Online conferencing in the midst of COVID-19: an “already existing experiment” in academic internationalization without air travel

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ABSTRACT

Academia, as many other sectors, has faced wide-ranging disruptions due to COVID-19, with teaching and research activity conducted entirely online in many countries. Before the pandemic grounded travel, academics were often hypermobile, some traveling more than 150,000 kilometers per year for conferences, board meetings, collaborations, fieldwork, seminars, and lectures. It is no surprise then that academic flying is among the leading causes of universities’ greenhouse-gas (GHG) emissions. Despite growing awareness surrounding GHG emissions from flying and calls for reducing aeromobility, academics have continued to travel. The COVID-19 pandemic, in equitably stopping all flying, offers a unique opportunity to study emerging low-GHG modes of academic internationalization. In this article, we look at academic internationalization, inspired by digital ethnography, to explore how the academic landscape has adapted to meet internationalization goals within the context of a sudden grounding of travel. By investigating flight-free academic internationalization, we illuminate some of the implications and discuss potential opportunities and challenges of achieving less GHG intensive academic internationalization.

Introduction

Confronting the challenges that the climate emergency poses for humanity requires rapid responses across societies and sectors, including halving current greenhouse-gas (GHG) emissions in the next decade in order to avoid the most dangerous outcomes of climate change (Masson-Delmotte et al. 2019). Universities are a significant GHG emitter with academic flying among the leading causes of universities’ GHG emissions (e.g. Glover, Strengers, and Lewis 2017; Hiltner 2020; Klöwer et al. 2020; Wynes and Donner 2018; Chalvatzis and Ormosi 2021). Universities have the potential to reduce GHG emissions through both their own operations and also by informing present and educating future decision makers. The COVID-19 pandemic thus provides a relevant and timely case to study emerging low-GHG modes of academic internationalization. In this article, we look at academic internationalization, inspired by digital ethnography, to explore how the academic landscape has adapted to meet internationalization goals within the context of a sudden grounding of travel. By investigating flight-free academic internationalization, we illuminate some of the implications and discuss potential opportunities and challenges of achieving less GHG intensive academic internationalization.
university excellence with the World University Rankings methodology including indicators for internationalization of students, staff, and collaboration. Top universities strive for internationalization, benefiting from global perspectives and relevance.

However, academic internationalization, achieved by flying, is environmentally unsustainable (Barrineau and Facer 2019). Flying to fieldwork, meetings, workshops, conferences, and teaching appointments are responsible for the bulk of universities’ current GHG emissions. In Sweden, six of the top ten GHG emitting public institutions are universities with an average annual emission of one tonne of GHGs from travel per full-time staff member (Fagerström 2019). An average Lund university employee, for example, emits 0.98 tonnes of GHG a year from travel, 94% of which come from flights (Lund University 2019). Not included in these budgets are the emissions stemming from incoming and outgoing international students. Emissions from flying are well above targets needed to avoid climate change of 1.5°C (Masson-Delmotte et al. 2019). It has long been argued that academics can significantly reduce GHG emissions by simply avoiding flying to conferences and attending low-GHG conference formats. However leadership is needed to “courageously address the moral issues and take advantage of modern internet-based communication technologies” (Parncutt, Seither-Preisler, and Iles 2019, 1). Despite significant potential reductions, many academics do not fly less.

While academics are often well informed on climate change, they are also often frequent fliers (Klüwer et al. 2020). There is a widespread understanding among academics that aeromobility facilitates career progression and is a necessary part of a successful career. Some academics are hypermobile and routinely fly over 150,000 kilometers (kms) per year (Poldrack 2019). Entrenched structures (for example, national financiers of academic research do not consider GHG budgets for research proposals) and academic norms around flying-enabled internationalization, lock-in GHG emissions into everyday academic practices. Disseminating research findings at conferences and other events, and forging and maintaining connections with international collaborators are some of the benefits that accrue to academics that are able and willing to fly. Furthermore, boundaries between professional and personal justifications for flying are not entirely clear (Lassen 2006). Academics often combine attendance at conferences with tourism or other events, by “making the most” of a journey to a foreign destination and also participating in tourism or visiting family and friends.

