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LET'S TAKE THIS DISCUSSION ONLINE

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With the lockdowns caused by the COVID-19 pandemic, researchers turn to online conferencing. While posing new challenges, this format also brings multiple advantages. We argue that virtual conferences will become part of our regular scientific communication and invite community members to join the movement.

Your routine has changed drastically over the course of the last couple of months due to the lockdowns following the novel coronavirus outbreak. You now mostly stay at home, hopefully safe and healthy. Your classes are now taught online, and you probably had to quickly figure out how to run them at all. If you do experiments, your lab is either closed or operates at a much lower capacity. Your travel plans are cancelled. Still, despite all this, you have likely attended a scientific presentation or have even given one yourself. The only difference is that it happened online, perhaps as part of a virtual conference.

Virtual conferences were gaining momentum even before the coronavirus crisis due to multiple advantages over traditional in-person gatherings. With the increasing concerns about greenhouse emissions, many prefer to limit their long-distance travel. For some community members with limited mobility, either for family, health, or budget reasons, traditional in-person conferences are off limits altogether, and online events are the only available option. Online events are also free from most of the expensive and time-consuming aspects of conference organisation: finding a venue, arranging lodging and catering for the participants. With planning and logistics out of the way, virtual conferences can be organised much faster and can easily respond to the latest scientific developments (see a comparison of typical timelines in the figure). Since online events are easier to attend and since they accommodate hundreds of participants, they are also more inclusive. If the talks are recorded and published, they reach an even broader audience.

The Virtual Science Forum

The idea of organising virtual conferences brought us together—a group of geographically and academically diverse physics researchers. We started exploring the opportunities and challenges of online conferences in late Summer 2019, well before the COVID-19 pandemic. We decided to keep our organisation open for anyone to join, and all of our documentation and notes were public from the very beginning, with the thought that these should benefit anyone trying to work towards the same goal. After several discussions we committed to developing a community platform for online conferences, which we now call the **Virtual Science Forum**.

Once we started brainstorming how to organise online events, we realised that a lot of the usual assumptions about scientific meetings do not apply anymore. Already the sizes of the events are very different: while a typical workshop will have anywhere between 50 and 100 participants, an online conference session can easily attract 500 attendees. On the other hand, the median duration of a traditional conference is a full working week, while the duration of an online event is limited to a few hours because it needs to fit into the daily routines of participants spread across multiple time zones. The interactions during the session are also very different: the speaker cannot see the audience and has no way of receiving immediate feedback. Because mediating the interaction between the audience and the speaker becomes much more important, and because of the larger audience size, the moderators play

a more important role in ensuring that everything goes smoothly. Finally, offline conferences allow ample time for informal discussion between the talks and during coffee breaks: this valuable aspect of scientific meetings needs to be accommodated separately.

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To help the community members orient themselves in a new setting, we prepared basic guidelines for all online event participants: organizers, moderators, speakers, and audience members. Once we felt sufficiently confident, we ran a trial workshop with our direct colleagues as both speakers and the audience. We used this test run to try out different formats of interaction between the audience and the speaker, resolve unexpected technical problems, and collect the impressions from a broader group of colleagues. To our delight, we found that videoconferencing has now matured to accommodate high quality live talks, where every viewer gets the front row experience. After this experiment we were ready to hit the ground running. In fact, the cancellation of the APS March Meeting became a catalyst for our first virtual session, which we organised in just a few days. Now we are continuing to work in a steady pace: we improve the platform and organize a biweekly colloquium series. We also actively invite community initiatives to organise virtual conferences on our platform, and we are excited to already have the first of such conference applications in progress. Our experience with organising online conferences and colloquia has shown that they provide a stimulating environment and foster fruitful discussions.

With more and more people getting used to online meetings and seminars—and with online conferencing software continually improving—we expect that online scientific events will become commonplace. Our effort towards online conferences was not the first and is certainly no longer one of few. Such events are now organised by many science departments and research institutes. Emerging organisations like

Online Conference planning

- Planning & Application	1 year before 2 months before
- Book venue	8 months before N/A
- Reach out to speakers	6 months before 6 weeks before
- Announce	4 months before 4 weeks before
- Select attendees	3 months before N/A
- Flights/accommodation	2 months before N/A
- Run the event!	

◀ FIG: A conference organizer checklist.

researchseminars.org aggregate the information and distribute announcements in order to help navigate the rapidly growing volume of online events.

We conclude with a call to action: give virtual conferences a shot!

Online conferencing is emerging right now because there are no alternatives until the pandemic is over, lockdowns are lifted, and travel is restored. While our hand is currently forced, we hope that the research community will grow accustomed to this long overdue change and will see the value of virtual conferences in their own right. This is why we conclude with a call to action: give virtual conferences a shot! Start with attending the events you like: it has never been easier. Or perhaps you have an idea for a good event to run? Now is your chance—go for it, and know that we are here to help. ■

Website: <https://virtualsecienceforum.org>

About the Authors

The authors are members of the Virtual Science Forum, an open, collaborative, and volunteer-run initiative to facilitate online scientific seminars. They work at academic institutions spread across North America and Europe and donate their effort to make a positive impact on the research community.

