Research ([FAIR](#)), awarded financial support by National Recovery and Resilience Plan (PNRR) - NextGenerationEU – Mission 4, Component 2, Investment 1.3 – D.D. 1555 11/10/2022, PE00000013 - CUP: E13C22001800001).  
**Role: Task Leader** for two tasks in the work package 7.4 (Computer Vision and Sensing in Extreme Computational Frameworks) of spoke 7 (EDGE AND EXASCALE AI):

- T7.4.3: Parallel Visual Learning and Sensing in 2D
- T7.4.4: Parallel Visual Learning and Sensing in 3D

**11/2023 - 11/2024** I am the **principal investigator** of the **ISCRA-B project LarGeo**, which aims to investigate several engineering and technical choices and their effect on the scalability of visual geo-localization methods (and closely related solutions for other tasks)..

ISCRA-B projects are received twice a year. They go under peer-review evaluation, concerning both technical and scientific aspects, and a 5 months delay is expected before a project gets access to HPC resources. For each user it is allowed to have only one class B project each 6 months as Project Investigator.

The project awarded 2.000.000 GPU hours on the Leonardo HPC at CINECA

**08/2023 - 05/2024** I am the **principal investigator** of the **ISCRA-C project DisGeo**, which aims to push the scalability of visual geo-localization algorithms, by:

1. exploring solutions to distribute the training of the model developed in the MaGeo project;
2. exploring ways to formulate the visual geo-localization problem in a federated learning setting.

ISCRA-C projects are received through continuous submission and reviewed once per month, both technically and scientifically. An average period of about 30 days is required for activating the project. For each user it is allowed to have only one class C project each 6 months as Project Investigator. The project awarded 80.000 GPU hours on the Leonardo HPC at CINECA.

**04/2022 - 01/2023** I am the **principal investigator** of the **ISCRA-C project GeoWarp**, which aims to investigate the problem of viewpoint shifts in visual geolocalization, i.e.,:

1. Quantitatively assess the invariance achieved by the method with respect to different variations in the viewpoint.
2. Extend the method to new kinds of viewpoint shifts besides homographies.

ISCRA-C projects are received through continuous submission and reviewed once per month, both technically and scientifically. An average period of about 30 days is required for activating the project. For each user it is allowed to have only one class C project each 6 months as Project Investigator. The project awarded 32.000 core hours on the Marconi 100 HPC at CINECA.

**06/2021 - 03/2022** I am the **principal investigator** of the **ISCRA-C project MaGeo** which aims to investigate the task of visual geolocalization in large scale databases (possibly with millions of images) with two studies:

1. A benchmark that analyzes the impact of different architectural and training choices of the image retrieval pipeline and verifies the results on datasets with different qualities (in terms of sparsity/density and size).
2. Develop a novel architecture based on deep neural networks that leverages the advances made in large scale classification problems.

ISCRA-C projects are received through continuous submission and reviewed once per month, both technically and scientifically. An average period of about 30 days is required for activating the project. For each user it is allowed to have only one class C project each 6 months as Project Investigator. The project awarded 32.000 core hours on the Marconi 100 HPC at CINECA.

**08/2020 - 08/2023** **Coordinator** of a research project on visual geolocalization that employs 1 senior researcher (full time equivalent), 3 research fellows (full time equivalent) and 3 junior fellows (full time equivalent).

## Industrial Projects

**07/2017 - 07/2020** As an employee of Italdesign Giugiaro I worked on several R&D projects regarding innovative and concept platforms for autonomous and assisted mobility:

1) **TechDemo** - a self-driving platform built entirely at Italdesign. I contributed to the design of the system architecture (definition of sensors and compute units) and to the implementation of the software functionalities (motion planning and control, obstacle avoidance based on lidar readings).

Role: **developer** for perception, planning and control functionalities

2) **Pop.Up Next** - a hybrid mobility concept with seamless transition between ground and aerial

transportation. I worked on a small-scale demonstrator of the concept, developing the autonomous functionalities for the ground vehicle (definition of sensors and compute units, implementation of the motion planning, motion control and perception functions).

Role: **developer** for perception, planning and control functionalities

3) **WheeM-i** - a micro mobility vehicle for wheelchair users. I was the technical leader in the definition of the assisted driving functionalities and in their implementation. I was involved from the early phases of the project and acted as the technical spokesperson to the presentation of the idea at the judging panel for the Mobility Unlimited Challenge organized by the Toyota Mobility Foundation. The proposal was selected as one of the top-5 finalists among all global entries and received a development grant of \$500000.

