



INSTITUTE OF COMPUTER SCIENCE

The Czech Academy of Sciences

Pod Vodárenskou věží 2, 182 07 Praha 8

Michal Chytil, Director

tel.: +420 266 053 785

fax: +420 286 585 789

e-mail: chytil@cs.cas.cz

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Statement from the director of the Institute on the final reports of the Commission No. 1: Mathematics, and the Commission No. 2: Computer and Information Sciences

We thank the members of both Commissions for the time they spent on the evaluation, and for their insightful and encouraging evaluation reports.

In response to the results of the evaluation process we have started to prepare a document summarizing how we plan to exploit findings and recommendations in the Reports of

- Commission No. 1: Mathematics - (C1),
- Commission No. 2: Computer and Information Sciences - (C2).

This statement will serve as a framework of the above-mentioned document. It focuses on the main issues concerning the Institute as a whole with a few comments on the individual teams.

Italics is used to mark the initiatives and measures which are already underway or close to taking off.

The Institute as a whole

We will comment on four key issues mentioned in the Reports:

- Strategy of the Institute as a whole,
- Some groups should be representative of Computer Science as a discipline,
- Variable quality of research outputs across teams,
- The necessity to attract young talent.

Strategy of the Institute as a whole

Both Reports identify a long-standing problem, which is not easy to solve quickly. Indeed, the teams have evolved rather than being created in response to a strategic plan (C2), this fact is a legacy of the genesis of the Institute as a computing center, not a scientific institute formed around one or more accomplished scientists.

The strategic development of the Institute sometimes dubbed "emergent strategy" in the literature, or characterized as bottom-up approach by (C2), brought its fruit. Two of the best teams in the Institute originated in this way - an exceptionally gifted individual appeared in the Institute and gradually built a team. Another quite recent example of emergent strategy which might lead to creating a group pursuing an important Computer Science topic (computer security) is the cooperation with a world leading high-tech company AVAST Software. It has started less than two years ago, so far-reaching conclusions would be premature, but the fact that it has led to filing two US patents has its weight.

Given outer restrictions in financing and the overall situation of the Institute, the approach had its advantages and at some points might have been the only one possible. However, we agree with (C2) that there need to

be some meaningful overarching principles and goals to which the groups can respond in formulating their plans.

We are encouraged by the statement of (C2) that "The strategy seems well stated at the group level". Although we are well aware that much has to be done at the group level (it is reflected by some of the comments below) the statement perhaps indicates that we came closer to the point when the issue of overarching principles (C2) and rules of allocating scientific areas to canonic disciplines (C1) can be addressed.

It goes without saying that we do not head for a list of fashionable umbrella titles which can cover anything.

The goal is ambitious and should be addressed concurrently with the goal stated in the following paragraph.

Some groups should be representative of Computer Science as a discipline

The recommendation echoes through the Report of (C2) ("the current groups are not particularly representative of Computer Science as a discipline", "the groups are not ideally positioned to respond in an agile way to recent developments in computer science", "teams of the Institute of Computer Science should still consider the area of informatics as the primary domain") and is gently formulated in the Report of (C1) ("The Institute of Computer Science is representing a spectrum of research areas, which is only partially in the core of Computer Sciences"). We agree that this goal is very challenging and of the highest importance.

We highly appreciate the concrete suggestion of (C2) how to approach the issue. Their recommendation that "the Institute should incorporate into its strategy a set of priority areas where it would hope to develop research strength if the opportunity presents itself" is very inspiring, because it represents a bridge between the emergent strategy approach and the strategy based on predefined goals.

This approach is viable as the above-mentioned example of the field of computer security demonstrates. The opportunity which suddenly presented itself matched expertise present at the Institute and was accompanied by a possibility of external funding.

The review of the strengths of the Institute

"The Institute has some excellent groups, which are internationally leading in their areas of expertise."(C2),

„[Department of Computational Methods] and its achievements are an advertisement for numerical and computational research in CAS and in the whole Czech Republic. It is nationally and internationally linked to the best teams in Numerical Mathematics, representing strongly the algorithmic approach and building bridges to Computer Science and several areas of applications."(C1)

will narrow the scope in which the Institute should be watchful for opportunities.

Given the size of the Institute, it will be enough if just a few groups representative of Computer Science as a discipline will be established.

The current way of financing does not allow the Institute to attract top scientists from abroad. The recommendation of (C2) to ease the problem by attracting visitors is, in fact, being implemented *by an initiative started in 2015*. We also prepare to submit a project of a visiting center mentioned favourably by (C2).

Variable quality of research outputs across groups

We appreciate the fact that (C2) in the part of the evaluation dedicated to the whole Institute diagnoses variability of the output quality over the teams, but in the account of individual teams pays attention also to their contributions which are not reflected by numerical profiles.

We consider it necessary to pursue high publication standards and to pay attention to publication strategies. *New career rules being prepared by the Institute's board should facilitate the progress to the goal.*

Attracting young talented researchers

The Institute is trying to ease the problem by *regular open calls for postdoctoral fellows* and envisions to extend the scheme for excellent doctoral students.

The finding of (C2) that

“The Ph.D. students are very satisfied with the environment provided. They receive a very good amount of personal attention from supervisors and there are sufficient funds to support presentation of their results at conferences”

is encouraging.

We continue in our effort of recruiting the Ph.D. students via *teaching activities at different universities*.

