Proposal Evaluation Form

EUROPEAN COMMISSION

Horizon 2020 - Research and Innovation Framework Programme

Evaluation Summary Report

Call: H2020-MSCA-IF-2016
Funding scheme: MSCA-IF-EF-ST
Proposal number: 753431
Proposal acronym: MiLC
Duration (months): 24
Proposal title: Monotonicity in Logic and Complexity
Activity: ST-MAT

N.	Proposer name	Country	Total Cost	%	Grant Requested	%
1	KOBENHAVNS UNIVERSITET	DK	200,194.8	100.00%	200,194.8	100.00%
	Total:		200,194.8		200,194.8	

Abstract:
MiLC will develop logical characterisations of monotone complexity classes, yielding languages and systems which are machine-independent and well suited for reasoning over such classes of functions. Monotone Boolean functions abound in the theory of computation, e.g. in sorting algorithms and clique detection in graphs, and nonuniform classes of monotone functions have been well studied in computational complexity under the lens of monotone circuits. From the point of view of computation, monotone functions are computed by algorithms not using negation, and this will lead to several recursion-theoretic characterisations of feasible classes such as monotone P, NCi, ACi and the polynomial hierarchy. The main purpose of MiLC will be to capture these classes proof theoretically, by calibrating each class with the formally representable functions of a certain theory. MiLC will work in the setting of Bounded Arithmetic since its techniques are well suited to handling monotonicity, building on recently discovered correspondences with monotone proof complexity. To this end two avenues for controlling monotonicity will be investigated: (a) restricting negation in proofs, inducing monotone witnessing invariants, and (b) restricting structural rules of the underlying logic to eliminate the nonmonotone cases of witness extraction. The aim is to arrive at modular characterisations, where monotonicity of a represented class is switched on or off by the inclusion or exclusion, respectively, of certain structural rules. Finally MiLC will calibrate these theories with well studied systems in proof complexity, namely monotone, intuitionistic and deep inference systems, under the usual correspondence between theories of Bounded Arithmetic and systems of propositional logic. These tight correspondences ensure that the tools developed in MiLC may be employed to attack certain open problems in the area, reformulating and improving existing bounds.

Evaluation Summary Report

Evaluation Result

Total score: 92.60% (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: **4.70** (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 provides a very clear presentation of the research objectives constituting a relevant, original, novel, timely, and promising research programme in mathematical logic.
+ The current state-of-the-art is well presented, identifying the obstacles to overcome, and citing relevant references.

+ The research methodology is credible, well planned, and appropriate for the objectives.
+ A very good training programme is proposed, accommodating a good balance of scientific and transferable skills.
+ The planned integration of the researcher in the host team host is very well considered.
+ The supervisor is very experienced and recognised, and excellent concrete measures to assess the development of the researcher's progress are put forward.
+ The planned transfer of knowledge from the host to the researcher is clearly explained.
+ The host and the collaborating team have the relevant competences necessary for supporting the project.
+ Taking into account the level of experience, the researcher has a very good publication record showing the capacity of not only acquiring new knowledge, but also of attaining important results.
+ There is a very good match between the researcher's expertise and the project.
+ A successful completion of this ambitious project would significantly enhance the researcher's development and maturity.

Weakness:
- Transfer of knowledge from the researcher to the host is not convincingly argued in the proposal.

Criterion 2 - Impact

Score: **4.60** (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:

+ Very good publication and communication plans are in place, encompassing high quality journals and conferences, as well as open access publications.
+ Very good dissemination and community building actions are proposed.
+ A successful completion of this project would significantly increase the applicant's career prospects within academia.

Weaknesses:

- Vague references are provided to the new skills to be acquired and their importance for career development.
- The proposed communication measures to non-specialist audiences lack detail.

Criterion 3 - implementation

Score: **4.50** (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 coherent, effective, and consistent with the research and career development goals.
+ Tasks are credibly allocated and consistent with the work plan and objectives.
+ The allocation of time to the work packages is credible, given the experience of the supervisor and the researcher.
+ A suitable discussion of risk management and of mitigation measures is provided.
+ The proposed management structure is appropriate for this project. An experienced and competent staff would be available to administratively manage the project.
+ The host infrastructure is very well suited for the project.

Weaknesses:

- Milestones and envisaged results are only vaguely identified.
- The Gantt chart is not fully explained.

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)

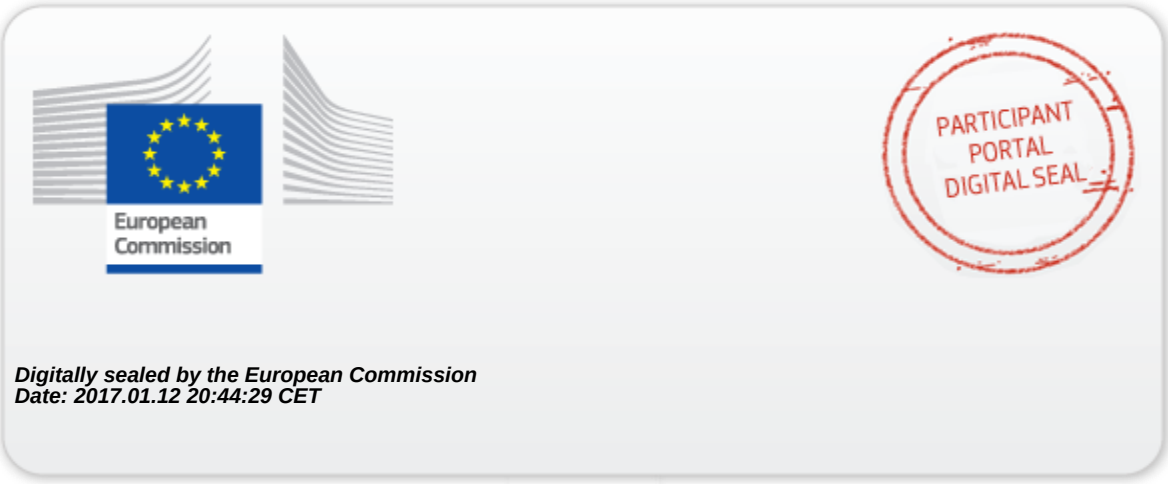
Status: **No**

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 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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