Role: **technical lead** for assistive functionalities

## Participation to Research Groups

**08/2020 - ongoing** Within the VANDAL research lab ([www.http://vandal.polito.it](http://vandal.polito.it)) I have created a research unit working on the topic of visual geo-localization. The goal of this unit is to develop new solutions for this problem that are robust across different domains (e.g. different lighting, weather conditions, seasons, viewpoints) and applicable to large scale geographical environments. I am also guiding research activities on the topics of anomaly detection and uncertainty quantification and collaborating on research on distributed learning and edge AI.

**09/2018 - 07/2020** Member of the Volkswagen Group AI Team, a global team composed by researchers within the Volkswagen group that are working in the field of AI. The group, created by Firas Lethaus, aims to foster the collaboration among the VW researchers and accelerate results. As a member affiliated to Italdesign, I organized one of the bi-annual workshops of the group.

**01/2010 - 05/2017** Member of the Autonomous Robotics and Human-Machine Systems research group at the Max Planck Institute for Biological Cybernetics (Tübingen, Germany). The group focus was on aerial robotics, tele-operation and shared control. In this time frame I first was a Ph.D. student and then a Postdoctoral researcher.

## Habilitation

**20/11/2023 - 20/11/2034** National Scientific Habilitation for Associate professorship in Systems and Control Engineering (academic field 09/G1)

## Honors and Awards

**2024** Member of the European Lab for Learning & Intelligent Systems (ELLIS), within the ELLIS Turin Unit <https://ellis.eu/members>. Candidates for memberships are vetted by a committee based on their scientific resume in the field of machine learning.

- 2024** Outstanding reviewer award at the 2024 IEEE/CVF International Conference on Computer Vision and Pattern Recognition (CVPR). Given to the Top 2% reviewers.  
[https://media.eventhosts.cc/Conferences/CVPR2024/CVPR\\_main\\_conf\\_2024.pdf](https://media.eventhosts.cc/Conferences/CVPR2024/CVPR_main_conf_2024.pdf) (pag. 6).
- 2023** Reviewer of the month recognition by the Nature - Communications Engineering journal for the month of October 2023 <https://www.nature.com/commseng/referees/reviewer-of-the-month>
- 2023** Outstanding reviewer award at the 2023 IEEE/CVF International Conference on Computer Vision and Pattern Recognition (CVPR). Given to the Top 3.5% reviewers.  
<https://cvpr2023.thecvf.com/Conferences/2023/OutstandingReviewers> .
- 2022** Outstanding reviewer award at the 2022 IEEE/CVF International Conference on Computer Vision and Pattern Recognition (CVPR). Given to the Top 0.9% reviewers.  
<https://cvpr2022.thecvf.com/outstanding-reviewers> .
- 2019** Finalist with Italdesign's team WheeM-i of the Mobility Unlimited Challenge organized by the Toyota Mobility Foundation. As a finalist, the team was awarded a development grant of \$500k (<https://mobilityunlimited.org/>). I was the team's technical responsible at the pitch presentation for the judging panel that selected the finalists.
- 2016** IROS JTCF Novel Technology Paper Award for Amusement Culture (winner), at the 2016 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), for the paper "The CableRobot Simulator - Large Scale Motion Platform Based on Cable Robot Technology".  
<https://www.ieee-ras.org/about-ras/latest-news/842-iros-2016-award-winners-announced>
- 2016** Best Paper Award (finalist) at the 2016 IEEE International Conference on Information and Automation (ICIA), for the paper ' Modeling and Analysis of Cable Vibrations for a Cable-Driven Parallel Robot'.
- 2011** Winner of the "Wow-Factor award" for the best multimedia content presented at the 2011 Joint Virtual Reality Conference (JVRC). The prize was awarded for a video demonstrating the operation of the MPI CyberMotion Simulator.