Air-travel practices have been characterized by mobility scholars as building “network capital” (Elliot and Urry 2010), a key resource that affords research resources and opportunities through professional connections. Although moving researchers and students around the globe is currently a common way of performing academic internationalization, there can be other ways of achieving this objective (Rostan 2012). However, the systematic internationalization of academic life has not simply been enabled by flying; academia has created discourses of global collaboration, networking, and other rewarded activities that are mutually reinforcing, at an individual as well as institutional level (Cohen et al. 2020). Conference presentations are often considered as part of career progression. High competitiveness within academia puts pressure on academics to cohere with intensive flying practices to not lag behind on a precarious career path (e.g. Rothengatter and Hil 2013; Herschberg, Benschop, and Van den Brink 2018), even if correlations between academic flying and career progression are tenuous (Wynes et al. 2019; Chalvatzis and Ormosi 2021). Despite growing awareness of the need to minimize GHG-intensive flying (Gössling, Humpe, and Bausch 2020), initiatives to reduce academic flying (cf. Kalmus 2017) and increasing calls for moral responsibilities of academics (Parncutt, Seither-Preisler, and Iles 2019) international travel is still widely seen as academically meritorious and thus a necessary part of academic life.

This presents a clear tension between the personal and professional benefits associated with academic flying, and the concern for climate integrity – what some have labeled the “flyer’s dilemma” (Higham, Cohen, and Cavaliere 2014) and “climate hypocrisy” (Higham and Font 2020). Flying is often justified psychologically as the expression of values, the desire for social conformity, and the justification for utilitarian reasons (Cocoslas et al. 2021). The tension between living sustainably and campaigning for sustainability is, of course, not confined to academia, but is an acute example of a broader phenomenon (e.g., Balmford et al. 2017). More theoretically, academic flying is tightly bound with entrenched norms and practices: being a successful (sustainability) academic entails flying to conduct and present research, participating in international projects, and presenting one’s results at international conferences. Likewise, being a highly ranked university currently requires being actively present on the global stage that academia has become, attracting faculty and students from afar, and participating in the international scholarship arena. When decisions are made between internationalization and sustainability goals, sustainability is often neglected.
To achieve internationalization goals without compromising on sustainability, many universities have been investing in state-of-the-art digital communications, and supporting the technology with policies that discourage employees from flying. For instance, in Australia, 30% of universities were found to be promoting videoconferencing as their main strategy for reducing GHG emissions from air travel (Glover, Strengers, and Lewis 2018). Many universities have at least some dedicated “telepresence” meeting rooms, with high-definition screens, microphones, and speakers, supported by high-speed data connections. Such facilities are designed to give the best possible experience of co-presence in remote meetings and events, although the experience is not fundamentally different to a high-quality videoconference conducted with more common technologies. However, despite this push from universities, the existence of communication and collaboration software, and the sustainability imperative not to fly, academic flying had, until early 2020, continued largely unabated.

In this article, we discuss how the COVID-19 pandemic has disrupted academic air travel and, by extension, academic collaboration. Using methods based around already existing experiments and digital ethnography, we describe our experiences of attending online conferences in 2020, producing a typology of these collaborative events. We discuss the challenges and affordances of coordinating and performing academic collaboration in the digital realm, and conclude by suggesting future directions for policies and practices that will affect academic air travel into the post-COVID world.

**COVID-19 and the grounding of academia**

COVID-19 was declared a pandemic by the World Health Organization (WHO) on March 11, 2020 (WHO 2020). The virus has infected millions of people and resulted by the end of the year in nearly two million deaths (Worldometers 2020). Attempting to mitigate the virus’ spread, many countries closed borders, restricted long-distance travel, and even imposed lockdowns. One outcome of the pandemic has thus been reduced GHG emissions due to reduced mobility and industrial activity (McGrath 2020).

The pandemic has been by far the greatest interference in global air travel in recent decades. By early April 2020, aviation emissions had declined by 60% compared to the previous year, the largest relative decline of any sector (Le Quére et al. 2020). This is not to say it is the only occasion when significant disruption has occurred. In 2010, flights throughout Europe and the northern hemisphere more generally were grounded for several weeks by an ash cloud emanating from the Icelandic volcano Eyjafjallajökull. Academic flying to and from Europe, along with all other types of air travel, was effectively halted for this period, meaning that many events were either postponed or canceled. However, other forms of travel – such as high-speed rail, bus, or car – allowed for some degree of mobility during the interruption.

Unlike previous air-travel curtailments, during the COVID-19 pandemic it was not simply the mode of travel that was disrupted. Physical co-presence itself – the primary objective of most academic air travel – was prohibited in most jurisdictions throughout the first half of 2020, meaning that conferences, symposia, and other events were canceled. In February 2020, a conference of the biotechnology company Biogen resulted in over 70 cases of COVID-19 from those who attended the event (Viglione 2020). Even if one could board a flight and remain mobile, the events for which this mobility is ordinarily used for were no longer occurring. From an epidemiological perspective, conferences are highly unsafe, because of the potential for spread from participants converging from disparate locations into a central location, mixing over the course of the event, then dispersing again on planes or public transport – all highly transmissible environments (Pandian 2020).

