



Andrea Bedei

PhD Student in Automotive Engineering for Intelligent Mobility

AI

Computer Vision

Simulation

HMI

Profile

PhD student focused on **simulation of complex systems** and the integration of **AI, perception, and human-machine interaction**.

Automotive: I study driver behavior, ADAS decision logic, and validation in high fidelity simulated environments, applying **machine learning** and **computer vision** for environmental perception, risk estimation, and decision support.

Marine robotics: I work on simulation and control of underwater vehicles, addressing low visibility perception and **sensor fusion**. My research leverages **simulation** and **computer vision** to design, test, and validate intelligent systems in scenarios that are hard to replicate in the real world.

Key Skills

Machine Learning	Python, Scikit-Learn, TensorFlow, PyTorch, OpenCV, Keras
Simulation & Robotics	ROS2, sensor fusion, CARLA simulator, HoloOcean, digital twins
Programming	C, C++, Java, Python, C#, JavaScript, PHP, Kotlin, Swift, SQL
Web & Mobile	Node.js, FastAPI, HTML, CSS, Apache, REST APIs
Tools	Docker, Git

Languages and Certifications

Languages:

- Italian native
- English B2

Certifications:

- Open Science: Open Access Principles and Practices, Jun 2026
- European Funding Landscape: Opportunities and Proposal Writing, Jun 2026
- Career Development Workshop: Skills, Strengths and Professional Values, Jun 2026
- Research Data Management Principles and Practices, Mar 2026
- PhD Media & Information Literacy Workshop (ITA), [Open Badge BEStr](#), Feb 2026
- Oracle Cloud Infrastructure 2025 Certified AI Foundations Associate, Sep 2025
- Oracle Cloud Infrastructure 2025 Certified Foundations Associate, Sep 2025

- Oracle Data Platform 2025 Certified Foundations Associate, Sep 2025
- GDPR, General Data Protection Regulation: Cybersecurity
- English B2 Certification

Professional Experience

Teaching Assistant, Programming

Alma Mater Studiorum University of Bologna

Nov 2025 - Jan 2026

Cesena, Italy

Course: Programming, BSc in Engineering and Computer Science.

Academic year: 2025/2026 12 university credits

Supported students in learning C and C++ through theory, exercises, and project work.

Teaching Assistant, Programming

Alma Mater Studiorum University of Bologna

Nov 2025 - Jan 2026

Cesena, Italy

Course: Programming, BSc in Information Systems Technologies.

Academic year: 2025/2026 9 university credits

Supported students in learning C through theory, exercises, and project work.

Computer Science Teacher

Ser.In.Ar., Innova-Mente project

Jun 2024 - Present

Cesena, Italy

Delivered programming, robotics, and digital skills courses across 15 schools, 300 total hours. Project carried out with the Centro di Ricerca per l'Informatica Applicata alla Didattica e all'Educazione and the University of Bologna departments of Computer Science and Psychology.

Teaching Assistant, Data and Information Visualization

Alma Mater Studiorum University of Bologna

Sep 2025 - Oct 2025

Cesena, Italy

Course: Data and Information Visualization, Academic year 2025/26. Total hours: 80.

Online course within the National Recovery and Resilience Plan (NRRP) project DEH2023-00010 on digital education hubs for higher education, funded by the European Union, NextGenerationEU.

Instructor, Data and Information Visualization

Ser.In.Ar.

Sep 2025 - Oct 2025

Cesena, Italy

Training courses on Digital Education Hub project. Total hours: 120.

Academic Advisor

Alma Mater Studiorum University of Bologna

Sep 2023 - Jul 2025

Cesena, Italy

Guided Bachelor's students in Information Systems Technologies on study plans and administrative procedures. Two academic years, 150 hours each, 300 hours total.

Computer Science Teacher, National Recovery and Resilience Plan (NRRP) and PN School Projects

Local schools

2024 - 2026

Cesena, Italy

National Recovery and Resilience Plan (NRRP) DM65 Line A STEM Courses - 20 hours per course:

- STEM Up for Your Future, project code M4C113.1-2023-1143-P-32215.

- Discover Your STEM Skills, project code M4C113.1-2023-1143-P-38400.
- Bertola School of the Future, project code M4C113.1-2023-1143-P-27573.
- Coding and Educational Robotics, project code M4C113.1-2023-1143.

PN School and Skills 2021-2027:

- Digital Storytelling and Visual Education, 50 hours. ESO4.6.A1.B-FSEPN-EM-2024-213
- Code With Me, project Your Way, 30 hours. ESO4.6.A2.B-FSEPN-EM-2024-111

Software Developer, Internship

LOG 80 S.R.L.

