

Berducci Luigi

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I am an enthusiastic Computer Scientist and I love to approach new challenges, formalise them and have a clear logical understanding of the problems. I am a PhD candidate and look forward to participating in international conferences and experiences to exchange ideas and collaborate with brilliant minds.

Education

- 2020 – Present » **Ph.D. Candidate, Institute of Computer Engineering, TU Wien**
Research Topic: Safe Learning Algorithms for Autonomous Driving
Advisor: Radu Grosu
- 2018 – 2020 » **MSc in Computer Science, University of Rome "La Sapienza"**
Thesis: Failure Probability Estimation for Autonomous Systems through Deep Reinforcement Learning and Importance Splitting
Supervisors: Enrico Tronci, Radu Grosu
Final mark: 110/110 e lode (*full marks with honors*).
- 2015 – 2017 » **BSc in Computer Science, University of Rome "La Sapienza"**
Thesis: Performance analysis of Apache Spark in Scala, Java and Python.
Supervisor: Irene Finocchi
Final mark: 110/110 e lode (*full marks with honors*).

Employment History

- Sep 2020 – Present » **University Assistant, TU Wien.** I am employed by TU Wien as member of the Doctoral College in Resilient Embedded Systems (DCRES), which supports my research activities.
- Feb 2023 – May 2023 » **Visiting Associate, University of Pennsylvania.** I collaborated with the xLab of the Department of Electrical & Systems Engineering, under the supervision of Prof. Rahul Mangharam.
- Jan 2021 – Present » **Collaborator, Autonomous Driving EXaminer (ADEX).** Automatic testing of Autonomous Driving Systems (ADAS) leveraging a mix of Accident Analysis, Runtime Verification and Reinforcement Learning.
- Jan 2020 – Sep 2020 » **GARR Fellow, INFN RomaTre.** Research fellow in the project "ML4NP: A Machine Learning Approach for Neutrino Physics" in the context of the LEGEND-200 experiment. The project aims to develop a classifier for real-time rejection of noisy sensor data, in order to allow the experiment to be extended in size in the current facilities without suffering an overwhelming level of ambient background noise.

Research Publications and Preprints

Conference Proceedings

- 1 Berducci, L. & Grosu, R. (2022). Safe policy improvement in constrained markov decision processes. *International Symposium on Leveraging Applications of Formal Methods*, 360–381.
- 2 Brunnbauer, A., Berducci, L., Brandstätter, A., Lechner, M., Hasani, R., Rus, D. & Grosu, R. (2022). Latent imagination facilitates zero-shot transfer in autonomous racing. *IEEE International Conference on Robotics and Automation (ICRA)*.

Workshops & Preprints

- 1 Scheuchenstuhl, D., Ulmer, S., Resch, F., Berducci, L. & Grosu, R. (2023). Enhancing robot learning through learned human-attention feature maps. *Workshop on effective Representations, Abstractions, and Priors for Robot Learning (ICRA 2023)*.
- 2 Berducci, L., Aguilar, E. A., Ničković, D. & Grosu, R. (2022). Hierarchical potential-based reward shaping from task specifications.

Competitions

- May 2023 » **11th F1TENTH Autonomous Grand Prix at ICRA2023** Team-based competition to deploy autonomous racing algorithms on F1Tenth miniature racecars. The team "Scuderia Segfault" placed *second* over 41 registered teams.
- May 2022 » **10th F1TENTH Autonomous Grand Prix at ICRA2022** Team-based competition to deploy autonomous racing algorithms on F1Tenth miniature racecars. The team "Scuderia Segfault" placed *third* over 38 registered teams.
- Sep 2021 » **9th F1TENTH Autonomous Grand Prix at IROS2021** Team-based competition to deploy autonomous racing algorithms on F1Tenth miniature racecars. The team "Scuderia Segfault" won the *first* prize as fastest car in the Time Trials, and head-to-head competition.
- 2018 – 2020 » **Online Competitions** During the university, I participate in various team-based online competitions, ranging from Machine Learning (e.g., Kaggle - House Prices, Kaggle - APTOS 2019 Blindness Detection) to competitive programming (ITACPC - Italian Collegiate Programming Contest).

Nominations & Grants

- Dec 2022 » **Marshall Plan Scholarship** (EUR 6 500) Academic exchange program between Austria and the U.S. that offers scholarships and fellowships for students from universities of applied sciences and technical universities to conduct research abroad in the field of technical sciences.
- July 2022 » **TUW Under 30** Campaign to present 30 people under 30 years of age who have proven their potential in various areas and have distinguished themselves through extraordinary achievements.

Nominations & Grants (continued)

- Jan 2020 » **GARR Scholarship Orio Carlini** (EUR 19 000) Prestigious grant sponsored by Consortium GARR Association, that provides an exceptional opportunity for innovators in the field of information technology, recognizes excellence and supports outstanding achievements in research and development.

Personal projects

- Oct 2021 – Present » **Autonomous F1Tenth Racing Team.** After having participated to F1Tenth Autonomous Racing Competition, I support and actively take part in the formation of a F1Tenth team at TU Wien. The aim of the F1Tenth Team is to develop novel racing algorithms, experimenting techniques for perception, planning, and control of autonomous racing cars.

Other skills

- Coding » **Python**, C++¹, ROS, Bash scripting
- Databases » MySQL, PostgreSQL
- Operating Systems » **Linux Ubuntu**, Windows 10
- Languages » Native **Italian**.
English: IELTS certification on March 2019. Score: 7.0 (CEFR Level: **C1**). Master's study and experience in foreign countries have enforced my communication skills in English.
German: Currently studying German (Level: B1) and living in a German-speaking country.