Michael Bosello

PhD Candidate — Department of Computer Science and Engineering, Università di Bologna, Italy.
Researcher — Autonomous Robotic Research Center, Technology Innovation Institute, Abu Dhabi.

michael.bosello@unibo.it — michael.bosello@tii.ae
 Website *Google Scholar* *GitHub*

Reinforcement Learning, Deep Learning, Autonomous Robotics

Education

2021–Present	**PhD in Automotive Engineering for Intelligent Mobility, Department of Computer Science and Engineering**
	University of Bologna, Cesena (Italy)
	Research Topic: Reinforcement Learning and Autonomous Driving | Machine Learning-based battery management
	Supervisor: Prof. Giovanni Pau; Co-Supervisor: Prof. Claudio Rossi
2017–2020	**Computer Science and Engineering (Master's) – 110/110 with Honours**
	University of Bologna, Cesena (Italy)
	ML-related classes:
	○ *Machine Learning* – 30/30 with Honours
	○ *Computer Vision* – 30/30 with Honours
	○ *Intelligent Robotic Systems* – 30/30 with Honours
2014–2017	**Computer Science and Engineering (Bachelor's) – 100/110**
	University of Bologna, Cesena (Italy)

Short Courses

04/2021 2 days	**CVML Short Course: Machine Learning and Deep Neural Networks** Aristotle University of Thessaloniki (online), Lecturer: Ioannis Pitas Short course providing an in-depth presentation of Machine Learning and Deep Learning theory with recent advances [link]

Master's Thesis

10/2020 74 pages	**Integrating BDI and Reinforcement Learning: the Case Study of Autonomous Driving** Supervisors: A. Ricci, G. Pau `http://amslaurea.unibo.it/21467`

Journal Publications (Peer Reviewed)

04/2024
8 pages

Race Against the Machine: A Fully-Annotated, Open-Design Dataset of Autonomous and Piloted High-Speed Flight
M. Bosello, D. Aguiari, Y. Keuter, E. Pallotta, S. Kiade, G. Caminati, F. Pinzarrone, J. Halepota, J. Panerati, G. Pau
IEEE Robotics and Automation Letters. (RA-L). [DOI]

03/2023
17 pages

To Charge or to Sell? EV Pack Useful Life Estimation via LSTMs, CNNs, and Autoencoders
M. Bosello, C. Falcomer, C. Rossi, G. Pau
Energies. MDPI. [DOI]

Conference Publications (Peer Reviewed)

10/2022
10 pages

Enabling Deep Reinforcement Learning Autonomous Driving by 3D-LiDAR Point Clouds
Y. Chen, R. Tse, **M. Bosello**, D. Aguiari, S. Tang, G. Pau
14th International Conference on Digital Image Processing
(ICDIP 2022). SPIE. [DOI]

01/2022
9 pages

Train in Austria, Race in Montecarlo: Generalized RL for Cross-Track F1$^{\text{tenth}}$ LIDAR-Based Races
M. Bosello, R. Tse, G. Pau
19th Annual Consumer Communications & Networking Conference
(CCNC 2022). IEEE. [DOI]

09/2021
6 pages

Li-Ion Batteries State-of-Charge Estimation Using Deep LSTM at Various Battery Specifications and Discharge Cycles
K. L. Wong, **M. Bosello**, R. Tse, C. Falcomer, C. Rossi, G. Pau
Proceedings of the Conference on Information Technology for Social Good
(GoodIT 2021). ACM. [DOI]

09/2020
6 pages

On exploiting Gamification for the Crowdsensing of Air Pollution: a Case Study on a Bicycle-based System
M. Bosello, G. Delnevo, S. Mirri
6th EAI Intl. Conference on Smart Objects and Technologies for Social Good
(GoodTechs 2020). ACM. [DOI]

12/2019
6 pages

Robot Drivers: Learning to Drive by Trial & Error
M. Bosello, R. Tse, G. Pau
15th International Conference on Mobile Ad-hoc and Sensor Networks
(MSN 2019). IEEE. [DOI]

Workshop Publications (Peer Reviewed)

07/2020
20 pages

From Programming Agents to Educating Agents - A Jason-based Framework for Integrating Learning in the Development of Cognitive Agents
M. Bosello, A. Ricci
Engineering Multi-Agent Systems. *Lecture Notes in Computer Science*
(EMAS 2019). Springer. [DOI]

06/2019
12 pages

Comparative Analysis of Blockchain Technologies Under a Coordination Perspective
G. Ciatto, **M. Bosello**, S. Mariani, A. Omicini
Highlights of Practical Applications of Survivable Agents and Multi-Agent Systems. *Communications in Computer and Information Science*
(PAAMS 2019). Springer. [DOI]

Service

2023–2024	**Reviewer – *Conference***, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2023, 2024)
2023	**Reviewer – *Journal***, IEEE Robotics and Automation Letters (RA-L)
2021–2023	**TPC Member and Reviewer – *Conference***, IEEE Consumer Communications and Networking Conference (CCNC 2022, 2023, 2024)
2021	**Reviewer – *Journal***, Network Modeling Analysis in Health Informatics and Bioinformatics (NetMAHIB)

