Organizing an international conference online during a pandemic: first experience

Lev Shchur
Landau Institute for Theoretical Physics, 142432 Chernogolovka, Russia
National Research University Higher School of Economics, 101000 Moscow, Russia
E-mail: lev.shchur@gmail.com

Abstract. We discuss an international conference, “Computer simulations in Physics and beyond” organized at October 2020 during a pandemic. We pay a particular account for the advantages and disadvantages of holding an international conference online.

1. Introduction
Computer simulations are well established third pillar of the modern natural sciences. It complements the experiment and theory, and the emerging fourth pillar, extraction of new knowledge from big data sets. The conference Computer simulations in Physics and beyond (CSP2020) are multidisciplinary meetings focusing on computational physics and related subjects. Computational physics methods prove useful in a broad spectrum of research in multiple natural sciences branches. This volume provides a sample. In line with data science developments, machine learning methods applied to natural sciences problems were presented at CSP2020.

The 4th International Conference on Computer Simulations in Physics and beyond (CSP2020) took place October 12-16, 2020, in Moscow [1]. The conference continues the tradition started by an inaugural conference in 2015 [2]. It was jointly organized by the National Research University Higher School of Economics, the Landau Institute for Theoretical Physics, and Science Center in Chernogolovka.

The year 2020 is unusual for the CSP conference due to the pandemic. We understood the difficulty for some participants to come to Moscow, taking into account the lockdowns around the world. Consequently, we changed the usual format of the Conference: both plenary talks and parallel sessions were shifted afternoon due to the equilibration of the time zone differences around the globe. Parallel sessions include contributed talks (20 min) and poster talks (short online talks up to 10 min).

Conference participants were eligible for submitting a paper related to their presentations given at CSP2020. All papers go through the review and correction process, and accepted papers are combined in this Proceedings volume.

We decided to add an epilogue with the discussion of organizing the conference during a pandemic. We hope that our modest experience may be useful to other conference organizers.
2. Conference format

In this section, we present the format of the previous CSP conferences and the format of the CSP2020 on-line conference discussing the reasons for changes.

2.1. The format selection.

Designing the first Conference on Simulations in Physics and beyond in 2015, we analyzed many conferences with the intersection of two main subjects, computational physics, and simulations in natural sciences. We found the format of the Conferences on Computational Physics, organized by the Commission on Computational Physics (C20) [3] of International Union of Pure and Applied Physics (IUPAP) [4] as most appropriate to implement for our CSP2015 conference.

The selection of the CCP format was due to several reasons. First, it is a well-established conference, starting in 1989 in Boston, and it keeps being successful over the years. Second, it is an international conference rounding over three zones dividing the Globe from the south to the north and adopting the entire culturally diverse spectrum of the scientific community. Third, the conference topics are mostly similar. Finally, we got a good experience organizing the XXV IUPAP Conference Computational Physics in Moscow in 2013 [5].

2.2. Traditional CSP conference format.

The Traditional CSP format for offline participation is shown in Table 1 with the example of CSP2018 Conferences. It consists of three plenary talks at the morning sessions, with 40 minutes for the talk and 5 minutes for the discussion. The number of parallel sessions varies according to the number of accepted oral presentations, with 20 minutes each, including time for discussion. The parallel sessions are placed in the nearby and sequential rooms, giving a fast shifting to the talk of interest. All entries in the conference timetable are pointing to the information on the particular session. The coffee and snacks in the evening time accompany the poster session. What is not presented in the program is plenty of open area space for the conference’s scientific discussions.

2.3. Online CSP conference format.

We try to keep the traditional CSP format with the online procedure. The main structure of the program remains, with plenary and parallel sessions. We replace poster presentations with online ones, limiting the time for each talk to 10 minutes. We shorten the time of the plenary talk to 40 minutes, including discussion. It was done for two reasons.

First, we synchronize the conference timing with the timing of HSE University. In contrast to the offline conference and traveling, participation in online conferences is not regulated by all universities yet.

Second, we already knew from the experience of the online seminars and lectures that it is difficult for participants to keep attention for more than 80 minutes, both physically and mentally. Accordingly, all parallel sessions last 80 minutes, with the 10 minutes break between sessions.

