

VIRTUAL NETWORKING STRATEGY

for COST Action 18232

1. Introduction

COST Action ‘Mathematical models for interacting dynamics on networks’ started at the kick off meeting in Brussels on October 3, 2019. The intention of the initiators of the application grant was to bring together leading groups in Europe working on a range of issues connected with modelling and analysing mathematical models for dynamical systems on networks. First initiatives related to the division of all grant members into five working groups (C_0 -semigroups and beyond, Nonlinear problems, Networks and similar structures, Variational methods on graphs and networks, and Numerical methods and applications), taking into account specific interest of participants, can be considered as a success. The number of participating countries rose from 16 at the moment of proposal submission to 38 at the end of December. During the meeting in Zagreb, 24/02-28/02/2020, joined with the first MC meeting, the new collaborations were initiated which resulted in five publications affiliated to COST in 2020.

The outbreak of SARS-Cov-2 pandemics that appeared in Europe in March 2020 slowed markedly the dynamics of collaboration. Uncertainty of the situation forced the grant management to postpone the working group meetings in Novi Sad, Lausanne, and Rome that were originally scheduled for 29/9-1/10/2020, 15/2-17/2/2021, and 8/2-12/2021, respectively. Also, the training school on numerical methods in Lausanne fell through.

The obvious response of the scientific society to the unexpected breakdown of the standard methods of collaborations was moving all activities to a virtual or hybrid format. Although the adjustment to the new circumstances can be regarded as a global success, the speed of this change divided dramatically all grant participants into those who can easily adjust to new situations; and others who due to financial, technical, personal and very many other reasons cannot adapt that easily.

The aim of this virtual networking strategy is to put into perspective the last year of virtual collaboration in order to examine and understand the opportunities, risks and weaknesses that took place over the last Grant Period. The developed tools called Virtual Mobility (VM)

Grants should foster communication in the following months when traveling could be impossible, as well as promote equal access to the events in the time when different restrictions are imposed in different parts of Europe. Navigation of the Action by Virtual Networking Support (VNS) Manager according to the above guidelines gives hope to pursue in building an efficient and lasting network of researchers studying dynamical systems on networks across Europe. Another crucial responsibility of VNS Manager, especially at the beginning, is to identify successful practices developed during the months of compulsory isolations that should be introduced to everyday practices.

2. Virtual activities held during pandemics

From March 2020 till now, Action members have had an opportunity to participate in several online events organised by the Action such as

- a. Conference in honour of Rainer Nagel "C₀-semigroups and Beyond", 26/11-27/11/2020,
- b. Conference on "QGraph 2020: Quantum graphs in mathematics, physics and applications", 8/12-9/12/2020,
- c. MC meeting, 10/02/2021, and CG meetings 02/07/2020, 08/01/2021 and 16/06/2021,
- d. WG4 meeting, 17-18/02/2021,
- e. Virtual meeting of WG3, 15/04/2021,
- f. WG2 Workshop on Nonlinear problems in traffic and multispecies diffusion models, 18/05/2021.

Furthermore, the leader of WG4, Delio Mugnolo, has conducted from September 2020 onward regular online seminars on the topics related to the Action. Until now 43 lectures have been given.

Finally, in recent months, initiated by our CG members and well-accepted by other Management Committee Members, an initiative of Lumer Lectures was proposed. The event is named after Gunter Lumer, a great German mathematician who lived in France, and then in Uruguay, and whose extensive achievements and a deep curiosity for applied functional analysis and operator theory can be seen as a connective tissue joining the scientific activity of all Action's Working Groups. The lectures will be delivered by carefully selected distinguished scientists whose research interests are related to the Action. Up to the date of strategy submission, one lecture took place.

We analyzed the statistical data of online meetings comparing the results with its counterpart in Zagreb. The attendance in all specified events was high, which is a big achievement considering the circumstances. On the other hand it is also worth examining the interest of the most vulnerable groups of participants: women and participants from ITCs, NNCs and IPCs. Let us mention in this context that according to a broad research of UN Woman¹, women as a social group are more vulnerable to the workload in the situation of increment of family demands that become a reality in the pandemics. To our best knowledge, there is no similar data on ITCs and ECIs. As it is also difficult to obtain relevant data on those issues from previous events organised by the Action, we will draw our attention to the situation of these groups in the analysis of virtual and hybrid meetings. Since we have just a few

¹ UN Women Rapid Gender Assessments on the Impacts of COVID-19, April–November 2020

participants from NNCs and IPCs their problems have been studied individually; this is addressed in the next section.

Although raw numbers concerning gender balance during virtual meetings may not seem overly encouraging at first glance (except WG2 workshop and Lumer Lecture, where perfect balance occurred), it is worth looking wider. On average, the fraction of female Action participants in the WG1 and WG3 meetings (0.4 and 0.3 resp.) is higher than either the fraction of women in the Action overall (which is 0.29) or the female representation in Zagreb (which is 0.26). Although there seems to be a greater gender inequality in some WGs, the overall trend shows that about 0.35 of participants are female; thus we see an increase in female attendance since the meetings have moved online. We still need more data to support this hypothesis.