Thus, for the first time, physically co-present academic conferencing – and academic travel more generally – has all but ceased, with events either having been postponed until a later date, moved online, or canceled indefinitely. Academics have been grounded, confined to their home cities, if not their places of residence, in a way that has not been experienced previously. This amounts to a drastic change in the practices of many academics, and raises fundamental questions about the nature of academic practice going forward in a world where physical mobility and air travel are highly restricted and uncertain. In the context of a concerted effort to transition to less GHG intensive academic internationalization, COVID-19 may have forced the academic community to acquire the necessary skills for online collaborations potentially reaching a critical mass. If academia has passed a threshold in transitioning to new conferencing practices, there is potential for reducing the GHG impact of universities and mitigating climate change. To explore the potential consequences of academic internationalization without flying we ask the following questions:

1. How is academic internationalization performed when the vast majority of people are not able to fly?
2. What are some of the challenges and opportunities digital communications present for academic internationalization?

Methods

To answer our questions around how academic internationalization is being performed during the COVID-19 pandemic and consequent grounding of academic flying, we use the concept of “already existing experiments” (Browne, Jack, and Hitchings 2019). Already existing experiments enable us to learn from socio-material realities to understand, envisage, and encourage more sustainable everyday practices (cf. Browne, Jack, and Hitchings 2019; Edwards and Bulkeley 2018). Experimentation is emerging within sustainability scholarship to research and to reflect on real-world complexities inherent in transitions, but also as an active process for sustainability (cf. Davies and Doyle 2015; Fois 2019; Jalas et al. 2017). Prior to 2020, there were few scenarios in which it was possible to ask academics to stop the GHG-intensive internationalization to which most of them are now accustomed in the global North. Yet during the COVID-19 pandemic, nearly all academic travel ceased. We are currently living through the experiment that seemed out of reach before 2020.

To explore the digitalization of academic internationalization we use our own experiences inspired by digital ethnography (Pink 2016). During the first half of 2020, we had planned to attend various conferences and seminars for international collaboration. We both have active academic careers researching social practices and sustainability and attend on average five conferences each per year of various sizes and scales – from local single-day workshops to large international conferences with thousands of participants. As the conferences we planned to attend in 2020 were all canceled or transferred online due to COVID-19, we had first-hand experience of various alternatives to physically attending conferences in order to achieve career milestones.

We collected data by digitally participating in and observing online conferencing, as well as the social media interactions around these events. As our interest was piqued, we also attended various other alternative online academic collaboration events such as Zoom seminars, followed social media discussions around these conferences, and read blogs and reviews on experiences of online conferencing. Our data-collection period lasted from March to August 2020 when we had expected to attend the majority of conferences, this all-consuming lived experience providing an “intense route to knowing” (Pink and Morgan 2013). Our experiences gave us a wide range of material on various forms of online academic collaboration, networking, and community discussions which we compiled in a shared document along with our reflections about the experiences we had attending these events. We used this shared document as a springboard for inductively discussing potentials and pitfalls of digital conferencing. The variety of data provided us with a diverse array of experiences and a “fuller, more comprehensive account” of online conferencing (Murthy 2008, 849). Our analysis was also inductive, while reading each other’s experiences on our shared document we video chatted to interrogate commonalities and differences of our experiences. While our results may be more broadly applicable, they should be considered in the context of social science.

To narrow the scope for this article, we chose to focus on conferences as a measure of academic internationalization. Of the conferences we observed, many went online, rather than be postponed, and most used some form of networking promotion. Of the six conferences we had planned to attend, three went online and the other three were canceled. In one case, this was due to the planned dates being too close to transition to an online format. However, two larger conferences in Australia due to be held later (July and November) in the year were also indefinitely postponed. The three conferences in April, June, and August were offered online.

