

Short-Term Scientific Mission Grant - APPLICATION FORM¹ -

Action number: CA20111

Applicant name: Claudio Sacerdoti Coen

Details of the STSM

Title: Centralized indexing and search for LambdaPi/Dedukti Proofs

Start and end date: 21/01/2025 to 30/01/2025

Goals of the STSM

Purpose and summary of the STSM.

The aim of the STSM is to design and start implementing a centralized service for LambdaPi/Dedukti libraries able to automatically track the release of new libraries, index them and allows remote searches over them.

Working Plan

Description of the work to be carried out by the applicant.

To reach the STSM aims, the applicant together with the LambdaPi team members will have to collaborate on several tasks:

- 1. the LambdaPi team will need to identify a suitable distribution model for the heterogeneous libraries exported from the multiple interactive provers able to export to Dedukti.*
- 2. together with the applicant the LambdaPi team will specify and start implementing a set of tools to manage the life-cycle of the heterogenous libraries of the system. The tool may take the form of a package manager, unless at point 1 a totally centralized approach is taken.*
- 3. the applicant will specify how to integrate the tools of the previous point with indexing, following up on his previous work on implementing indexing/retrieval in LambdaPi. In particular the applicant and the LambdaPi team will understand how to automatize re-indexing when a new library version is released.*
- 4. the applicant will modify LambdaPi to integrate remote searches passed to the centralized repository with indexing and search on libraries locally installed or under development*
- 5. indexing in LambdaPi, as currently implemented by the applicant, normalized the library content using sets of rewriting rules that apply library alignments and that “undo” the logical encodings. At the moment only rules for the Coq library (as produced from Coqine) have been developed. The applicant will*

¹ This form is part of the application for a grant to visit a host organisation located in a different country than the country of affiliation. It is submitted to the COST Action MC via-e-COST. The Grant Awarding Coordinator coordinates the evaluation on behalf of the Action MC and informs the Grant Holder of the result of the evaluation for issuing the Grant Letter.

implement them for all the encodings currently in use for LambdaPi, in particular for those developed by the CA.

Expected outputs and contribution to the Action MoU objectives and deliverables.

The STMS directly contributes to the CA research objective 5 (Provide tools for searching large libraries of formal proofs) which in turns impacts also on the capacity building objective 4 (Ease access to formal verification techniques in education and other areas of science.). The concrete expected output is to integrate the previous contributions of Work Group 4 (Libraries of Formal Proofs) on the final Deliverable 15 (Prototype implementation of the mathematical framework, with basic user interface, user documentation and gallery of examples of type theories)