In conclusion, in order to improve the gender balance in mathematical research we emphasize in the VN strategy that all organised events should enable online participation, if not for everyone then at least in justified cases.

Finally, we note that all virtual events were conducted using Zoom licences that were either provided by individual universities or covered by the Action. No disturbance in this platform of communication has been reported.

3. Main objectives of the virtual networking strategy

A preliminary analysis of the needs of Action members indicates that the policy of promoting large events allows linking several mathematical subfields that usually work at separate topics in functional and numerical analysis or in graph theory, to mention a few. Furthermore, the inequality in the access to virtual meetings cannot be observed.

On the basis of this observation, the proposed strategy follows in two clear directions.

Firstly, it is a response to the actual needs of the members in the times of pandemics SARS-CoV-2. We still have some difficulties in capturing all the challenges that participants of the Action face. Therefore, we will try to meet all their needs by flexible grant management which allows one to receive support for a collaboration that is the most convenient for individuals in their current situation. In order to mention just one non-standard case of difficulties reported to the Core Group, let me draw your attention to the situation of our friends from NNCs and IPCs. The shift in pandemic waves, e.g. between Europe and South Africa, reduced to zero the time interval for direct contacts in 2021.

Secondly, the objective of the strategy is the identification of further useful online tools and good virtual practices that should be incorporated as a standard method of management in the future. Specifying standards that are well fitted to both specific fields of mathematics and particular groups of grant holders will not only improve scientific results but also allow for a better budget allocation in the next GPs. The methods of evaluation of this issue are presented in detail in Section 5.

In order to achieve the first of the specified goals in this Grant Period, we realize that the time from July to October requires the introduction of two different policies.

In the summer we expect a relaxation of limitations related to the mobility within Europe, which should result in putting the emphasis on face-to-face meetings. In the meantime the restrictions imposed by governments should be carefully followed to assure the equal accessibility to all events organized by the Action. The crucial responsibility of VNS Manager in this matter is to support the hybrid parts of the Action events, providing the organisers with substantial support in technical and organisational issues. The VM Grants should promote the preparation of high quality materials and solutions indispensable for remote participants of hybrid meetings.

In the autumn when not only scientists return to their didactical responsibilities but also the rising trend in SARS-CoV-2 disease is more likely, we will use the VM Grants to promote events that allow Action participants to remain in touch despite the distance, e.g. cyclic invited lectures or virtual mentoring grants.

4. Procedure of VM grant application

In response to the above challenges, we plan to open at least one call for VM Grants at each Grant Period in which the tool is provided for by COST. In particular within GP2, in which both VNS and VM grants are pilot projects, there will be one call for up to six VM grants. VNS Manager will open it shortly after the Management Committee's approval of the virtual networking strategy and it will be an open ended call.

In order to assure that all six VM grants are fairly distributed among Action members, the following rules of distribution of support among grantees will be established. Five grants will be awarded to the members of five different working groups. It is suggested to determine within the working groups the proper candidates for this grant and prepare the project appropriately. The last financial support will be granted for the project that is not assigned to any group of members but can affect the whole Action.

It will be proposed to the Management Committee to appoint a special committee for the evaluation of applications, which will consist of the VNS Manager and two other representatives from the Action's MC. In the case of a change of VNS Manager in following Grant Periods, the election committee will be also reappointed.

In order to apply for a VM grant, the applicant will need to satisfy the eligibility criteria listed in point 10.2.1 of Vademecum. Furthermore, the successful application should take into account the following criteria:

- a. promoting the maintenance of (preferably hybrid, but possibly entirely virtual) contact between Action members which due to the circumstances is highly hampered,
- b. supporting a least three achievements of Action specified in MoU objectives,
- c. maintaining the geographical and gender balance within participants involved in the project,
- d. being active participants in the Action.

Applications which also follow other criteria specified in Section 3 of VN Strategy will be prioritised.

All applications for VM grants should be submitted via e-COST.

5. Evaluation of VM Grants and VN Strategy

In line with Section 10.2.3 of Vademecum, the project realised on the base of the VM Grant should be implemented within a single Grant Period and the final report needs to be

submitted within 30 days from its end, but no later than on the last day of the current Grant Period.

Each VM grant beneficiary, who has run more than a one-day event either remotely or in a hybrid format, is obliged to conduct the questionnaire among the participants verifying the progress towards the Action objectives and importance of the choice between online and in-person participation.

At the end of October, the evaluation of the strategy together with a careful understanding of additional needs and challenges arising in the time of the pandemic will be conducted. Thoughts on practices that worked out for remote collaboration in the field of mathematics as well as encountered obstacles will be collected using a questionnaire. The results of this survey, together with analysis of reports submitted by VM Grant recipients, will become the backbone of strategy evaluation in GP2. The results of this analysis will imply further updates provided that VM Grants will be eligible by COST in the next Grant Periods.

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