SUPERVISOR INFORMATION	
First and Last name	Alexandra Mendes
URL of supervisor webpage	https://archimendes.com/ https://sr-lab.github.io/
Department	Informatics Engineering
Field(s) of research	Computer Science/Informatics Engineering
PROJECT PROPOSAL	
Title (optional)	Improving Productivity in Software Verification

Brief project description

Our research group has a strong track record in advancing the usability of verification-aware programming languages, with particular emphasis on Dafny. We currently host an active team of PhD students (https://sr-lab.github.io/) working in this area, who contribute to both foundational research and practical tooling.

The main objective of this postdoctoral project is to further develop this line of work by improving user support for completing correctness proofs in such languages. We plan to investigate both deterministic and non-deterministic approaches within the Dafny ecosystem, and to extend these techniques to additional verification-oriented languages, including Verus (https://github.com/verus-lang/verus) and Lean (https://lean-lang.org/). A particular direction of interest is the use of agentic techniques to support and automate software verification tasks.

To facilitate broader community engagement and to enable systematic comparison across research efforts, we also intend to design and evaluate online platforms capable of collecting large-scale Dafny and Verus examples. Such platforms would support reproducibility and benchmarking, ultimately strengthening the evaluation pipelines for verification research.

Some of our most recent work includes:

[6] Inferring multiple helper Dafny assertions with LLMs
Álvaro Silva, Alexandra Mendes, Rúben Martins
Under-submission, arXiv preprint arXiv:2511.00125

[5] MutDafny: A Mutation-Based Approach to Assess Dafny Specifications
Isabel Amaral, Alexandra Mendes, José Campos
Under-submission, arXiv preprint arXiv:2511.15403

[4] What Challenges Do Developers Face When Using Verification-Aware Programming Languages?
Francisco Oliveira, Alexandra Mendes, Carolina Carreira
The 36th IEEE International Symposium on Software Reliability Engineering (ISSRE 2025), 2025

[3] Specification-guided repair of arithmetic errors in Dafny programs using LLMs
Valentina Wu, Alexandra Mendes, Alexandre Abreu
International Conference on Software Engineering and Formal Methods (SEFM 2025), 2025

[2] Can Large Language Models Help Students Prove Software Correctness? An Experimental Study with Dafny
Carolina Carreira, Álvaro Silva, Alexandre Abreu, Alexandra Mendes
23rd International Conference on Software Engineering and Formal Methods (SEFM 2025)

[1] Leveraging large language models to boost Dafny's developers productivity
Álvaro Silva, Alexandra Mendes, João F. Ferreira
Proceedings of the 2024 IEEE/ACM 12th International Conference on Formal Methods in Software Engineering (FormaliSE), 2024