Proposal Evaluation Form

	EUROPEAN COMMISSION Horizon 2020 - Research and Innovation Framework Programme	**Evaluation Summary Report**

Call:	H2020-MSCA-IF-2019
Type of action:	MSCA-IF-EF-ST
Proposal number:	897873
Proposal acronym:	Cameleer
Duration (months):	24
Proposal title:	Principles and Methods to Verify OCaml Programs
Activity:	EF-ST-ENG

N.	Proposer name	Country	Total Cost	%	Grant Requested	%
1	UNIVERSIDADE NOVA DE LISBOA	PT	147,815.04	100.00%	147,815.04	100.00%
	Total:		147,815.04		147,815.04	

Abstract:

Deductive software verification, a subject within the broader field of formal methods, proposes a very ambitious path: to turn the correctness of a computer program into a mathematical statement, and then prove it. This project aims to develop a deductive verification framework, with a clear focus on proof automation, that directly tackles the verification of OCaml-written programs.

OCaml seems to be particularly good target for verification. On one hand, it is the language of choice for the implementation of sensible software such as proof assistants, automated solvers, and compilers. On the other hand, OCaml is a multi-paradigm language, supporting both the functional and imperative paradigm, one can write clean, concise, type-safe, and efficient code. Yet, a verification tool that can handle hand-written code and is mostly automated does not currently exist. OCaml programmers must chose between proof automation, with the price of learning and programming in a verification-aware language, and then perform code extraction, or tools that require manual proof assistance.

The Cameleer project aims to remedy this situation by providing the tools and principles for the verification of OCaml programs. The main outcome of this project is a powerful, usable, and mostly automated verification framework for the OCaml-written code. This will be a major step towards making verification more accessible to OCaml programmers, even in case they are not verification experts. The Cameleer framework will feature a translation of OCaml programs annotated with specifications written in GOSPEL, a recently proposed specification language, to different intermediate verification languages, namely WhyML, Viper, and Coq. This coexistence of multiple intermediate verification infrastructures allows the devised framework to target the verification of a large subset of OCaml programs, while combining the strengths of each individual intermediate language to obtain better verification results.

Evaluation Summary Report

Evaluation Result

Total score: 98.40% (Threshold: 70/100.00)

Form information

SCORING

Scores must be in the range 0-5.

Interpretation of the score:

> *0– The **proposal fails to address the criterion** or cannot be assessed due to missing or incomplete information.*

> *1– **Poor.** The criterion is inadequately addressed, or there are serious inherent weaknesses.*

> *2– **Fair.** The proposal broadly addresses the criterion, but there are significant weaknesses.*

> *3– **Good.** The proposal addresses the criterion well, but a number of shortcomings are present.*

> *4– **Very good.** The proposal addresses the criterion very well, but a small number of shortcomings are present.*

> *5– **Excellent.** The proposal successfully addresses all relevant aspects of the criterion.Any shortcomings are minor.*

* - mandatory fields

Criterion 1 - Excellence

Score: **4.90** (Threshold: 0/5.00 , Weight: 50.00%)

• **Quality and credibility of the research/innovation project; level of novelty, appropriate consideration of inter/multidisciplinary and gender aspects**
• **Quality and appropriateness of the training and of the two way transfer of knowledge between the researcher and the host**
• **Quality of the supervision and of the integration in the team/institution**
• **Potential of the researcher to reach or re-enforce professional maturity/independence during the fellowship**

Strengths:
- The research is very relevant, novel and addresses timely needs. The research methodology is very precisely specified. The state-of-the-art

and the progress beyond it are clearly and convincingly presented.
- The proposal describes a very convincing mix of activities for training and the transfer of knowledge between the host and the researcher including teaching, supervision of students, and international collaborations.
- The qualifications and experience of the supervisors are excellent. They possess relevant skills which are supported with strong track records in research and training areas.
- A good integration of the researcher with the host is credibly presented. The proposal is very well aligned with the current areas of activity of the research group.
- The professional independence of the researcher is well documented and it will be further improved through the collaboration with the host during the fellowship.

Weaknesses:

No weakness.