Aug 2022 - Sep 2022

Forlì, Italy

Developed and maintained management systems for healthcare companies; bug fixing and feature delivery.

Technologies: PHP, HTML, CSS, JavaScript, jQuery, MySQL.

Education

PhD in Automotive Engineering for Intelligent Mobility

Alma Mater Studiorum University of Bologna

Supervisors: Giovanni Pau, Roberto Girau

Nov 2025 - Present

Bologna, Italy

Research on ADAS, driver behavior, simulation based validation, and perception for intelligent mobility.

M.Sc. in Engineering and Computer Science

Alma Mater Studiorum University of Bologna

Supervisors: S Mirri, G Pau

Sep 2023 - Jul 2025

Cesena, Italy

Final grade: 110/110 cum laude.

Thesis: Predictive Modeling of Tire Grip During Cornering in High Speed Racing.

Thesis developed with **Technology Innovation Institute, Abu Dhabi**.

Two stage workflow: start from simulation to build a labeled dataset and validate models, then move to real vehicle data with a dedicated extraction pipeline.

- **Simulated data (Assetto Corsa):** built a labeled dataset; tested CNN, LSTM, Transformer, ResNet to classify grip states (neutral, high grip, loss of grip) from telemetry.
- **Real vehicle data (TII):** built the pipeline to extract, preprocess, and synchronize high frequency logs; derived slip ratio, slip angle, friction coefficient μ ; trained the networks on real data and used rule based and regression models to quantify understeer and oversteer risk.

Keywords: Python, PyTorch, NumPy, pandas, ROS2, shared memory, MCAP files, msg, IDL parsing, LSTM, CNN, Transformer, ResNet, real time telemetry, simulation, regression, classification, multichannel synchronization, vehicle dynamics, data visualization (matplotlib, seaborn), Git.

Thesis link: amslaurea.unibo.it/id/eprint/35541.

B.Sc. in Engineering and Computer Science

Alma Mater Studiorum University of Bologna

Supervisors: A Franco, A Zaccaroni

Sep 2020 - Jul 2023

Cesena, Italy

Final grade: 110/110 cum laude.

Thesis: Development of a digital ecosystem for the documentation and analysis of marine sightings using computer vision and image recognition.

Designed and delivered a full-stack platform (database, web and mobile interfaces, and a Dockerized image-recognition module), later transferred to the University of Bologna for use by marine research teams.

Keywords: Python, TensorFlow, Keras, OpenCV, FastAPI, Docker, Docker Compose, REST API, GitHub.

Thesis link: amslaurea.unibo.it/id/eprint/29165.

Publications

ALAR: Customizable Multimodal Underwater Scenarios for Harsh-Domain Perception. Andrea Bedei, Lorenzo Bacchiani, Nicholas Petrucci, Andrea Melis, Franco Callegati, Giovanni Pau, Roberto Casadei, Roberto Girau. Poster presented at the IEEE ICRA 2026 S2S Workshop. Companion dataset: *ALAR: A Multimodal Underwater Dataset for Harsh-Domain Perception*. Andrea Bedei, Lorenzo Bacchiani, Andrea Melis, Roberto Girau, Franco Callegati, Giovanni Pau. IEEE DataPort, 2026. [doi:10.21227/qd5q-rp93](https://doi.org/10.21227/qd5q-rp93); [hdl:11585/1073171](https://hdl.handle.net/11585/1073171).

A Hybrid Automaton-Based Vehicle Digital Twin for Verifiable Pedestrian Protection. Lorenzo Bacchiani, Andrea Bedei, Özlem Kaya, Roberta Presta, Mario Bravetti, Roberto Girau. *IEEE Access*, 2026, pp. 1–1. ISSN 2169-3536. [doi:10.1109/ACCESS.2026.3714040](https://doi.org/10.1109/ACCESS.2026.3714040).

Predictive Modeling of Tire Grip During Cornering in High-Speed Racing. A Bedei. University of Bologna, 2025.

Progettazione e sviluppo di un ecosistema digitale per la gestione degli avvistamenti di animali marini. A Bedei. University of Bologna, 2023.

Thesis Supervision

Co-supervisor, Programming

Alma Mater Studiorum University of Bologna

A.Y. 2025/2026

Cesena, Italy

Title: Study of SLAM in Underwater Environments and Comparative Analysis of the Main Approaches

Student: Mattia Mencaccini

Supervisor: Roberto Girau

Title: Decision-Making Framework for Safely Overcoming Obstacles in Autonomous Driving

Student: Davide Amantini

Supervisor: Roberto Girau

Third Mission (Public Engagement)

Researchers' Night: public outreach event where researchers present their work to the general audience through talks, demos, and interactive activities.

July 22, 2026

Andrea Bedei