

Application No. 264061

Call Centre of Excellence programme 2014–2019, letters of intent 02.04.2012 - 25.04.2012

Applicant Karl Tapio Westerlund

Research topic ENG: Center of Excellence in Optimization and Systems Engineering

Summary of the reviews

	Review-1	Review-2
	21.08.2012	19.08.2012
Overall rating	5	6
1. Research plan	5	5
1.1 Assess the scientific quality and innovativeness of the research plan	5	4
1.2 Assess the scientific added value of working as a CoE	5	5
2. Scientific merits	5	5
2.1 Are the merits and scientific expertise of the proposed CoE leader appropriate and sufficient for the proposed project?	5	5
2.2 Estimate overall quality of the publication records of the proposed CoE leader and the team leaders.	5	6
2.3 Do the proposed CoE team leaders bring appropriate and required complementary expertise to the CoE project?	4	5
3. Research environment	4	5
4. International competitiveness	5	5
4.1 Assess how the CoE as a whole rates in relation to top international research in its field. The CoE as a whole belongs to the	(top5%)	5-6
5. Overall assessment		
5.1. Overall assessment	Excellent	Excellent

Reviewers are asked to rate the plan of intent using the scale below.

- 6 Outstanding, stands out for exceptional novelty, innovativeness and renewal of science at global level
- 5 Excellent, extremely good in international comparison – no significant elements to be improved
- 4 Very good, contains some elements that could be improved
- 3 Good, contains elements that could be improved
- 2 Unsatisfactory, in need of substantial modification or improvement
- 1 Weak, severe flaws that are intrinsic to the proposed project or the plan

For each specific question, a written evaluation should be given in addition to indicating a rating number. There should be consistency between the numerical rating and written comments.

Date	21.08.2012	Overall rating	5
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1 Research plan	5
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1.1 1.1. Assess the scientific quality and innovativeness of the research plan. 5

This is an interesting proposal that deals with breakthrough research in optimization concepts and algorithms applied to a variety of scientific applications, including systems biology, physics and material science and financial mathematics. Optimization problems abound in all of these application domains and the CoE team is exploring commonalities among them. This team includes experts in mixed integer nonlinear programming, nonsmooth optimization and stochastic optimization to address application problems at a fundamental optimization level. Based on the strength of the team, the scientific quality is likely to be high. The research plan is only briefly described but also reflects the strength of the team and is likely to be innovative.

1.2 Assess the scientific added value of working as a CoE. 5

The added value of working within three institutions is high. The AaAU and PU groups are pioneers in discrete and nonlinear optimization with applications to engineering and bioscience. The TU team adds a strong nonsmooth and stochastic component that leads to synergies that allow the CoE to branch out to more challenging problems in the domains mentioned above.

2 Scientific merits	5
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2.1 Are the merits and scientific expertise of the proposed CoE leader appropriate and sufficient for the proposed project? 5

Yes, the team represents some of the strongest researchers in mixed integer optimization. The expertise in this area as well as nonsmooth and stochastic optimization make it extremely well-suited for the proposed project.

2.2 Estimate overall quality of the publication records of the proposed CoE leader and the team leaders. 5

As shown by the publication statistics of the researchers (citations, h- and g-indices), the publication records are very high. Moreover, the CoE and team leaders are widely known within their areas of optimization expertise. Moreover, they have had strong impacts on application domains in systems biology, chemical engineering, finance and material science.

2.3 Do the proposed CoE team leaders bring appropriate and required complementary expertise to the CoE project?

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Yes, this team includes experts in mixed integer nonlinear programming, nonsmooth optimization and stochastic optimization to address application problems at a fundamental optimization level. These components should lead the CoE to branch out to more challenging problems in the domains mentioned above.

3 Research environment	4
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3.1 Does the research environment support this project, including appropriate infrastructures, and offer a wide base for successful research? Assess the planned promotion of creative research environment

The appropriate infrastructures for this work are strong. The PU component adds a high quality international component to the project as well as greater exposure to a larger optimization community and application areas.

4 International competitiveness	5
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4.1 Assess how the CoE as a whole rates in relation to top international research in its field. The CoE as a whole belongs to the

There proposed researchers are an important component of a large, world-wide optimization community. They bring unique strengths to these areas, not found in other research labs. As a result I believe they are among the top 5%.

5 Overall assessment: Strengths, weaknesses, added value working as a CoE, other comments
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5.1 Overall rating (not required to be mathematical average of the ratings given above):

The overall rating of this proposal is Excellent. I believe some very interesting and worthwhile efforts will come out of this long-term CoE, both in the development of optimization theory and algorithms, as well as a strong impact in the cited application domains.

Date	19.08.2012	Overall rating	6
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1 Research plan	5
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1.1 1.1. Assess the scientific quality and innovativeness of the research plan. 4

The research plan is well thought of and it aims at some very important challenges. The plan, however, fails to detail how the interaction between theoretical challenges and challenging applications will work. The plan makes no mention of application areas that the present optimization tools will be applied to, so that their limitations will be discovered and new theoretical challenges will be defined.

1.2 Assess the scientific added value of working as a CoE. 5

Any time a group of excellent researchers come together to collaborate, very positive results could emerge and get published as influential publications. The tree groups here have collaborated before and indeed produced influential publications. The added value of this collaboration is definitely strong.

2 Scientific merits	5
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2.1 Are the merits and scientific expertise of the proposed CoE leader appropriate and sufficient for the proposed project? 5

The overall quality of the leader of this CoE is excellent. He could also play a role in defining the challenging applications for the optimization tools to be applied and tested.

2.2 Estimate overall quality of the publication records of the proposed CoE leader and the team leaders. 6

Excellent

2.3 Do the proposed CoE team leaders bring appropriate and required complementary expertise to the CoE project? 5

Yes they do. The only expertise that might be missing is a person that could bring challenging industrial applications to the optimization tools developed and to be developed. Professor Westerlund could bring these expertise, based on his past research interests

3 Research environment	5
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3.1 Does the research environment support this project, including appropriate infrastructures, and offer a wide base for successful research? Assess the planned promotion of creative research environment

I have not visited either of the two Finish groups. From what I know inferentially, I think that the research environment is excellent.

4 International competitiveness	5
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4.1 Assess how the CoE as a whole rates in relation to top international research in its field. The CoE as a whole belongs to the

My estimate is that the group rating is between 5 and 6. However I note that a percentage calculation is not possible here.

5 Overall assessment: Strengths, weaknesses, added value working as a CoE, other comments
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5.1 Overall rating (not required to be mathematical average of the ratings given above):

Excelled proposal; excellent team; challenging optimization methodology problems. Need to add challenging application challenges.