One of the authors of this article was involved in organizing the April conference, Nordic Network for Sustainable Consumption (NONESCO), along with three colleagues. We thus had first-hand experience of planning a quick shift to online, as well as some insights into participant-engagement strategies. A key focus for the conference was forging connections between participants and creating the foundation for a strong international network. We facilitated this through circulating a pre-conference provocateur paper (Hansen et al. 2020) with three sets of questions, which we discussed in
smaller groups in three breakout sessions. We constructed the breakout groups based on participants’ research interests. To encourage a feeling of community, we started with a quiz for all attendees, included a 15-minute yoga session each day, and also had a “random” breakout-room coffee on the second day for more spontaneous interaction. We invited a keynote presenter and had a lively chat stream during the presentation followed up by an interactive question and answer session. Rather than paper presentations we had an introduction round where participants outlined their research interests in relation to the conference theme and it was then up to participants to chat with each other, visit one another’s academic webpages, and read more about one another’s current projects. The two half-day format made it appealing for participants with caring responsibilities to attend, but also avoided sitting in-front of a computer for an extended period, since we were concerned about screen fatigue and decreasing attention levels. The conference had a geographic focus, the Nordic region, and thus we were all on the same time zones which made being a synchronous online conference possible. Since our main focus was on discussing common topics arising from our provocation, rather than the more typical paper presentations, the discussions were rich and participants in each group got to know each other and build connections.

The other author of this paper organized a “virtual plenary” panel discussing how the field of mobilities was being affected by COVID-19. The objective was to capture ideas that researchers were experiencing during the pandemic, rather than waiting until after its main impacts had passed. The organizers chose a plenary-discussion format where five speakers each gave a ten-minute presentation, followed by an extended half-hour conversation between panelists with a moderator guiding the discussion. Questions were also taken from non-panelists, ensuring that there was a degree of audience participation. The event was held on Zoom, publicized on social media beforehand to attract participants, and recorded for viewing afterwards by those who could not attend on the day. Fifty-three participants were in the virtual “room” when the event started, and 47 were still present at the end of the hour and a half. There were no notable technical issues, and the event ran smoothly and was deemed a success by the panelists and several audience members who provided feedback on social media (Figures 1 and 2).

Results

In this section, we discuss several prominent online-conference formats and platforms: synchronous, asynchronous, and conferencing platforms designed to promote networking and connections between participants (Table 1). We summarize ways that academic internationalization has been digitized,
discuss experiences of academic online conferencing, and highlight some of the challenges and opportunities these developments pose for academia more broadly.6

**Synchronous online conferences**

Synchronous online conferences are the most common conference format that we observed. These tended to follow a traditional format with an introductory plenary, parallel sessions, and keynotes, all done live in real time, enabling interaction of geographically dispersed participants in similar time zones. Synchronous online conferences may have better emotional connection and decreased misinterpretation between participants, creating a shared experience through the opportunity to video chat, watch keynotes, and pose questions in real time. Semi-synchronicity can also be achieved through setting up digital regional hubs, for example hosting similar sessions at times that suit East and Southeast Asia, Australia, New Zealand, times that suit South and North America and times that suit Africa, Europe, Middle East, West and South Asia, as was done by the International Conference on Ethnography in Business (EPIC2020 Conference).

A leading example of a synchronous conference was the Sustainable Consumption Research and Action Initiative (SCORAI 2020) which is usually held in a venue that participants travel to with physical co-presence. In 2020, SCORAI was planning to hold the conference in two regional hubs so that more participants could avoid flying and thus reduce GHG emissions, but it became totally virtual in response to COVID-19, saving an estimated 150–200 tonnes of GHG emissions (Addell, 2020). The online program was similar to the pre-online format with a mix of keynotes, parallel sessions incorporating 3–5 presenters and discussion, and even a field trip to a secondhand mall, all in real time with nearly 400 attendees. At the same time there was an online-backchannel discussion on Twitter with the hashtag #SCORAI2020 where participants could post responses to presentations and have discussions. A challenge for the synchronous format was the time zones with early starting times for participants on the east coast of North America and late ending times for participants in central Europe.

**Asynchronous online conference**

Another common format is the asynchronous online conference, where keynotes are prerecorded and participants can watch and interact by posting and responding to written questions and comments in their own time: what some have referred to as a “distributed happening” (Pandian 2018). This provides participants time to think and ask (potentially) well-developed questions. However risks can accompany asynchronicity and the text-based discussions that are most often used. For instance, text-based discussions may involve more misinterpretation due to the generally lower resolution form of communication than is the case for direct voice and video connection.7 Nevertheless, asynchronous online conferences are convenient for scientists who live in...
different time zones, providing flexibility and control over time spent on any topic and also allowing more equal participation from participants all around the world since the events are less anchored to a particular time zone.