Competitions

2022	Competed at ICRA 2022 DodgeDrone Challenge: Vision-based Agile Drone Flight (Team Alpha, website)

Contributions to Conferences

Presented our WIP paper at CDC 2023, online

Attended IROS 2023, Detroit, US

Attended ICRA 2022, Philadelphia, US

Attended PerCom 2022, online

Presented our paper at IEEE CCNC 2022, online

Attended NeurIPS 2021, online

Presented our paper at GoodIT 2021, Rome, Italy

Presented our paper at GoodTechs 2020, online

Presented our paper at IEEE MSN 2019, Shenzhen, China

Presented our paper at EMAS 2019, Montreal, Canada

Attended AAMAS 2019, Montreal, Canada

Research Funding

2022	Grant for abroad research, Marco Polo program, University of Bologna
2021–2024	PhD Scholarship, CEMI Mobility Technology Holding Limited
2020–2021	Research grant, University of Bologna

Work Experience

11/2022–Present	**Researcher**, *Technology Innovation Institute*, Autonomous Robotic Research Center, Abu Dhabi (UAE) *Autonomous Drone Racing* Development of a software stack based on ROS2 for autonomous drone racing, and deployment on custom quadrotors. *Contributions:* Leading the project: planning, task assignment and definition, coordination of the team. Development of some SW modules. Code review of all the stack. Conducting testing and experiments.
07/2022–11/2022	**Intern**, *Technology Innovation Institute*, Autonomous Robotic Research Center, Abu Dhabi (UAE)

11/2020–10/2021	**Research fellow**, *University of Bologna*, Interdepartmental Centre for Industrial ICT Research, Cesena (Italy)
	LiBER project, `https://liberproject.eu/en`
	○ Using machine learning techniques to estimate and predict the status of batteries
	○ Leading a small team that works on autonomous driving with both simulated and real 1/10 scale cars, aiming to win the f1tenth competition
	In partnership with the Macao Polytechnic University and multiple companies
08/2020	**Software developer**, *University of Bologna*, Department of Computer Science and Engineering, Cesena (Italy)
	Freelance collaborator – Development of software for batteries data acquisition and elaboration. Preparation of a database for batteries' status prediction using ML
09/2017–11/2017	**Software developer**, *FlashStart (Collini Consulting)*, Cesena (Italy)
	Part-time job – FlashStart provides business Web filtering services based on DNS blocking. Improved their web application, by adding features and fixing bugs
03/2017–05/2017	**Software developer**, *FlashStart (Collini Consulting)*, Cesena (Italy)
	Curricular internship. – Developed the mobile version of their web app

Supervision & Teaching

2022	Teaching in Smart Vehicular Systems class (Master's). Topics: Autonomous Driving, Robot Operating System (ROS)
2021	Tutoring students of Macao Polytechnic University in autonomous driving and the use of machine learning for battery status estimation
2021	Tutoring students of Smart Vehicular Systems class during their exam projects about autonomous driving
2021	Introducing autonomous driving and reinforcement learning to Master's students of Smart Vehicular Systems class
2020	Held a seminar about the integration of BDI agents and reinforcement learning to Master's students of Pervasive Computing class

Job-Related Skills

Academic writing	Paper writing, systematic literature review, LaTeX
Machine learning	PyTorch, Tensorflow v2, StableBaselines3, Gym, Tensorboard Hyper-parameter tuning and reward shaping: abilities acquired during research experiences with deep reinforcement learning Strong theoretical and practical background in DL and RL
Robotics	ROS/ROS2 (Robot Operating Systems). Embedded systems design and development (Nvidia Jetson, 3D modelling, electronics, serial communication). Sensors and actuators management (UAV, small cars). State Estimation (DL, Vision, VIO, EKF). Planning (STRIPS, A^*, BDI). Control (RL, PID, MPC). Trajectory generation (time-optimal, geometric). Behavior-Based Robotics. Subsumption architecture
Sim/Plot	RVIZ, Plotjuggler, Foxglove, Matplotlib, OpenCV, Gazebo, CARLA
Programming	Clean code and effective programming. Advanced design and architectural patterns. Distributed and concurrent programming; Functional and logic programming. (code quality was stressed during course activities)
Languages	Currently used: Python, C++ Used in the past: Scala, Java, Javascript, C, C#, Prolog, Go

Soft Skills

- *Problem solving and creativity*: ability to identify the source of the problem and finding alternative solutions to reach the target no matter what. Abilities exercised in challenging situations and research projects when dealing with complex systems
- *Team management*: technical planning, tasks definition and assignment, people coordination and management. I gained those leadership and organizational skills as the leader of the drone racing team and the leader of other significant projects
- *Collaboration*: experience of team working in university and industry projects, managing collaboaration with external companies, working with people from different backgrounds and cultures
- *Independent work*: I was able to conduct innovative research and take decisions without asking for help from the supervisor/line manager

Languages

		Listening	Reading	Speaking	Writing
Italian	Mother Tongue	C2	C2	C2	C2
English	Advanced	C1	C1	C1	C1