A living history reflection on the shaping of the future geoscience profession

Luc Charbonneau[1], Christopher M. Keane[1] (keane@americangeosciences.org), Leila M. Gonzales[1]
[1]American Geosciences Institute, 4220 King Street, Alexandria, VA 22302

SY22B-0578

american geosciences institute
connecting earth, science, and people

The COVID-19 pandemic has been uniquely disruptive to social, economic, and educational frameworks, bringing about sweeping changes, both temporary measures to adapt to rapidly changing circumstances as well as permanent changes in the way people work and learn. Through AGI's NSF-supported Geoscience COVID-19 Impacts study (Award #2029570) that began in May 2020 and will continue through December 2022, we have tracked how geoscience workplaces and learning environments have adapted to the changing pandemic situation, including the permanent changes that have occurred with respect to work and learning environments. As part of the study, we conducted a suite of oral history interviews in 2022 to capture the experiences of geoscience employers, academic departments, faculty, recent geoscience graduates and post-doctoral fellows during the pandemic. This presentation delves into these experiences to explore the rich experiential fabric of geoscientists as they navigated impacts to work and research activities and implemented strategies for overcoming pandemic-related challenges, fostered and discovered new opportunities for work and research that arose as a result of changes brought about by the pandemic. From these experiences, we will also reflect upon how these experiences are shaping the future directions of the geoscience profession.

Challenges

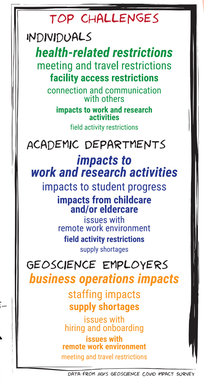
Travel

Summer field class...[was] a month of...camping and...that was summer 2021. We were approved to be able to go to the field in-person because [it was] outside and...as long as students were...separated...they had to sit in...our vehicles as we were driving from different spots like we only have like two or three people,...and they had to be separated by a long distance and everybody had to wear masks. ~ *academic faculty*

Fieldwork

Both field travel international and local and all the lab stuff that shut down for me. So the [lab] was 100% shut down [since] March...And so it was probably November when we were allowed to start going back in...very minimally with like one person a day in the whole facility. And so we have to...schedule that between all the researchers who are trying to use the facility and everybody who obviously...lost six months worth of lab time and so. Things like really actually slowed down for me a lot...I essentially had enough time to go out into the field collective bunch of stuff and start working on it, but not actually get any data yet. ~ *recent graduate*

Lab access



Childcare & Eldercare

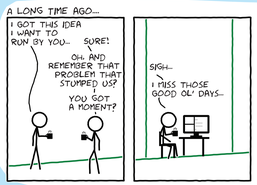
I was teaching classes on Zoom [and] even if I asked the group if there [were] questions and waited for a very long time to see if they would respond, it was minimal. Whereas when I started teaching the same exact classes in person, hardly changing the content and curriculum, it was just night and day. I mean there were constant questions, comments, talking like we're working together and that made a huge difference. I think not only is it the field skills and the social skills, but the ability to ask your peers and work in a team. ~ *academic faculty*

One of the first kind of personal difficulties I had was having young children at home...We live in ...a 2 bedroom [apartment] and so there's not like a whole dedicated office space. And so my kitchen counter became my office. And so the first hurdle was just that logistic of finding the space, the quiet space with with young children that, you know, ... I had a a child born during COVID. And then my oldest...she was four at the time. So you can imagine what that looked like. And so, you know, if it's kind of adjusting just to the the change setting and it's funny, you know, there were days I worked from home before the pandemic. But of course, in those instances, you know, the house was empty, kids were at school, etcetera. Now everyone being home while at once, that was definitely, you know, a good kind of personal challenge. ~ *recent graduate*

Learning

My professors are due a lot of credit for making it work and transitioning away from...that traditional lecture style college course to something that was asynchronous or project based. And I think that there was a direct correlation in my experience between professors who made that switch and the quality of the content. So I like the courses where I could learn at my own pace or do a project and then turn it in and get feedback from the professor. Those courses were great and I learned a lot from them. I got great experience, whereas the ones that were like, alright guys, we're gonna get on zoom at 7:00 AM and you're gonna listen to me for two hours...I hated those. And that was a really poor experience from a research side. I had to pivot a fair amount [because] I knew I wanted to go into science. - *graduate student*

Teaching



Onboarding is proving to be a challenge. Not from a technical proficiency standpoint, but from assimilation into the culture and core values of the organization. Also, some animosity [is] starting to creep in from those that need to be in the office to do their jobs, vs. those that can [work] remote 100%...The pandemic has exacerbated some of our pre-existing problems with hiring, onboarding, and training; new hires receive more assistance and direction from mid-level staff of the same latitude than they have access to direction from top-level staff...A lot of the interviewing, hiring, on-boarding, training, etc. of new employees has been changed by the new remote work environment. A lot of these tasks are now done remotely...Recruiting remains an issue, as there seems to be limited number of both experienced and entry-level geoscientists available...Definitely fewer applicants per opening than pre-pandemic. ~ *geoscience employers*

Remote work

Hiring

Onboarding

Strategies

Adaptability

We basically tried to hold on to everybody and keep paying salaries...We got PPP monies both years. That it was available because we thought...there was our production responsibility to the company and our employees to take what was offered...So you know we we took advantage of a program that was intended to keep our business viable and and healthy and and it and it did. It for sure helped. There's no question about it. I'm not saying we would have gone out of business, but it wasn't clear whether we were gonna go out of business or not. So, but the PPP money made it for sure that we were not going to go out of business. And once you have that, it kind of gave you more options because you knew kind of what you were dealing with so. And at the end of the day, if we, you know we we had quote extra PPP money and you know we distributed that that some of that to an employees for sure because you know our thought was that this was also intended as stimulus right so you know we get bonuses to our employees...and we also took an opportunity to sort of, you know, tool up our business under the thought that that was in the best interest of...the economy as well and our company. ~ *geoscience employer*

