

# Berducci Luigi

✉ luigi.berducci@tuwien.ac.at

🐦 @BerducciLuigi

🌐 www.luigiberducci.github.io

🐙 www.github.com/luigiberducci

in www.linkedin.com/in/luigi-berducci



*I am a enthusiastic Computer Scientist with a love for tackling new challenges, formalizing them and gain a clear, logical understanding of the problems. I aim to make learning algorithms inherently safe and scalable for real-world robotics applications.*

*Eager to engage in projects to exchange ideas and drive innovation 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 (*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).
- 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" for 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.

## Skills

- Coding   » **Python**, CPP, ROS
- Data Mining   » **numpy**, pandas, scikit-learn
- Machine Learning   » **pytorch**, tensorflow, scikit-learn
- Databases   » **MySQL**, PostgreSQL
- Operating Systems   » **Linux Ubuntu**, Windows 10

## Research Publications and Preprints

### Conference Proceedings

- 1 Berducci, L., Yang, S., Mangharam, R. & Grosu, R. (2023). Learning adaptive safety for multi-agent systems [Under Review.].
- 2 Berducci, L. & Grosu, R. (2022). Safe policy improvement in constrained markov decision processes. *International Symposium on Leveraging Applications of Formal Methods*, 360–381.
- 3 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.

## 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 » **TU Wien Informatics' 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.
- 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.

## Competitions

- 2021-2023 » **9th, 10th, 11th F1TENTH Autonomous Grand Prix** Team-based competition to deploy autonomous racing algorithms on F1Tenth miniature racecars. The team "Scuderia Segfault" won the *first* prize in 2021, *third* in 2022, and *second* in 2023.
- 2023 » **The Agency Foundations Challenge** AI Safety Hackaton about preserving human agency in advanced AI systems. The team won the *first* prize (EUR 1 250) in the Agency Preserving RL track, with the project *Preserving Agency in Reinforcement Learning under Unknown, Evolving and Under-Represented Intentions*.

## Languages

- Italian » **Native.**
- English » **Level C1** (IELTS in 2019, Score: 7.0). Living and working in foreign countries enforced my communication skills in English.
- German » Studying German (**Level B1**) and living in a German-speaking country.