Short CV of the advisor:

Sara Silva

Curriculum Vitae
May 2026

GENERAL DATA

Name	Sara Guilherme Oliveira da Silva
Place and date of birth	Lisboa, Portugal, 28 Julho 1972
Institutional contacts	Faculdade de Ciências da Universidade de Lisboa C6, Room 6.3.53, Campo Grande, 1749-016 Lisbon, Portugal Tel: +351-217500565, Email: sgsilva@ciencias.ulisboa.pt
Current academic positions	Associate professor, Faculdade de Ciências da Universidade de Lisboa Integrated researcher, LASIGE (https://lasige.pt/)
Research interests	Machine learning, evolutionary algorithms, genetic programming. Interdisciplinary applications in remote sensing and medical imaging. Data preprocessing and feature construction, manipulation of feature spaces. Model interpretability, reliability and robustness.
Academic indicators	Google Scholar: http://scholar.google.com/citations?user=g15oqi0AAAAJ Citations: 5957 (2960 in the last 5 years) h-index: 38 (32 in the last 5 years) *(7 May 2026)*

NARRATIVE HIGHLIGHTS

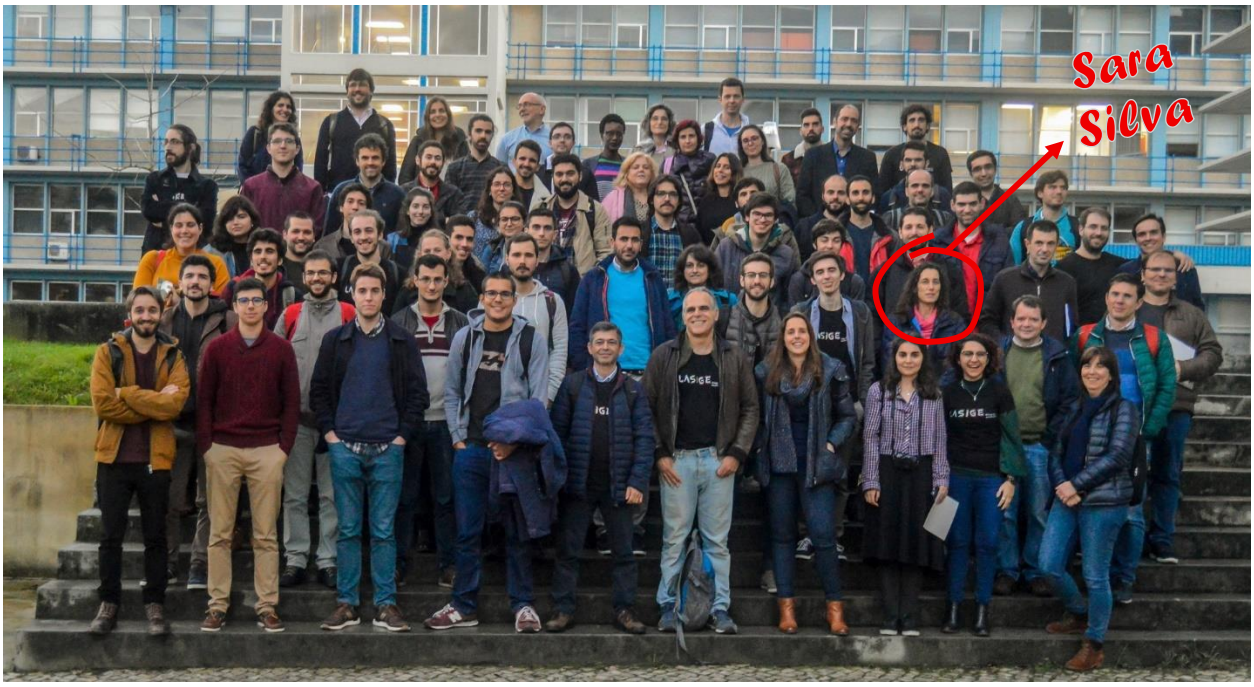
Publication record: Publications include a 350-page textbook "Lectures on Intelligent Systems" (2023); several book chapters including one in the "Handbook of Evolutionary Machine Learning" (2023); more than 100 peer-reviewed articles in Q1 and Q2 journals and core A and A* conferences, mostly on evolutionary computation methods and applications, but also on knowledge graphs, neural architecture search and deep learning for medical imaging.

Awards and peer recognition: Highly recognized in the evolutionary computation community: received the EvoStar Award for Outstanding Contribution to Evolutionary Computation in Europe (2018) by SPECIES (Society for the Promotion of Evolutionary Computation in Europe and its Surroundings); was General Chair of the largest conference of the field, GECCO (Genetic and Evolutionary Computation Conference) (2023); is an elected member of the executive board of ACM SIGEVO.

Supervision and editorial activities: Has successfully supervised six PhD students, three of which in the last 5 years, with theses titles like "Deep Learning Models for Clinical Assessment of Prostate Cancer", "Semantic perspectives for supervised learning with biomedical knowledge graphs" and "Evolving Robust and Readable Land Cover Models for Improved Forest Monitoring". Is associate editor of ACM Transactions on Evolutionary Learning and Optimization and of Genetic Programming and Evolvable Machines.

Description of the Research Group:

The student will be part of the LASIGE Computer Science and Engineering Research Centre (https://lasige.pt/) at the Faculty of Sciences of the Universiy of Lisbon (https://ciencias.ulisboa.pt/en).



LASIGE is organised around seven Research Lines, namely Cyber-Physical Systems, Data and Systems Intelligence (DSI), Dependable and Secure Decentralized Systems, Health and Biomedical Informatics (HBI), Inclusive Human-Computer Interaction, Reliable Software Systems, and Theory of Computing.