Criterion 2 - Impact

Score: **4.90** (Threshold: 0/5.00 , Weight: 30.00%)

• Enhancing the future career prospects of the researcher after the fellowship
• Quality of the proposed measures to exploit and disseminate the project results
• Quality of the proposed measures to communicate the project activities to different target audiences

Strengths:
- The career prospects of the researcher will be significantly improved through knowledge sharing, obtained skills and further experience in supervision. The project will strongly support the long-term career of the researcher, especially in the research and teaching areas.
- The measures to disseminate the project's results through conferences and journal publications are very relevant with the realistic impact which is credibly described. The strategy for targeting various audiences, including researchers, industry and students is clearly presented.
- The communication strategy is very good and will target different groups though various actions, including European Researcher's night, meetings with school children and online forums. The communication activities are adequately reflected in the Gantt chart.

Weaknesses:

No weakness.

Criterion 3 - Implementation

Score: **5.00** (Threshold: 0/5.00 , Weight: 20.00%)

• Coherence and effectiveness of the work plan, including appropriateness of the allocation of tasks and resources
• Appropriateness of the management structure and procedures, including risk management
• Appropriateness of the institutional environment (infrastructure)

Strengths:
- The work plan is excellent, including very well defined main tasks and deliverables. The human resources are very well allocated for the purpose of successful research and training activities.
- The Gantt chart is very clearly presented and includes major deliverables, milestones and secondments.
- The management procedures and structures are good, including detailed and appropriate mechanisms for the progress monitoring.
- The risk analysis and mitigation procedures are very convincingly presented.
- The host organisation offers the research environment, administrative support, scientific support and relevant infrastructures of the highest quality.

Weaknesses:

No weakness.

Scope of the proposal

Status: **Yes**

Comments (in case the proposal is out of scope)

Not provided

Operational Capacity

Status: **Operational Capacity: Yes**

If No, please list the concerned partner(s), the reasons for the rejection, and the requested amount.

Not provided

Use of human embryonic stem cells (hESC)

Status: **No**

If yes, please state whether the use of hESC is, or is not, in your opinion, necessary to achieve the scientific objectives of the proposal and the reasons why. Alternatively, please state if it cannot be assessed whether the use of hESC is necessary or not because of a lack of information.

Not provided

Overall comments

Not provided
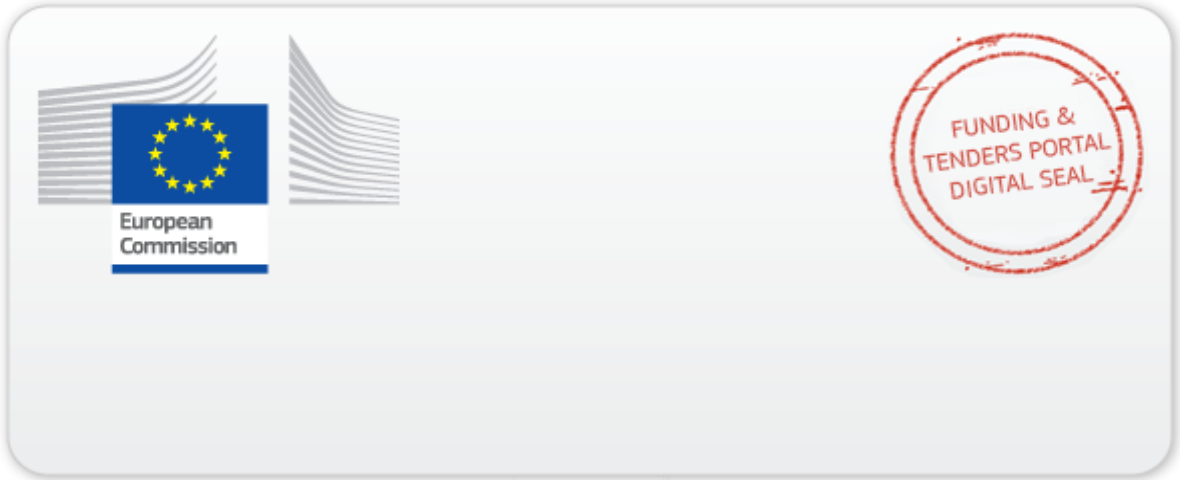
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