Ignacio D. Lopez-Miguel, M.Sc.

✉ ignacio.lopez@tuwien.ac.at
🌐 http://ignaciolopezmiguel.github.io//
in www.linkedin.com/in/ilomi/

Education

2022 – present — **Ph.D. Logic in Computer Science, TU Wien**.
Applying logic reasoning to machine learning-based systems. It includes reinforcement learning, answer set programming, runtime verification, and ethical AI.

2019 – 2021 — **M.Sc. Artificial Intelligence Research, Menendez Pelayo Univ. (UIMP)**. GPA: *9.5./10*.
Thesis title: *Simplification of Numeric Variables for PLC Model Checking.*

2016 – present — **B.Sc. Mathematics, National University of Distance Education (UNED)**. GPA: *8.7/10*.

2015 – 2017 — **M.Sc. Business Consulting, ICADE Business School**. GPA: *8.4/10*.
Thesis title: *Machine Learning Applied to Credit Scoring.*

2011 – 2015 — **B.Sc. Ind. Electronics and Automation Eng., Valladolid University**. GPA: *8.7/10*.
Thesis title: *Guided acoustic wave's phase and group velocity at low frequencies in fluid-filled elastic pipes.*

Employment History

2020 – 2022 — **Formal Verification Engineer,** CERN — *Geneva, Switzerland*
- Development and usage of the tool PLCverif to automatically formally verify PLC code.
- Eclipse ecosystem with Java and Xtext.
- Research work to optimize model-checking algorithms for programs containing complex data types.

2017 – 2019 — **Model Validation Specialist,** Deutsche Bank — *Frankfurt am Main, Germany*
- Validation of Machine Learning models to estimate credit score by performing different analyses, such as assumptions validation, sensitivity, robustness, and back-testing.
- Validation of Natural Language Processing model for credit scoring of enterprises.
- Development of Machine Learning challenger models.
- Participation in Data Science competitions.

2015 – 2017 — **Quantitative Consultant,** Management Solutions — *Madrid, Spain, and London, UK*
- Design and development of tools in VBA to automate processes.
- Analysis of Hadoop-based ecosystem to integrate it in a data lake.

2015 – 2015 — **Research Engineer,** Ifak e.V — *Magdeburg, Germany*
- Experimental research in order to characterize fluids via acoustic waves.

2014 – 2015 — **LEGO Robotics Teacher,** San Jose School — *Valladolid, Spain*
- Teaching students aged from 10 to 14 how to program and build LEGO robots.

Research Publications

1 **Lopez-Miguel, Ignacio D.**, Fernandez Adiego, B., Blanco Viñuela, E., Salinas, M., & Betz, C. (2023). Working Together for Safer Systems: A Collaboration Model for Verification of PLC Code. In *19th International Conference on Accelerator and Large Experimental Physics Control Systems (ICALEPCS)*.

2 Soldà, D., **Lopez-Miguel, Ignacio D.**, Bartocci, E., & Eiter, T. (2023). Progression for Monitoring in Temporal ASP. In *26th European Conference on Artificial Intelligence (ECAI)*.

3 **Lopez-Miguel, Ignacio D.**, Fernández Adiego, B., Ghawash, F., & Blanco Viñuela, E. (2023). Verification of neural networks meets PLC code: An LHC cooling tower control system at CERN. In *24th International Conference on Engineering Applications of Neural Networks*.

4 Ádám, Z., **Lopez-Miguel, Ignacio D.**, Mavridou, A., Pressburger, T., Bęś, M., Blanco Viñuela, E., … Fernández Adiego, B. (2023a). From Natural Language Requirements to the Verification of Programmable Logic Controllers: Integrating FRET into PLCverif. In *NASA Formal Methods - 15th International Symposium, NFM 2023.*

5 Ádám, Z., **Lopez-Miguel, Ignacio D.**, Mavridou, A., Pressburger, T., Bęś, M., Blanco Viñuela, E., … Fernández Adiego, B. (2023b). Automated verification of programmable logic controller programs against structured natural language requirements. ().

6 **Lopez-Miguel, Ignacio D.** (2023). Stop at red? Engineering meets ethics. In *International Conference on Computer Ethics, CEPE 2023.*

7 **Lopez-Miguel, Ignacio D.**, Fernandez Adiego, B., Tournier, J.-C., Rodriguez-Aguilar, J. A., & Blanco Viñuela, E. (2021). Simplification of Numeric Variables for PLC Model Checking. In *19th ACM-IEEE International Conference on Formal Methods and Models for System Design (MEMOCODE'21).*

8 Fernandez Adiego, B., **Lopez-Miguel, Ignacio D.**, & Tournier, J.-C. (2021). Applying model checking to highly-configurable safety critical software: the SPS-PPS PLC program. In *ICALEPCS'21.*

9 **Lopez-Miguel, Ignacio D.**, Tournier, J.-C., & Fernandez Adiego, B. (2021). PLCverif: status of a formal verification tool for Programmable Logic Controller. In *ICALEPCS'21.*

10 **Lopez-Miguel, Ignacio D.** (2021). Survey on Big Data Preprocessing Techniques. In *XOVETIC'21.*

Skills

Languages	🔖	Spanish (mother tongue), English (fluent), German (intermediate), French (basic).
Coding	🔖	Python, Java, C, R, SQL, VBA, LaTeX, NuSMV

References

Juan A. Rodriguez-Aguilar, Research Professor at Artificial Intelligence Research Institute (IIIA-CSIC)

Borja Fernandez Adiego, Automation Engineer at CERN

Jean-Charles Tournier, Software Engineer at CERN and Lecturer at EPFL

Ezio Bartocci, Full Professor at TU Wien