## **Editorial Activities, Conference Organization, Institutional Service**

### Reviewer Activity

Since 2010 I have been serving as reviewer for several conferences and journals:

- Robotics: Science and Systems conference (RSS)
- IEEE International Conference on Robotics and Automation (ICRA)
- IEEE/RSJ international Conference on Robotics and Intelligent Systems (IROS)
- IEEE/CVF International Conference on Computer Vision and Pattern Recognition (CVPR)
- IEEE/CVF international Conference On Computer Vision (ICCV)
- European Conference on Computer Vision (ECCV)
- International Conference on Pattern Recognition (ICPR)

- IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)
- IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)
- IEEE Robotics and Automation Letters (RA-L)
- IEEE Robotics and Automation Magazine (RAM)
- IEEE Transactions on Image Processing (TIP)
- IEEE Transactions on Robotics (TRO)
- IEEE Access
- Human Robot Interaction conference (HRI)
- Sensors
- Nature - Communications Engineering
- ...

### Editorial activity

**2022-ongoing** Associate Editor for the IEEE Robotics and Automation Letters journal in the area “Aerial and Field Robotics” <https://www.ieee-ras.org/publications/ra-l/ra-letters-editorial-board>

### Service

**2024** Area Chair for the 2025 IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)

**2023** Area Chair for the 2024 IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)

**2021** Pre-screening evaluator in the selection process for the 2021/2022 ELLIS (European Laboratory for Learning and Intelligent Systems) Ph.D. program. This program aims to support excellent young researchers, granting them the supervision from two advisors within the ELLIS network. The pre-screening is the first filtering stage in the selection process.

### Conference/Workshop Organization

**2024** Co-organizer of the workshop “Adjustable Autonomy and Physical Embodied Intelligence”, at the 27th European Conference on Artificial Intelligence (ECAI), Santiago de Compostela (Spain), October 19<sup>th</sup>-24<sup>th</sup>.

<https://sites.google.com/diag.uniroma1.it/aapei24/>

**2023** Co-organizer of the workshop “Learning Meets Model-based Methods for Manipulation and Grasping”, at the IEEE/RSJ International Conference on Robotics and Intelligent Systems (IROS), Detroit (US), October 1<sup>st</sup>-5<sup>th</sup>.

<https://sites.google.com/view/learning-meets-models-iros2023/>

**2023** Co-organizer of the workshop “Adapting to Change: Reliable Multimodal Learning Across Domains”, at the 2023 European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML-PKDD), Torino (Italy), September 18<sup>th</sup>-22<sup>nd</sup>.

<https://sites.google.com/view/adapting-to-change-ecml-pkdd>



**2019** Organizer of the “VW Group AI Workshop 2019.1”, at Italdesign (Torino, Italy). This is a semestral workshop that unites researchers within the Volkswagen group who work in AI. The event was attended by over 100 people from all around the world.

### Invited Jury Member to Academic Defenses

**2023** Jury for the **M.Sc. thesis defense** of Nazir Nayal, Koç University & İş Bankası AI (KUIS AI) Center

## Collaborations

### International academic collaborations

I collaborated with researchers from various institutions, with whom I co-authored several papers:

- Dr. Paolo Robuffo Giordano - Senior Scientist at CNRS at IRISA and Inria Bretagne Atlantique and head of the Rainbow research group
- Prof. Antonio Franchi - Full Professor with double affiliation at the University of Twente, Enschede, The Netherlands and the Sapienza University of Rome
- Prof. Paolo Stegagno - Assistant Professor, University of Rhode Island
- Prof. Torsten Sattler - Senior researcher at CIIRC, the Czech Institute of Informatics, Robotics and Cybernetics
- Dr. Gabriela Csurka - Principal Scientist at Naver Labs Europe
- Thomas Pollok - Fraunhofer IOSB
- Alex Stoken - Data scientist in the Earth Science and Remote Sensing Unit at NASA

### Industrial collaborations

I held collaborations (joint thesis, phd, projects, ...) with few companies

- Italdesign Giugiaro
- STMicroelectronics
- Teoresi

## Tech Transfer

### Start-ups and academic spin-offs

**2023** **Co-founder** of [Focoos.AI](#), a startup spin-off of Politecnico di Torino, whose mission is to automatically design neural models with efficiency in mind, optimizing resources and leveraging advanced algorithms to reduce latency and increase processing speed. Focoos.AI has received a pre-seed funding round.

### Patents

**2023** **Co-inventor** of the proposal “Metodo e algoritmo per la progettazione automatica di reti neurali tramite machine learning”, submitted to the Italian patent office.