The Nearly Carbon Neutral Conference (NCNC) is a frontrunner of the asynchronous online conference model. This format, developed in 2016, has been used by different groups for a myriad of conference themes. To deal with participants who are not located in the same time zone, NCNC asks presenters to pre-record video presentations and text-based questions and answers, sacrificing a certain amount of embodied connection but ensuring equal participation opportunities, regardless of where one is attending from. Displacements, the biannual meeting of the Society for Cultural Anthropology, is another early example of asynchronous conferencing explicitly addressing both carbon footprints and equitable access (Pandian 2018).

Network-promoting tools

Networking and connecting with others with similar research interests, lies at the core of academic internationalization. Forging these connections is not always easy regardless of whether or not a conference is online. Some of the conferences we observed overcame challenges to developing serendipitous connections by using various networking tools to connect participants through, for example, “chat roulette” based on research interests, discussion rooms on various topics, or even virtual hubs to meet others who are also attending the conference. For instance, the virtual conferencing platform “Remo” – in addition to having a standard webinar format – also allows participants to position themselves at specific “virtual tables” to engage in small group video conversations with other conference participants at specific times during a virtual conference, be it during a particular networking session or during a break in the main conference proceedings. Similarly, the virtual event platform “Shindig” allows and encourages participants to interact with each other by opening small group video-chat windows before, during, and after formal events take place. Platforms such as these are attempting to make virtual events more social, by attempting to promote the same kinds of incidental and small-scale interactions that are often experienced at physical conferences.

Experience tells us that many academics find it difficult to network at physical as well as online events. Incorporating initiatives for spontaneous networking and discussion of research at conferences and workshops may assist in sparking high quality international connections and scientific discussions. There is also potential to break down existing academic hierarchies and to facilitate research discussions based on scientific interest. For example it may be less intimidating for a young minority background PhD candidate to join a chat room than asking a question in a full lecture hall or walking over to a group of established scholars. Interpersonal connections formed in these videoconferencing encounters can be further developed with digital networking tools such as AuthorAID, ResearchGate, and WeChat that focus on shaping ideas and progressing science (for a detailed discussion see Sanganyado 2020).

The COVID-19 pandemic has been an experiment in building these international academic collaboration competencies. During the pandemic, conference-goers and organizers, ourselves included, developed many new competencies in both the technology requirements for such online collaborations, but also the soft skills of facilitating connection and scientific discussion remotely. Now that these skills exist in the academic community on a broader scale, there is an opportunity to use them to reduce the GHG intensity of academic internationalization. In the following section we expand on our experiences with online conferences to discuss some of the opportunities and challenges with digitizing academic internationalization.

Opportunities and challenges for digital academic internationalization

Our findings highlight potential opportunities such as more democratic participation, as well as challenges such as maintaining engagement and fostering digital skills. While the benefits from reducing GHG emissions are clear, we explore some of the

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**Table 1. Online conference types.**

| Description      | Aim                                      | Presentations | Attendees | Example                          |
|------------------|------------------------------------------|---------------|-----------|----------------------------------|
| Synchronous      | Participants are online at the same time and interact in real time | Sharing research and building academic relationships | Live   | ~400 | Sustainable Consumption Research and Action Initiative |
| Asynchronous     | Participants access presentations at their convenience | Sharing research and building academic relationships | Prerecorded   | ~50  | Nearly Carbon Neutral Conference |
| Network           | Can be a combination | Building academic relationships | None | ~50  | Remo and Shindig |

 
parallel challenges and opportunities of online academia more broadly – for an overview see Table 2. These considerations are key to the digitalization of academic internationalization should air travel remain restricted in the future.

**Democratic participation**

One of the clearest developments of digital conferencing is the lowered barriers – both financial and temporal – to entry which early evidence suggests is increasing both the number and diversity of participants at academic conferences. For example, the European Geosciences Union, which typically attracts 16,000 attendees, in 2020 drew 26,000 participants to its online conference (Klöwer et al. 2020). We and a number of our colleagues also experienced this development, spontaneously participating in more conferences than we otherwise had planned to join. The opportunity for wide academic participation in international events without the financial and temporal commitment has clear benefits in the de-hierarchization of academia and inclusion of marginalized academics. This holds potential for egalitarian contributions to knowledge production and dissemination; not just reproducing the research of those academics with the resources to travel and present at conferences. Part of improving the egalitarianism of academic conferences is registration fees reflecting currency values of scholars’ home countries: some conferences already accommodate this innovation. In our experience of attending conferences – both physical and online – there are often backchannels where participants engage in conference-related discussion in chat rooms or on Twitter. These backchannels provide the potential for further presentation of the academic self, engaging with other participants and ultimately forging connections between academics with similar research interests. Digital academia and digital conferencing lowers barriers to entry, participation, and outreach, potentially flattening existing academic hierarchies that were maintained by a reliance on aeromobility.