One of the problems participating in offline conferences is the jet lag problem. One does not have that with offline conferences. Nevertheless, the time-zone problem remains with the next important feature, in the time difference. It is not possible to keep the conference’s full-day timing online because it is impossible to synchronize full daily activity globally. As the made-off has participants over the world, we squeeze the daily time to 5 hours only, in contrast to the 8-9 hours in the traditional format.

As a result, we organize up to seven parallel sessions daily and up to four plenary talks. The time of the plenary talks was chosen to synchronize the usual activity of the plenary speakers. It comes out that most of the speakers are lecturing on Tuesday. Presentations from the Eastern
International Conference on Computer Simulation in Physics and beyond  
September 24-27, 2018, Moscow, Russia

| Time          | Monday September, 24 | Tuesday September, 25 | Wednesday September, 26 | Thursday September, 27 |
|---------------|-----------------------|------------------------|--------------------------|------------------------|
| 09.15-09.45   | Registration          |                        |                          | Registration           |
| 09.30-09.45   | Opening               |                        |                          | Registration           |
| 09.45-10.30   | Plenary Talk 1        | Plenary Talk 4         | Plenary Talk 4           |                        |
| 10.30-11.00   | Coffee                | Coffee                 | Coffee                   |                        |
| 11.00-11.45   | Plenary Talk 2        | Plenary Talk 5         | Plenary Talk 8           |                        |
| 11.45-12.30   | Plenary Talk 3        | Plenary Talk 6         | Plenary Talk 9           |                        |
| 12.30-13.50   | Lunch                 | Lunch                  | Lunch                    |                        |
| 13.50-16.00   | Parallel Session S25-1| Parallel Session S26-1 | Parallel Session S27-1   |                        |
|               | Parallel Session S25-2| Parallel Session S26-2 | Parallel Session S27-2   |                        |
|               | Parallel Session S25-3| Parallel Session S26-3 | Parallel Session S27-3   |                        |
|               | Parallel Session S25-4| Parallel Session S26-4 | Parallel Session S27-4   |                        |
|               | Parallel Session S25-5|                        |                          |                        |
| 16.00-16.30   | Coffee                | Coffee                 | End of program           |                        |
| 16.30-18.40   | Registration Welcome | Social Program         | Poster Session           |                        |
| 18.40         | End of program        | End of program         | End of program           |                        |

Figure 1. Time table of the CSP2018 Conference. The first number in the session abbreviation is the day of the month, and the second one, the number of the session on that day. The clickable table can be found at http://csp2018.ac.ru/program.html
places were at the beginning of the daily schedule. The Western places’ presentations were shifted to the later hours, which are the West’s early hours.

2.3.1. **SCP conference topics.** The list of the parallel topical sessions includes

1. Simulations in statistical physics.
2. Physics and mechanics of polymers.
3. Space research: simulations and big data.
4. Methods and software for simulations in research and engineering (hydrodynamics, aerodynamics, etc.).
5. Computational and statistical genomics.
6. Simulations in material science.
7. Simulations and analysis of social networks.
8. Precision many-body physics.
9. Simulation and analysis of technical networks (roads, urban transportation, data networks, etc.).
10. Algorithms, methods, and tools with properties of scalability and enhanced parallel simulations.
11. Informatics and education.
12. Simulations in chemical physics and physical chemistry.
13. Quantum computing and quantum technologies.
14. Advanced information technologies of data analysis for experiments.
15. Mathematical methods and optimization problem.
16. Computational problems in Numerical Weather Prediction.

The CSP topics of parallel sessions reflect the activity of local participants, which is the base for successful conferences. This year we announced 18 topics, from which 16 were organized. Some of the parallel sessions were given in a format close to the satellite meeting’s – for example, Section 8 Precision many-body physics and Section 5 Computational and statistical genomics.

3. **Online organization details.**

3.1. **Zoom platform**

We use conferencing and meeting software at HSE University and Landau Institute intensively since March 2020. Finally, most of the individuals and labs agreed with Zoom platform [6], as convenient for all purposes, in the education, meetings, and seminars.

HSE university provided the CSP2020 conference with 12 licenses for Zoom. Each evening preceding the conference day, we plot the table of sessions, both plenary and parallel, and associate them with the Zoom sessions. The table was sent to all registered participants.

We run the Discussion Room and Technical session in addition to the plenary zoom session and parallel zoom sessions. The Discussion session replaces the open area conference space to allow free discussions for the conference participants. The Technical session helps participants to test the connection quality, both with audio and with the presentation. We found the Technical session successful and helped organize sessions running smoothly with the presentations, without any delays and problems.

