

# Report on the outcomes of a Short-Term Scientific Mission<sup>1</sup>

**Action number: CA20111**

**Grantee name: David M. Cerna**

## **Details of the STSM**

Title: Exploring anti-unification over typed languages and equational theories.

Start and end date: 01/08/2024 to 10/08/2024

## **Description of the work carried out during the STSM**

Description of the activities carried out during the STSM. Any deviations from the initial working plan shall also be described in this section.

*(max. 500 words)*

There was no deviation from the initial work plan presented in the proposal. David met with Temur Kutsia and his PhD student Georg Ehling on multiple occasions to discuss which type of quantitative anti-unification should they address and how the algorithm would work. Towards the end of the trip they focused on construction of a representation of the minimal complete set of solutions as this turned out to be the hardest aspect of developing quantitative anti-unification. Work on this continues. David also met with Gabriela Ferreira, a visiting PhD student from Brasilia. They worked on extending the framework discussed in the proposal. An issue slowing down progress was a lack of clarity concerning what should be present in the generalization after anti-unification is performed. This was a central part of the discussions and was resolved during the visit. Concerning the combination of disjoint theories, we discussed proposed algorithms developed over the past few months and realised that certain more complex theories, i.e. Idempotent and absorbing, may be handled. This is unexpected as the methods were developed for finite theories.

## **Description of the STSM main achievements and planned follow-up activities**

Description and assessment of whether the STSM achieved its planned goals and expected outcomes, including specific contribution to Action objective and deliverables, or publications resulting from the

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<sup>1</sup> This report is submitted by the grantee to the Action MC for approval and for claiming payment of the awarded grant. The Grant Awarding Coordinator coordinates the evaluation of this report on behalf of the Action MC and instructs the GH for payment of the Grant.

STSM. Agreed plans for future follow-up collaborations shall also be described in this section.

*(max. 500 words)*

It is likely the case that these developments will lead to three separate papers over the coming months. We plan to have further meeting over the next 6 months and hold regular online meetings. The target events are: FSCD, CADE, FOSSACS, and related venues. As mentioned in the proposal, anti-unification is an important operation (as outlined in [Cerna and Kutsia, 2023]) with applications within many of the tools addressed in the MoU objectives list and deliverables.

[Cerna and Kutsia, 2023] David M. Cerna, Temur Kutsia: Anti-unification and Generalization: A Survey. IJCAI 2023