Another opportunity with being able to attend conferences digitally is being present to perform caring duties at home. Academics who may not be able to travel due to care responsibilities now have the potential to attend and participate in more conferences. At the previously discussed NONESCO conference, two participants who had notified us that they were unable to attend due to caring responsibilities, were able to come after we announced that the meeting would be held online. Participation can also be enhanced for those with care responsibilities through recording and uploading sessions. For example, a senior academic who had caring responsibilities during the synchronous SCORAI conference was able to “attend” afterwards, still participating in the online discussion via Twitter. Many of the academics speaking publicly about the link between caring responsibilities and conference participation that we observed were female, suggesting that digitalization of academic internationalization may advantage women who are often responsibilized for care work. This has concerning implications for the normalization of women performing both care and academic labor simultaneously, and data suggests that COVID-19 has had unequally negative consequences on female academics’ working hours (Myers et al. 2020) and publications (Viglione 2020). As Cohen et al. (2020, 162) notes “dominant discourses constructing the modern “academic” and gender render parenting and a “good” academic career as incompatible, particularly for female academics.” Performing academic internationalization without traveling can enable simultaneous caring responsibilities and research engagement, and gender and caring responsibilities should continue to be discussed in the context of online conferencing.

A further consequence of digitalization of academic collaboration has, in our experience, led to more personal connections between colleagues. In some cases, we met for the first time, children of colleagues we have known and worked with for years. The crossing of boundaries between the professional into the personal may lead to a better understanding of balancing academic and private life.

**Engagement in a digital environment**

Traditional conferences involve physically traveling to a location that is (usually) away from one’s home and institution. Co-present conferences extract us from our day-to-day work and home life, taking us out of our normal routines and environments to distant locations where conferences are being held. Co-present conferences then immerse us in the experience of being there. We attend presentations at the conference venue, engage in conversations, and eat meals with other participants. We attempt to absorb the knowledge disseminated at the event, discuss current research developments and connect with other attendees. While the link to our day-to-day academic roles is rarely entirely removed – particularly with the advent of smartphones and Wi-Fi connections – there is a general tendency to immerse oneself in the conference experience and prevent intrusion from normal academic duties.
In contrast, online conferences tend to lack the extraction from everyday life and immersion in the conference experience. They are often experienced using the same technology – personal computer, Internet connection, and physical office, even the same coffee cup – as we use in our day-to-day work. As such, e-mail, social media, and other non-conference related matters are often no more than one click away. We have also heard anecdotal accounts of scholars doing housework while tuned into conference keynotes. Online conferences may make distractions more likely. A suggestion could be to take “conference leave” from the workplace to get away from a normal working space, students, and administrative duties. Lund University, for example, provides staff with videoconference rooms that can be booked in advance. A further help in creating a conference space would be to organize with other scholars from the same institution to book a conference room together, and attend from a local hub to achieve some extraction from day-to-day life and immersion in the conference experience.

Another potential downside to the increasing attendance of online conferences is that there is generally a lower perceived commitment to staying for the entire session and potentially lower engagement. Instead of rigorous questioning and debate that sometimes arises at physical meetings, participants can simply log off if they disagree, are not interested, or if there is no strong feeling of involvement. An example we found from our Twitter observations is a well-known professor who disagreed with a presenter’s argument and simply tweeted his disagreement and then logged off. While participation barriers are lowered in digital environments and can allow junior scientists access to participation – and many are willing and able to participate, ask questions, and discuss – it may also decrease engagement.

A further challenge with digital networking is unequal digital skills: some people may be very good at navigating an online-conferencing space, and thus have more coverage and visibility. This often reflects a generational shift with younger academics better equipped to acquaint themselves with new virtual environments. Whether online or in person, the skills needed to engage a peer in a discussion have similarities, so we argue that building the capabilities to ask questions and engage others in discussion can be transferred from the physical to the digital.

A final factor in engaging in a virtual conference space is screen fatigue. Physical conferences can be stimulating, with academics often reflecting on such events as being inspiring and energizing from an intellectual point of view. In contrast, participating in online conferences involves viewing a computer screen for an extended period of time, often resulting in screen fatigue: a “loss of that affective charge that surges most powerfully through proximate spaces of telling and listening” (Pandian 2020). A recommendation for ameliorating screen fatigue is to provide a clear schedule, to keep sessions to a manageable length, and to encourage participants to spend shorter, more engaged time at digital conferences.