We trained the volunteer students to be the sessions’ technical hosts, naming them the Digital Assistants. For all sessions, we use the Waiting Room zoom option. Digital Assistants admits only registered participants. The registration includes using the real names for the zoom sessions and names used as the admitting pass. We do not meet any inappropriate behavior at all conference sessions. Besides, registered participants provide organizers with an alternative
**Time** | **Monday, October 12** | **Tuesday, October 13** | **Wednesday, October 14** | **Thursday, October 15**
--- | --- | --- | --- | ---
14.40 MSK | Parallel Session S01-D13 | Parallel Session S03-D14 | Plenary talk Sukhum Hong "Theoretical Study of Electronic Structure of 2D Materials and Their Heterostructures" |  
11.40 GMT | Parallel Session S07-D13 | Parallel Session S07-D14 |  |  
15.50 MSK | Opening | Poster Session P11-D13 | Poster Session P10-D13 | Plenary talk Hai-Qing Lin "Entanglement, Wilson Ratio, and Quantum Phase Transition: Computational Approaches"  
12.50 GMT | Vice-President HSE Igor Agamirzyan Conference Chair Lev Shchur | Poster Session P11-D14 | Poster Session S16-D14 |  

**Discussion Day**
Friday, October 16, 14.40-18.00 MSK (11.40-15.00 GMT)

| Time | Monday, October 12 | Tuesday, October 13 | Wednesday, October 14 | Thursday, October 15 |
--- | --- | --- | --- | ---
16.20 MSK | Plenary talk Julia Yomons "Dense Active Matter" | Plenary talk Greg van Anders "Networks in Space: Insights into Distributed System Design from the Statistical Physics of Spatial Embeddings of Networks" | Plenary talk Evgeny Kozik "Diagrammatic Monte Carlo: the universal framework for precision quantum many-body physics" | Plenary talk Michail Diamantakis "The semi-Lagrangian advection scheme of the ECMWF global weather prediction system: recent developments and prospects"  
13.20 GMT | Plenary talk Predrag Cvitanovic "Spatiotemporal turbulent field theory" | 16.20 MSK (13.20 GMT) Parallel Session S08-1-D13 | Plenary talk Godenhard Sutmann "Simulation of Segregation in hybrid MD/SC Simulation" | Plenary talk Travis Humble "Accelerating Scientific Computing Using Today's Quantum Computers"  
18.10 MSK |  |  |  |  
15.10 GMT |  |  |  |  

**Figure 2.** Time table of the online CSP2020 Conference. The first number in the session abbreviation is the topic number listed in the section "Topics" and the second number is the day of the month. The program details can be found at http://csp2020.ac.ru/program.html
contact channel (WhatsApp, Telegram, etc.) to solve the zoom connection problem. It was helpful in a few cases.

3.2. Discussion room and plenary talks and youtube.
The idea of a self-organized discussion session was not the best idea for the conference. We expect the discussions of the already given talks. Few short discussions happen, which do not involve many people. The preliminary program for discussion rooms should probably be announced, and the discussion moderators would be appointed. The program committee discussed the possibility of using some other software platform that mimics the real discussion rooms, and we do not find a charming software system for that. We believe more research and design should be done for such software.

We invite readers to listen to the Welcome speech by HSE university vice-president professor Igor Agamirzyan at youtube channel [7] and the plenary lectures. The video is accessible from the CSP2020 Program table as well.

4. Acknowledgments
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References
[1] International Conference on Computer Simulation in Physics and beyond, October 12-16, 2020, Moscow, Russia. http://csp2020.ac.ru
[2] International Conference on Computer Simulation in Physics and beyond, September 6-10, 2015, Moscow, Russia. http://csp2015.ac.ru
[3] The Commission on Computational Physics (C20). https://iupap.org/commissions/computational-physics/
[4] The International Union of Pure and Applied Physics. https://iupap.org/about-us/
[5] XXV IUPAP Conference on Computational Physics, August 20-24, 2013, Moscow, Russia. http://ccp2013.ac.ru/
[6] https://zoom.us/
[7] Video of Welcome talk and Plenary talks. https://www.youtube.com/playlist?list=PLkRAeVdPqqHgMAbrIPtPrAJccNo6S_1N