The student will be working closely with the advisor Sara Silva, who is a member of both DSI and HBI research lines. Depending on the starting date and the selected proposal, there may be a few master students working in the same small team, on related subjects.

LASIGE has a vibrant student community that organizes activities all year long (https://phdcommission.lasige.di.fc.ul.pt).

Description of the Work:

Proposal A: Symbolic regression is experiencing renewed momentum as a key tool for interpretable, trustworthy AI, while the integration of large language models (LLMs) into evolutionary algorithms has become a fast-growing research trend. This workplan proposes a novel approach that tightly couples LLMs with genetic programming for symbolic regression, treating the LLM as a constrained symbolic variation operator that cooperates with—rather than replaces—the evolutionary engine. Unlike existing methods where LLMs dominate search decisions, the evolutionary algorithm retains full control of evaluation, selection, and dynamics, integrating LLM-based operators alongside classical and semantic ones through adaptive multiobjective control. The work of the student is expected to deliver a functional prototype and early evidence on when LLM-assisted operators most effectively accelerate convergence. The results will lay the groundwork for a longer research program on hybrid GP–LLM systems for fast, interpretable equation discovery.

Proposal B: This is a less specific proposal, focused on the issues of overfitting and model interpretability. From the work recently published by [Silva et al 2025], new developments are being made, and new ideas have come forward, that make use of model complexity measures (mostly the iSBC [Silva et al 2025] but also others) in two fronts:

1) To prevent overfitting in hard symbolic regression problems, resorting to the optimization of non-conventional objectives during the GP evolution;

2) To provide novel measures of feature-based explainability (akin to Partial Dependency Plots (PDP), Accumulated Local Effects (ALE), LIME and SHAP).

Work is ongoing and a more detailed proposal will be drafted once the student expresses their interest.

[Silva et al 2025] S Silva, I Magessi, L Vanneschi (2025). Controlling Functional Complexity for Overfitting Reduction and Improved Interpretability in GP. IEEE Transactions on Evolutionary Computation. DOI: 10.1109/TEVC.2025.3614086

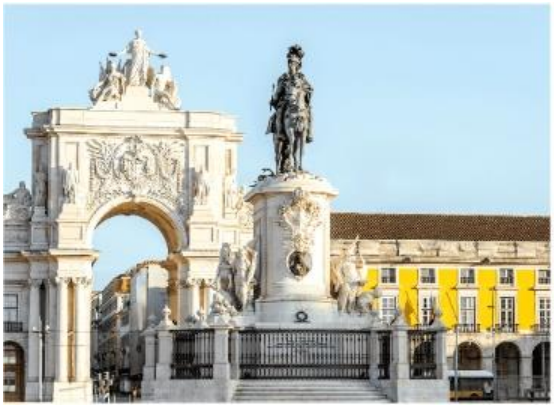
Proposal C: This proposal is open to discussion with prospective students, provided it is GP-based and related to interpretability, feature engineering, and/or model robustness.

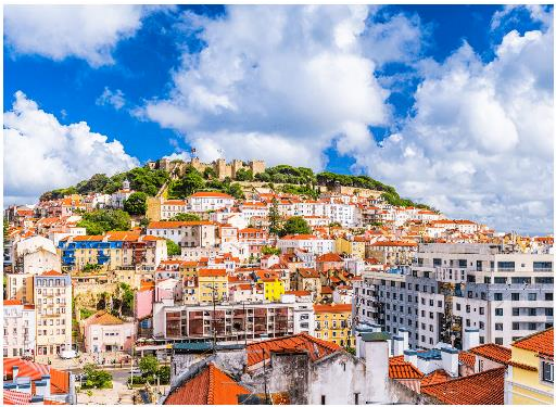
Additional relevant information:

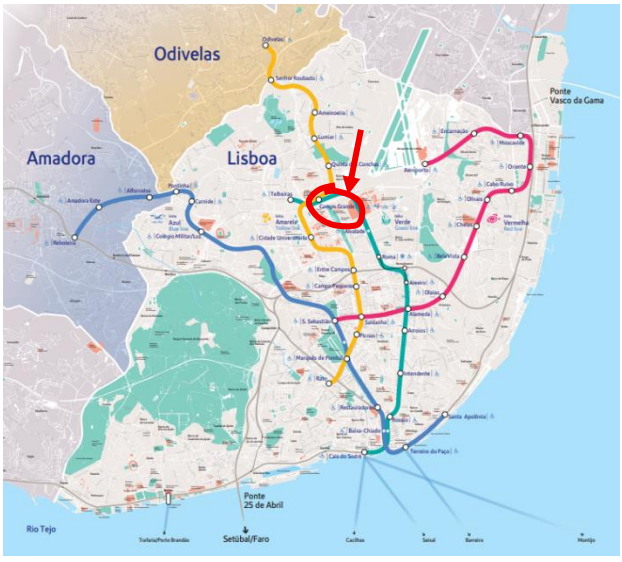
Additional funding: Pending bureaucratic issues, most probably it will be possible to top up the monthly allowance and/or to fund an additional month and/or to cover travelling costs.

Accomodation arrangements: Pending availability, it may be possible to reserve accomodation in a residency of the University of Lisbon.

Location information: Lisbon is the sunny capital of Portugal, known for its warm, welcoming atmosphere, rich history, and beautiful scenery. The Campus of the Faculty of Sciences is located in Campo Grande, near the subway that connects the entire city.







Subway map with Campus location

Contacts: Please contact me at sgsilva@ciencias.ulisboa.pt for any questions!