Ensuring that certain time zones are not marginalized in the online-conferencing experience should also be a consideration in ensuring strong academic internationalization. The asynchronous conference model is a relevant way to combat tendencies for research communities in the same time zone to form impenetrable cliques. The challenge is to recreate a convivial and engaging co-present experience and sense of research community where participants.

| Challenges – engagement in a digital environment | Opportunities – democratic participation |
|--------------------------------------------------|-----------------------------------------|
| **Time zone**<br>• Synchronous online conferencing requires being online at the same time, for some participants this can be outside normal working hours | **Wider participation base**<br>• Potential for egalitarian contributions to knowledge production and dissemination regardless of geographic location |
| **Asynchronous online conferences may not have as clear communication**<br>• Rather than being fully immersed in the conference experience, participants may be multitasking and thus less engaged | **Lowered barriers**<br>• Time – as travel time is reduced it becomes worthwhile to attend a 2-hour seminar<br>• Financial – potential for a wider range of academics to attend a larger number of conferences and networking events<br>• Ability to fulfill domestic and professional duties simultaneously<br>• Academics with caring responsibilities able to attend online conferences |
| **Blurring home/work boundaries**<br>• Distractions caused by conferencing from home<br>• Potential for compounding gender disparities | **Using otherwise underutilized skills**<br>• Some participants such as early career researchers may find it less intimidating to connect and discuss in an online environment<br>• Variety of social networking platforms<br>• Tools such as WeChat, Twitter, ResearchGate, Academia.edu, and so forth allow researchers to connect internationally with a wide range of peers and share scholarly interests |
| **Distribution of digital skills**<br>• Not all participants are equally fluent in online communication | **Academic meritocracy**, which allows for diverse voices to be heard |
| **Screen fatigue**<br>• Sitting at a screen is experienced by many people as less energizing and inspiring than face-to-face interactions | **Tools such as Zoom, Microsoft Teams, and Slack** for asynchronous and synchronous communication |

Table 2. Overview of challenges and opportunities.
are able to interact with others that they do not normally encounter on a day-to-day basis. For example, conference sessions can be conducted two continents at a time (e.g. Europe/Africa and Asia/Australasia) ensuring that participants are able to engage at appropriate times instead of having to do so outside normal working hours.

A final observation is that full engagement for the entire duration of the event is not assured: some participants attend online conferences with full commitment and intent to participate while others stream keynotes and sessions in the background while performing other tasks. We argue that such variations in participations should be embraced rather than discouraged, provided everyone has equal opportunity to participate and there is an awareness of the varying demands that academics have for attention and commitment. These differences may be tied to career phase, caring responsibilities, time zones, and other emerging factors that create new academic hierarchies. Ultimately, for academic internationalization, the opportunity to participate opens the door for inclusivity and diversity in knowledge creation.

An unresolved sustainability challenge with the digitalization of academic internationalization is the GHG emissions inherent in the information and communication industry. This industry, including the production of consumer devices as well as maintenance of data centers and communication networks, was responsible for a projected 14% of global GHG emissions in 2020 (Belkhir and Elmeligi 2018). While the information and communication industry’s footprint is on par with the aviation industry’s emissions from fuel – and predicted to increase – there are significant savings to be made from efficiencies and using renewable energy (Jones 2018). For example data centers in the northern Swedish city of Luleå take advantage of the naturally cold climate and access to inexpensive hydropower-produced energy (Luleå Data Centre 2020). A clear limitation to sustainability opportunities arising from digitizing academic internationalization is GHG emissions saved from discontinuing air travel end up being offset by increasing emissions from the information and communication industry. Evidence from analyses of the digitalization of a range of consumer goods suggests that their overall energy footprint can remain unexpectedly high (Court and Sorrell 2020). It is also important to recognize that the information and communications technology that facilitates digital conferencing also carries with it significant broader environmental impacts in terms of resource extraction and waste generation (Lennerfors, Fors, and van Rooijen 2015).

Further questions arising from our study revolve around the role of information and communications technology in the context of academic internationalization: is it a replacement for, stimulator of, or separate from physical travel? We argue that digital interactions have the potential to reduce environmental impacts through replacing air travel if acquired en masse, however this is an empirical question that we will only be able to answer once air travel is possible again. There is a risk that digitalization could simply stimulate more international activity and GHG impacts in the future. For example, sectors such as geological and archaeological sciences require field studies and engineering may require an exchange of physical materials and laboratory and manufacturing equipment. Digital conferencing in these sectors may become a gateway to further exchange of goods and processes that can have large environmental impacts even without individuals physically traveling for conferences.

