

Proposal Evaluation Form

Associated with document Ref. Ares(2018)137167 - 09/01/2018

	EUROPEAN COMMISSION Horizon 2020 - Research and Innovation Framework Programme	Evaluation Summary Report
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Call: H2020-MSCA-IF-2017
Funding scheme: MSCA-IF-EF-ST
Proposal number: 795119
Proposal acronym: CARBS
Duration (months): 12
Proposal title: Compositional Approximate Reasoning via Bialgebraic Semantics
Activity: ST-ENG

N.	Proposer name	Country	Total Cost	%	Grant Requested	%
1	UNIVERSITY COLLEGE LONDON	UK	91,727.4	100.00%	91,727.4	100.00%
Total:			91,727.4		91,727.4	

Abstract:

Programming languages with probabilistic features are used extensively in computer science and beyond, to model uncertainty, perform quantitative analysis, inference and much more. To analyse programs in such languages, it is essential to have effective tools and techniques for approximate reasoning: for instance, determining the chance of congestion in a network, or the chance of failure of a system component. CARBS proposes a general mathematical framework of compositional proof techniques for approximate reasoning, with two essential points of focus: general applicability, to deal with the wide variety of different quantitative languages and models, and compositionality, to deal with large-scale systems. A motivating case study and application for the developed proof techniques is ProbNetKAT, a probabilistic language for describing randomized protocols and analysing quantitative properties in networks such as throughput or chance of failure. Approximate reasoning about such network programs is an important but also challenging problem, and the abundance of possible case studies will allow to immediately evaluate and apply the developed proof techniques. Approximate reasoning requires to move from behavioural equivalence to behavioural metrics, formalising how far apart two programs are. CARBS is based on integrating behavioural metrics in bialgebraic semantics, a categorical approach for a systematic study of languages and calculi based on the combination of algebra and coalgebra. Coalgebra allows to define behavioural metrics, in a general manner, whereas algebra integrates compositionality in the associated proof techniques. The overall envisaged result of CARBS is an extension of bialgebraic semantics to quantitative systems, providing on the one hand fundamental insights about quantitative coalgebras and compositionality, and on the other hand concrete, effective proof techniques for approximate reasoning.

Evaluation Summary Report

Evaluation Result

Total score: 92.40% (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: **4.60** (Threshold: 0/5.00 , Weight: 50.00%)

- **Quality and credibility of the research/innovation action (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**
- **Capacity of the researcher to reach or re-enforce a position of professional maturity/independence**

Strengths

- The proposal has a novel and ambitious objective.
- The methodology proposed is well thought-out and credible.
- The proposal describes meaningful measure for training the applicant with activities both in science and administration.

- The proposal lists convincing activities for transfer to the host through activities that involve different levels in the host's group.
- The supervisor is an expert on the topic of the proposal and has an excellent publications record and experience in supervision of young researchers.
- The researcher will be well integrated into the institution and have both general support from it as well as personal support from the supervisor.
- The research group that is to host the researcher is of very high quality and performs research closely related to the proposal.
- The researcher has published a number of results at very well recognised scientific venues.
- The applicant has already shown the capacity to reach a high level of professional maturity and independence. This makes it plausible that the proposed project will increase this further.
- The researcher does also have useful experience with communication not only through scientific channels but also other means (e.g., an online blog).

Weaknesses

- The applicability of the proposed analysis technique for probabilistic programs is not sufficiently argued.
- State of the art discussion does not fully consider existing approaches for the analysis of probabilistic systems.

Criterion 2 - Impact

Score: **4.80** (Threshold: 0/5.00 , Weight: 30.00%)

- **Enhancing the potential and future career prospects of the researcher**
- **Quality of the proposed measures to exploit and disseminate the action results**
- **Quality of the proposed measures to communicate the action activities to different target audiences**

Strengths

- The researcher's professional knowledge will be strengthened in several important directions.
- The proposed project is part of a clear strategy to improve the future career prospects of the researcher.
- The researcher's skills will also be strengthened in non-scientific areas.
- There is a good plan in place for disseminating the research results of the project at appropriate conferences and journals as well by delivering seminars in local universities.
- The proposal sketches a convincing plan for communicating results and findings as well as experiences as an MSCA fellow to different target audiences.

Weaknesses

- Exploitation by potential users is not fully considered.

Criterion 3 - implementation

Score: **4.40** (Threshold: 0/5.00 , Weight: 20.00%)

- **Coherence and effectiveness of the work plan**
- **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 detailed, coherent, with an appropriate number of work packages, deliverables, and milestones.
- The management structures and procedures are adequate.
- The institutional environment is excellent and suitable for the proposed project, and the host provides sufficient organisational and scientific means to carry out the planned research.

Weaknesses

- The proposal does not convincingly explain that the research goal can be reached with the given allocation of resources.
- The proposal gives insufficient reasons why the risks can be ignored or mitigated. The proposal does not convincingly explain why the identified overall risk can be ignored.

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**

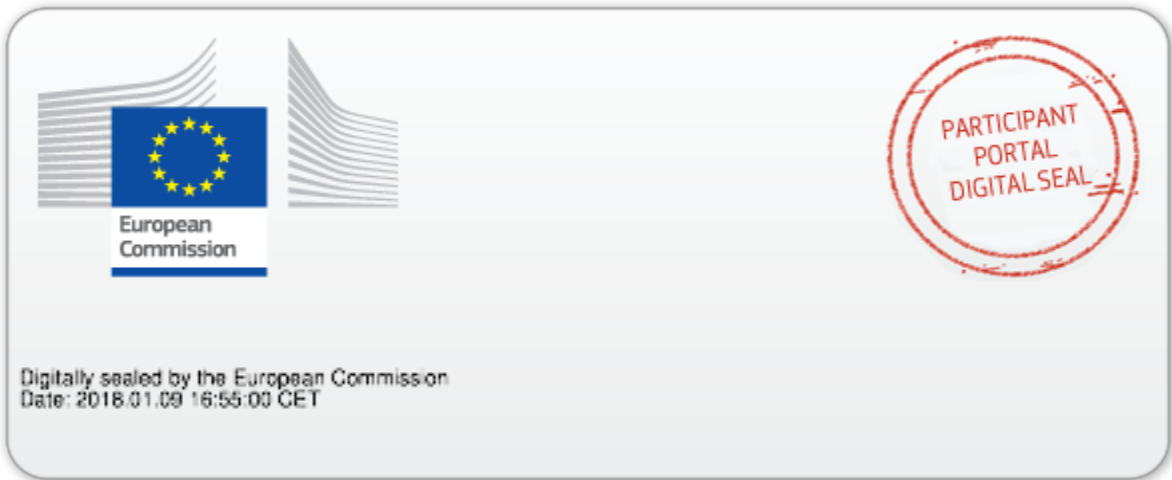
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If yes, please state whether the use of hESC is, or is not, in your opinion, necessary to achieve the scientific objectives of the proposal and the reasons why. Alternatively, please also state if it cannot be assessed whether the use of hESC is necessary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

Not provided

Overall comments

Not provided



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