## Seminars, Talks and Presentations

- 2023** Invited panelist at the “Congresso dei Dottori commercialisti e degli Esperti contabili”, October 18<sup>th</sup>-20<sup>th</sup>, Torino. The title of the panel is “Le prospettive del lavoro intellettuale nell’era dell’intelligenza artificiale“  
<https://cndcecpsstorage.blob.core.windows.net/media/docs/638331224916160343/ec0a0d2a-823a-4f30-a0b4-c49db512446a.pdf>
- 2023** Invited speaker at the tutorial on “A Comprehensive Tour and Recent Advancements Toward Real-World Visual GeoLocalization”, at the 2023 IEEE/CVF International conference on Computer Vision and Pattern Recognition (CVPR 2023), Vancouver (CA), June 18<sup>th</sup>-22<sup>nd</sup>.  
<https://www.sri.com/computer-vision/cvpr-2023-a-comprehensive-tour-and-recent-advancements-toward-real-world-visual-geo-localization/>
- 2021** “Semantic segmentation for automotive applications”, invited talk at the High-Frequency Workshop at Politecnico di Milano. Milan (Italy), November 22<sup>nd</sup>-23<sup>rd</sup>.
- 2018** Invited talk at the “VW Group AI Workshop 2018.2”, a semestral workshop that is organized within the Volkswagen Group AI team, a global team with all the researchers working in Volkswagen AG on AI related topics. Södertälje (Sweden), October 10<sup>th</sup>-11<sup>th</sup>.
- 2016** Presentation of the paper “Cooperative transportation of a payload using quadrotors: A reconfigurable cable-driven parallel robot” at the interactive session of the 2016 IEEE/RSJ International conference on Intelligent Robots and Systems (IROS). Daejeon (South Korea), October 9<sup>th</sup>-14<sup>th</sup>.
- 2016** Presentation of the paper “The CableRobot simulator large scale motion platform based on cable robot technology” at the interactive session of the 2016 IEEE/RSJ International conference on Intelligent Robots and Systems (IROS). Daejeon (South Korea), October 9<sup>th</sup>-14<sup>th</sup>.
- 2012** “Shared trajectory planning for human-in-the-loop navigation of mobile robots in cluttered environments”, presentation at the 5<sup>th</sup> International Workshop on human-Friendly Robotics (HFR 2012). Brussels (Belgium), October 18<sup>th</sup>-19<sup>th</sup>.
- 2012** Oral presentation of the paper “Interactive planning of persistent trajectories for human-assisted navigation of mobile robots” at the 2012 IEEE/RSJ International conference on Intelligent Robots and Systems (IROS). Vilamoura-Algarve (Portugal), October 7<sup>th</sup>-12<sup>th</sup>.
- 2011** Invited talk titled “Mechanical design and control of the new 7-DoF CyberMotion Simulator” at the 5<sup>th</sup> Human Centered Motion cueing Workshop. Göteborg (Sweden), May 19<sup>th</sup>.
- 2011** Oral presentation of the paper “Mechanical design and control of the new 7-DoF CyberMotion Simulator” at the 2011 IEEE International Conference on Robotics and Automation (ICRA). Shanghai (China), May 9<sup>th</sup>-11<sup>th</sup>.

## Teaching and Tutoring Activity

## Teaching

- 2023/2024** Teacher for 30 hours within the course **Robot Learning** (6 CFU, SSD: ING-INF/05) for the M.sc. degree in “Computer Engineering”.
- 2023/2024** Teacher for 30 hours within the course **Tecniche di Programmazione** (10 CFU, SSD: ING-INF/05) for the Bachelor degree in “Ingegneria Gestionale”.
- 2022/2023** Teacher for 10 hours within the course **Machine Learning and Deep Learning** (10 CFU, SSD: ING-INF/05) for the M.sc. degrees in “Data Science And Engineering” and “Ingegneria Matematica”.
- 2022/2023** Teacher for 50 hours (10 hours exercises during lectures + 40 hours exercises during practice laboratory) within the course **Tecniche di Programmazione** (10 CFU, SSD: ING-INF/05) for the Bachelor degree in “Ingegneria Gestionale”.