**Conclusion**

The sudden grounding of academics has demonstrated that air travel – previously deemed a necessary part of a successful academic career and university internationalization – was not in fact essential but relied on a system that maintained the conditions for its own ongoing aeromobility (Cohen et al. 2020). Before March 2020, academics often felt compelled to fly, in part because other academics were flying. To cease flying would be to forego the opportunities that other academics would be taking advantage of. Physical conferences were held, and held together, by shared expectations of aeromobility, this fear of missing out contributed to high volumes of GHG emissions. Only when academics were grounded during COVID-19 was there sufficient reason and incentive to transition to a primarily digital form of academic internationalization, resulting in a critical mass of academics acquiring digital collaboration competencies.

Going forward, academics should continue to explore ways of collaborating remotely, making use of emerging technologies that have certain affordances for sociality, connection, and network building. There is no shortage of such technologies and academia is fortunate that there is now significant momentum both inside and outside the university system to create and normalize platforms, events, and other forms of remote collaboration that negate the need for air travel. As we move into the post-COVID-19 era, a concerted effort must be made by academics and institutions to maintain low-carbon conferencing practices, even if air travel begins to resume in other sectors. Those responsible for
incitizing academic air travel, such as through funding arrangements, should consider how these resources could be allocated in ways that do not perpetuate high emissions-conferencing practices. While academic air travel may be a relatively minor proportion of overall air travel, academia may be able to serve as an example of how sector-based reductions in flying can be made.

Based on our observations and experiences with online conferencing, we argue that no singular digital conferencing platform or event format is superior to others overall. Whereas traditional conferences tended to be of a certain length to make travel “worthwhile” for academics from further afield, digitalization of these events opens up a range of possibilities once the travel element is eliminated. For instance, flying internationally for a two-hour event may not have been deemed worthwhile by most academics, even if the knowledge and connections at that event may have been highly beneficial for them and their careers. However, when such events are held online attendance may expand, increasing opportunities for international collaboration and knowledge sharing relative to face-to-face events of the same duration. Likewise, asynchronous online conferences can span much greater lengths of time, which may not otherwise attract academics to travel to a physical conference. Beyond online conferences there is the need for maintaining academic connections through social networking platforms. Piloting new and experimental ways to connect and collaborate between academics should be a priority (Barrineau and Facer 2019).

Opportunities for academia with digital internationalization include the potential for broader inclusion and more democratic knowledge creation and dissemination. Academics with limited travel budgets, time budgets, caring responsibilities, and other impediments that limit physical attendance at international conferences will have greater access to global spaces. As a wider range of academics are included in academic research projects, a flattening of hierarchies and more specialized collaborations will ensue, and academic knowledge creation will become more diverse and democratic: key goals of internationalization.

Challenges for online academic internationalization arise from engagement in a digital environment and blurring home/work boundaries. Time zones can still exclude groups of scholars from participating in synchronous online conferences, as can the demand for high-speed data connections for scholars in locations where these facilities are lacking.

Amid an unprecedented pandemic causing large-scale disruptions to everyday life, sustainability transitions may not be regarded as the top short-term priority. However, the threats caused by climate change and biodiversity loss are as urgent as ever and this already existing experiment has provided the opportunity to learn about flight-free academic collaboration. Our research shows that despite the grounding of flying, academics are still performing internationalization and many in academia have had a crash course in online collaboration. We argue that these competencies now exist in academic praxis at a scale to enable inclusive, low GHG academic internationalization.

Notes
1. See https://www.timeshighereducation.com/world-university-rankings/world-university-rankings-2020-methodology.
2. This group comprises Karolinska Institute, Uppsala University, Lund University, Stockholm University, Gothenberg University, and Malmö University.
3. We are both early career researchers in the social sciences based, respectively, in Sweden and Australia.
4. See https://blogs.helsinki.fi/nonesco/
5. Breakout rooms allow participants to split a Zoom meeting into separate sessions. The meeting host can choose to divide the participants of the meeting into these separate sessions automatically or manually and can switch between sessions at any time.
6. We include user reviews such as YouTube reviews, podcasts, tweets, and blogs by academics who attended digital conferences and shared their experiences online.
7. Sadly, the fonts Sarcasifont and Good Times Roman are still not widely used in academic communication.
8. The first iteration is archived at http://ehc.english.ucsb.edu/?page_id=12687.
9. See http://displacements.jhu.edu.

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