A promising option is the preparation of joint accreditation of doctoral programs in cooperation with the universities. *Two concrete cases – joint accreditation of doctoral studies of Logic with Charles University and doctoral studies of Mathematical Engineering with Czech Technical University are underway.*

The teams

The bulk of both evaluation reports is comprised by the assessment of individual teams. The internal document we intend to prepare will follow suit. However, in this brief statement we limit ourselves only to a few points related to the teams.

Team No. 1: Department of Computational Methods

Both main recommendations of (C1) are ambitious goals, but can fall back on proven strengths of the team.

The first recommendation is to strengthen connections between the teams of CAS involved with numerical methods, the group in the Institute of Mathematics is mentioned explicitly. The initiatives in this direction are underway and successful: *joint organisation of summer schools, cooperation in the Nečas Center and in the EU-Maths-In*. The team is indeed ready to strengthen the connections and participate in a broader cooperation within the CAS, as suggested above.

The second recommendation (related to the first one), to increase resources of the team by scientists strengthening the research in High-Performance Computing and Computational Sciences, deserves the highest attention and inventiveness. Fortunately, the team need not start from scratch in this area.

Team No. 2: Department of Theoretical Computer Science

The team is going to build on its strengths mentioned by (C2) and aims to abide by its recommendations:

- to optimize its publication strategies, while adhering to its existing and emerging research areas, targeting also high profile conferences,
- to continue and extend its successful fundraising activities to be able to maintain its international cooperation, invite foreign scientists, attract new researchers, students and postdocs (for instance 6 new postdocs are expected to extend the team during the year 2016),
- to seek opportunities to disseminate its expertise in industrial or commercial applications.

Team No. 3: Department of Nonlinear Modelling

Following the recommendations of (C2), the research of the team will be more focused on research areas where earth sciences, environmental science, mathematics and computer science intersect substantially.

To foster cooperation with the international scientific community the team will try to establish cooperation with leading groups in environmental simulation and modeling, for example, in the frame of H2020 EU programs.

Team No. 4: Department of Medical Informatics and Biostatistics

The final report (C2) repeatedly claims that the team is oriented to specific (medical) applications at a national level. However, the research strategy of the team has already undergone significant changes since the end of the evaluated period. The emerging strategy of the team is to perform an internationally recognized research in two principal areas:

- (1) Methodological research in mathematical statistics,
- (2) Statistical analysis of data in (not only) biomedical applications.

In the area (1), the team has already published several papers in internationally renowned mathematical journals and we plan to establish international cooperation and increase the mobility. In the area (2), the team cooperates with medical partners from the Czech Republic, while the results are regularly published in internationally recognized medical journals, leading to “a very good degree of international recognition as evidenced by the number of citations” (C2). Several publications with international cooperations are intended, e.g. exploiting the contacts of one young scientist from her recent two-year stay in Seattle.

Team No. 5: Department of Nonlinear Dynamics and Complex Systems

The team plans to continue to carry out both basic and application-oriented research leading to high-quality publications favorably mentioned by (C2). Since the description of the team contribution to most of the evaluated publications was not available to (C2), we specify it as follows: out of the 12 results undergoing evaluation (4 of them in journals ranked in the top decile according to WoS), 4 were reached entirely by the team, 5 were reached through an international collaboration with dominant contribution of the team; and in the remaining 3 the team had a key role by carrying out advanced data analysis of data acquired within an international project.

The team plans to follow the recommendations of (C2) regarding further strengthening outreach and collaborations and actively attracting early stage researchers, by building on the explicitly mentioned department's good scientific reputation, visibility and excellent international recognition. To this end, the team will participate in Horizon 2020 grant applications, and in the Institute's plans for an international scientific visitor center.

Team No. 6: Department of Optimization and Systems

The team fully agrees with the suggestion of bringing their methods into application areas. In fact, this already has been one of its long-term goals before the current evaluation exercise, and the team perceives the evaluation report as additional encouragement in this direction. Inspired by this, the team will take additional efforts to translate its research results into applications. This will be a long-term process built on a foundation of ongoing basic research.

Team No. 7: Department of Fundamental Topics

The construct “Fundamental Topics” while rather artificial has fulfilled the target to stimulate the research in some of the other teams in a relatively short time. The team will follow the recommendation (C2) to maintain traditional areas of strength and continue to produce strong research results in these areas; this is a part of team's strategy. The team will also follow the recommendation to review publication strategy and aim to achieve some outputs of world leading quality and increase the proportion of internationally excellent outputs versus internationally recognized outputs. The team will thoroughly consider “where to publish”, which should bring better recognition of results which can be reached with the contemporary structure and portfolio of problems solved.

Final remark

The introductory lines of this statement were addressed to the Commissions. I would like to dedicate the closing lines to the organizers of the evaluation.

It was quite a comprehensive process, which could not be fully tested beforehand, hence, surprising situations necessarily emerged.

For us, the very last one is reflected by the introductory remark in the Report of (C1), from which we learned that mostly due to a combination of differing tacit assumptions, the Commission did not have access to a part of the information about our Institute, which we prepared with due diligence.

Such cases - unpleasant though they may be - are valuable because they can help to debug the process for the next assessment in the Academy or in other institutions. I appreciate the effective, efficient and accommodating approach of the organisers to solving such complications. Moreover, the organisers succeeded in keeping the project on course and in maintaining the principles laid down at the very beginning. It deserves respect.

The previous pages indicate that the process was beneficial for our Institute and so it is my pleasure to close the statement by thanks to all organizers of the evaluation exercise.