## Teaching collaboration

- 2021/2022** Within the course **Machine learning and Deep learning**, held by Prof. Barbara Caputo at Politecnico di Torino for the M.Sc. degrees in “Data Science And Engineering” and “Ingegneria Matematica”, I have organized two of the compulsory group projects that the students must complete as part of their assessment. A total of 48 students have taken these projects. As part of these projects I held a lecture on visual geo-localization as a guest lecturer.
- 2021/2022** Within the course **Advanced Machine Learning**, held by Prof. Tatiana Tommasi at Politecnico di Torino for the M.Sc. degree program in “Science in computer engineering”, I have organized one of the compulsory group projects that the students must complete as part of their assessment. The project was on the topic of visual geo-localization.
- 2021/2022** Within the course **Data analysis and machine intelligence**, held by Prof. Tatiana Tommasi at Politecnico di Torino for the M.Sc. degree program in “Automotive engineering”, I have organized one of the compulsory group projects that the students must complete as part of their assessment. The project was on the topic of visual geo-localization.
- 2021/2022** Within the course **Machine learning and Deep learning**, held by Prof. Barbara Caputo at Politecnico di Torino for the M.Sc. degree program in “Data science and engineering”, I have participated in the organization of two reading groups for the students, on the subject semantic segmentation.

## Students Supervision

### **Ph.D. Students**

- 2023-ongoing** **Christian Cancedda**, Ph.D. student from Politecnico di Torino working on “Visual localization using 2D and 3D data”.
- 2023-ongoing** **Riccardo Zaccone**, Ph.D. student from Politecnico di Torino working on “Federated and distributed learning”.

**2022-ongoing Gabriele Trivigno**, ELLIS Ph.D. student from Politecnico di Torino working on “Visual Geo-Localization”. Co-hosted by Prof. Torsten Sattler from the Czech Technical University in Prague.

**2022-ongoing Gabriele Berton**, Ph.D. student from Politecnico di Torino working on “Visual Geo-Localization”.

**2022-ongoing Shyam Randan Rai**, ELLIS Ph.D. student from Politecnico di Torino working on “Federated Semantic Segmentation architectures on IoT devices”. Co-hosted by Prof. Zeynep Akata from the Technical University of Munich (TUM)

**2020-2023 Antonio Tavera** completed his Ph.D. at Politecnico di Torino in 2023 with a dissertation titled “Learn to Generalize and Adapt across Domains in Semantic Segmentation”.  
<https://iris.polito.it/handle/11583/2979900>

**2014-2019 Christian Schenk** completed his Ph.D. at the Max Planck Institute for Biological Cybernetics and at the University of Stuttgart in 2019 with a dissertation titled “Modelling and control of a cable-driven parallel robot : methods for vibration reduction and motion quality improvement”.

## M.Sc. Students

**2023-2024 \* Valerio Gallo**: M.Sc. thesis titled “ Understanding the Role of Visual Place Recognition for 3D Reconstruction”

\* **Enrico Chiavassa**: M.Sc. thesis titled “ Image retrieval for Visual Localization and Geo-Localization beyond standard domains: dealing with domain shift in large-scale datasets and challenging indoor environments” (<https://webthesis.biblio.polito.it/30396/> )

**2022-2023 \* Mattia Dutto**: M.Sc. thesis titled “Federated visual geo-localization”  
(<https://webthesis.biblio.polito.it/27734/> )

\* **Leonardo Rolandi**: M.Sc. thesis titled “Optimization and quantization on hardware accelerators of semantic segmentation neural networks” (<https://webthesis.biblio.polito.it/29531/>)

\* **Mostafa Moahmad**: M.Sc. thesis titled “Re-ranking methods for visual geo-localization with domain shift” (<https://webthesis.biblio.polito.it/26774/> )

\* **Juan Manuel Aragon Armas**: M.Sc. thesis titled “Approaching visual geo-localization through classification” (<https://webthesis.biblio.polito.it/26773/>)

\* **Matteo Gambino**: M.Sc. thesis titled “Optimizations and efficient retrieval solutions for large-scale visual geo-localization problems” (<https://webthesis.biblio.polito.it/25610/>)

**2021-2022 \* Gabriele Trivigno**: M.Sc. thesis titled “Deep learning for Sequence-based Visual Geo-localization” (<https://webthesis.biblio.polito.it/20597/>)

\* **Riccardo Mereu**: M.Sc. thesis titled “A Study on Deep Learning Approaches for Visual Geo-localization” (<https://webthesis.biblio.polito.it/21189/>)

