

# Proposal Evaluation Form

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	<b>EUROPEAN COMMISSION</b> Horizon 2020 - Research and Innovation Framework Programme	<b>Evaluation Summary Report</b>
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**Call:** H2020-MSCA-IF-2017  
**Funding scheme:** MSCA-IF-EF-ST  
**Proposal number:** 799557  
**Proposal acronym:** PolyBar  
**Duration (months):** 24  
**Proposal title:** A new approach to polymorphism through bar recursion  
**Activity:** ST-ENG

N.	Proposer name	Country	Total Cost	%	Grant Requested	%
1	UNIVERSITE PARIS DIDEROT - PARIS 7	FR	185,076	100.00%	185,076	100.00%
Total:			185,076		185,076	

## Abstract:

Parametric polymorphism is an ubiquitous paradigm in programming. It permits writing generic algorithms that can be used on several datatypes, thus reducing the duplication of code and producing safer software. System F is a very simple polymorphic programming language suited to the theoretical study of polymorphism. From the point of view of mathematical logic, System F corresponds to the theory of second-order Peano arithmetic (PA2), which in turn is a sub-theory of first-order Peano arithmetic with the axiom of countable choice (PA-AC). On the other hand, PA-AC can be computationally interpreted using the non-polymorphic programming language System T extended with the bar recursion operator (System TBR). The PolyBar project will turn the logical translation of PA2 to PA-AC into a computational translation from System F to System TBR. This translation will improve the state-of-the-art by extending the use of well-known proof techniques to polymorphic programming languages and promote the use of these languages in environments where safety is important, like medical software or autonomous car systems. Computer programmers will be able to use the sophisticated features of polymorphism and still prove correctness properties on their programs. The PolyBar project will be carried out by the experienced researcher who worked during his PhD thesis on computational interpretations of PA-AC using System TBR, and recently gave the first connections with PA2 and System F. The experienced researcher will collaborate with a supervisor who has a strong background in type theories (including System F) and in correspondences between various mathematical theories and programming languages. Working in France, where System F was discovered and is still a subject of intense research by many experts in the field, the experienced researcher will make the beneficiary benefit from his experience in the UK, which has a strong community on recursion theory and denotational semantics.

## Evaluation Summary Report

### Evaluation Result

**Total score: 95.00% (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: **4.80** (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 researcher provides a very good presentation of the state-of-the-art and of the problems to be addressed, setting the context for a high quality and novel proposal.

- The proposed methodology is highly credible and the research objectives are attainable. The applicant has already provided some of the building blocks for reaching the project goals.
- The training activities described are appropriate and of high quality, covering scientific, teaching, supervision, and funding issues, and presenting concrete actions.
- An excellent plan for knowledge transfer in both directions is proposed.
- Supervisor is a top researcher, with many important contributions and very active in the topics of the proposal, so he can definitely complement and guide the researcher towards a successful completion of the project.
- The team and institution integration are described clearly and offer an ideal environment for the proposed research project. The team has several periodic events promoting integration and collaborations.
- The proposal describes clear factors that make it plausible that the researcher has the capacity to reach an improved position of professional maturity, especially previous experience and research track record.

**Weakness**

- Interdisciplinary aspects of the proposal are minimally addressed.

**Criterion 2 - Impact**

Score: **4.70** (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 laid down a very well-articulated overview of how the fellowship will enhance their future career prospects, through network extensions, research results, and additional skills acquired.
- Dissemination in research venues is well-planned and realistic, containing an adequate approach to target first workshops and submit selected findings to top venues.
- The proposal identifies relevant target audiences, ranging from students over other research groups to the general public. The communication measures have potential to be successful because the researcher has already experience in communicating research results.

**Weakness**

- The exploitation measures are vague and the proposal lacks details on which parts of the theoretical results could be exploited in a commercial or industrial setting.

**Criterion 3 - implementation**

Score: **4.70** (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 and the associated Gantt chart gives a coherent picture of the implementation of the proposed research with an adequate number of deliverables and milestones and well defined tasks.
- The proposal describes a clear organization and management structure as well as the progress monitoring actions which together have the potential to guarantee a smooth operation of the project.
- The proposal describes an adequate risk assessment, risk management, and clear contingency plans.
- The proposal describes convincingly the embedding into the host institution, and the institution's contribution to the project, including a very good environment with all required facilities and infrastructures.

**Weakness**

- The proposal fails to clearly identify and allocate the resources.

**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**

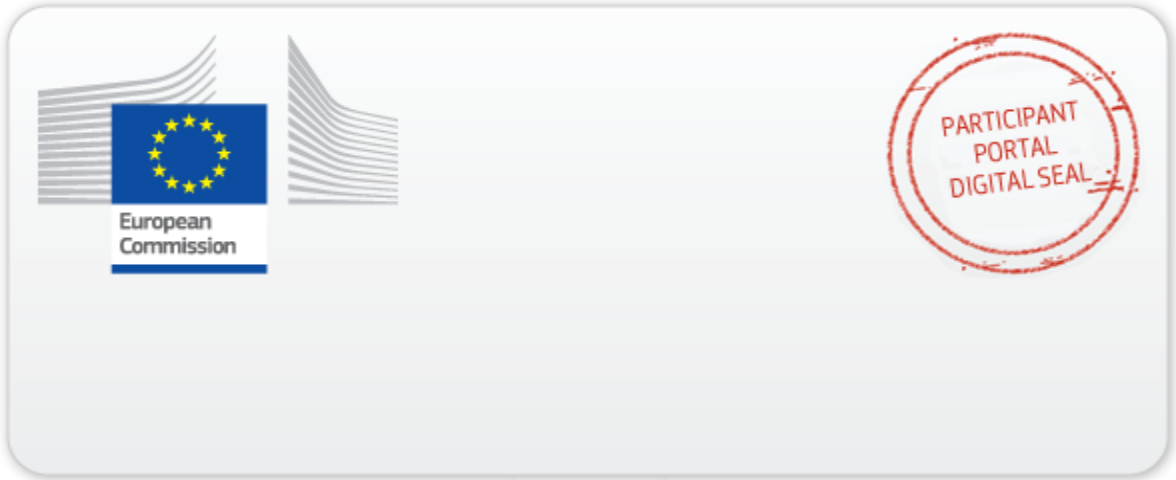
If yes, please state whether the use of hESC is, or is not, in your opinion, necessary to achieve the scientific objectives of the

proposal and the reasons why. Alternatively, please also state if it can be assessed whether the use of HESG is necessary or not because of a lack of information.

*Not provided*

#### Overall comments

*This proposal was declared as a resubmission from [If-2015] and/or [If-2016]. During the consensus stage of the evaluation, Evaluators were given access to the previous Evaluation Summary report(s).*



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