\* **Emanuele Munafò**: M.Sc. thesis titled “Efficient and scalable visual place recognition” (<https://webthesis.biblio.polito.it/18095/>)

**2019/2020 \* Antonio Tavera**: M.Sc. thesis titled “Steps towards Autonomous Driving: Deep Semantic Segmentation among vehicle viewpoints” (<https://webthesis.biblio.polito.it/12515/>)

\* **Emanuele Alberti**: M.Sc. thesis titled “Deep Semantic Segmentation across Environments for Autonomous Driving” (<https://webthesis.biblio.polito.it/12513/>)

\* **Stefano Zamboni**: M.Sc. thesis titled “Steps towards autonomous driving: deep semantic segmentation among weather conditions” (<https://webthesis.biblio.polito.it/12516/>)

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### Journals

- J1. S. N. Rai, F. Cermelli, B. Caputo, and **C. Masone**, "Mask2Anomaly: Mask Transformer for Universal Open-set Segmentation." *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 2024, doi:10.1109/TPAMI.2024.3419055, ISSN:0162-8828, 1939-3539
- J2. R. Zaccone, G. Berton and **C. Masone**, “Distributed training of CosPlace for large-scale visual place recognition”, in *Frontiers in Robotics and AI*, vol. 11, 2024, doi: 10.3389/frobt.2024.1386464, ISSN: 2296-9144
- J3. G. Berton, G. Trivigno, B. Caputo and **C. Masone**, "JIST: Joint Image and Sequence Training for Sequential Visual Place Recognition," in *IEEE Robotics and Automation Letters*, vol. 9, no. 2, pp. 1310-1317, Feb. 2024, doi: 10.1109/LRA.2023.3339058, ISSN: 2377-3766
- J4. E. Arnaudo, A. Tavera, **C. Masone**, F. Dominici and B. Caputo, "Hierarchical Instance Mixing Across Domains in Aerial Segmentation," in *IEEE Access*, vol. 11, pp. 13324-13333, 2023, doi: 10.1109/ACCESS.2023.3243475, ISSN: 2169-3536
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- J6. V. Paolicelli, G. Berton, F. Montagna, **C. Masone** and B. Caputo, “Adaptive-Attentive Geolocalization from few queries: a hybrid approach”, *Frontiers in Computer Science - Special issue on Domain Adaptation and Generalization in Challenging Visual Data Regimes*, vol. 4, 2022, doi: 10.3389/fcomp.2022.841817, ISSN: 2624-9898
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- J10. **C. Masone**, M. Mohammadi, P. Robuffo Giordano and A. Franchi, "Shared planning and control for mobile robots with integral haptic feedback", *The International Journal of Robotics Research*, 2018;37(11):1395-1420. doi:10.1177/0278364918802006, Part of ISBN: 17413176 02783649
- J11. A. Franchi, **C. Masone**, V. Grabe, M. Ryll, H. H. Bühlhoff and P. Robuffo Giordano, "Modeling and Control of UAV Bearing Formations with Bilateral High-level Steering", *The International Journal of Robotics Research*, 2012;31(12):1504-1525. doi:10.1177/0278364912462493, Part of ISBN: 02783649 17413176

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- P2. G. Barbarani, F. Vaccarino, G. Trivigno, M. Guerra, G. Berton, **C. Masone**, "Scale-Free Image Keypoints Using Differentiable Persistent Homology", In *2024 International Conference on Machine Learning (ICML)*.
- P3. G. Berton, G. Goletto, G. Trivigno, A. Stoken, B. Caputo, and **C. Masone**, "EarthMatch: Iterative Coregistration for Fine-grained Localization of Astronaut Photography", in *2024 IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)*, pp. 4264-4274.
- P4. G. Trivigno, **C. Masone**, B. Caputo and T. Sattler. "The Unreasonable Effectiveness of Pre-Trained Features for Camera Pose Refinement." *2024 IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 12786-12798.
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- P6. G. Berton, A. Stoken, B. Caputo, and **C. Masone**, "Earthloc: Astronaut photography localization by indexing earth from space", *2024 IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 12754-12764.
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## Demo

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## Other

- O1. **C. Masone**, "Planning and control for robotic tasks with a human-in-the-loop", Ph.D. dissertation, Stuttgart, 16 July 2014, <http://dx.doi.org/10.18419/opus-4589>
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