Group work in breakouts on Zoom was amazing! It saves time moving around, groups get privacy, I can easily screenshot a list of students in each group for attendance, and random assignments get students to meet new people faster. The accessibility was great, including recording and captioning lectures. Virtual labs worked really well when I completed redesigned them to function in that space (not just modified in person), and help prepare students to use their computers more effectively. Virtual field trips were fantastic for getting more details, accessibility, and by creating my own (with 3D models, thin sections, etc), I will continue using it, as a way to prepare students for going in the field. ~ *academic faculty*

We did a lot with additional leave options, additional pay options, additional support, trying to be as flexible as we could encouraging supervisors to be as flexible as [they] could [be]. So ... you know, childcare was a huge issue ...[and] instead of having them drop out of the workforce, we gave [them] 20 hours of free time a pay period right for close to a year. We phased it. I can't remember exactly when it dialed back and so for people especially women who would have dropped out of the workforce instead we just gave them a little bit of breathing. So we said here's 10 hours a week it's a significant amount, right? That's 25% of your time and it was not just for women, I'm just saying you know there's the statistics that women drop out of the workforce for child care more often than men, right? So and and plenty of parents took [it] and elder care - actually it was eligible for both. So those sorts of flexibilities I think allowed us to retain a lot of employees and allowing people to do what we did this the split parenting shift, right? So work six hours and then take a break and then work two hours after the kids go to bed right? We encouraged that if it worked for you and your family and your supervisor was okay with it and you were still being productive and working all of your hours, absolutely, and I think those things made a difference. ~ *geoscience employer*

Virtual platforms

So as part of the freshman class that I taught, there's a requirement that every first year student meet with their faculty for a little bit of time...And I did those [meetings] virtually during the pandemic... And now I've shifted my office hours to being flexible and they can either be virtual or in person, and when I do other things that...require me to meet students, I always offer up the virtual option and I think more often than not they take me up on that. So I think that has increased the ability to meet with students one-on-one...Students are more willing to log on to Webex for five minutes and meet with me and ask me a question quickly as opposed to like walking down to my office and going out of the building and that kind of stuff, even though we're very small campus...I do think that there is a little bit of a barrier that has been removed in that it's much easier to just click a few buttons and meet with someone because I've even taken meetings with students while they're in the library. So I'm assuming that like working on it and they get stuck and they know it's my office hours and they'll just quickly like kind of virtually meet with me and ask a question. So I think that that's something I never would have considered doing pre-pandemic, but once it became a thing, it was a pretty easy change to make. ~ *academic faculty*

Supportive actions

We continue to do what we can to support staff during these challenging times. We continue to not require anyone to come to the office. We continue to have check-ins with staff weekly. The burden of work continues to shift more and more to those with more flexible schedules, less severe mental health issues and those without children and elder care demands. ~ *geoscience employer*

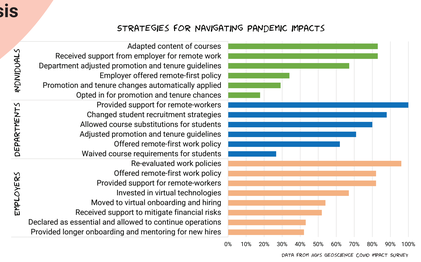
Self-direction

Mental toughness. Like, you know, having the ability to focus on something, be self-directed, all those things which I think I had at some degree back then. I definitely got a lot better at all those things as I, you know, matured through the pandemic. And I think that's the main skill that I have right now that will be to my advantage in grad school is that I can, you know, I can sit down and read 15 papers if I wanna, you know, learn more about a subject and just having the sort of perseverance to go through all of that, I think, arose mostly because of the pandemic. So I tell [others who are facing a similar situation] you know, you're about to go through a whole bunch of...time where you where you're by yourself. Think really hard about how you want to use that time, because if you use it effectively, you know you'll probably be happy with the result. - *graduate student*

Redefine projects

I have had to move my course from in person to online. Cheating is a big problem for online courses. To get around that, I now have a more work based assessment for students, such as turning in their lecture notes, answering specific questions to my lectures and their textbook that they turn in, and having them do presentations. I am not giving any tests. . ~ *academic faculty*

Data analysis



Literature review

Opportunities

Innovation

Members of our department created a fully online field camp last summer. They worked with education faculty to assess the outcomes of this, and are now presenting the results of that research and writing manuscripts. They are also continuing to assess student learning by taking the same cohort of students out for mapping projects (on a volunteer basis, with social distancing and masking). This work should open up a lot of interesting possibilities for accessible field instruction. ~ *academic department*

Broader collaboration

We have expanded our remote partnership network, including potential for remote instruction by teaching lecturers (instructors) in disciplinary areas not locally available. ~ *academic department*

Improving departmental culture

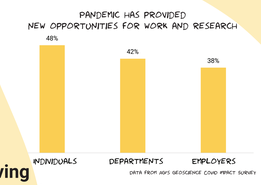
We have had regular, in-depth meetings focusing on diversity, equity, and inclusion. This departmental culture work may not have been given as high a priority without the cultural disruption of the pandemic. ~ *academic department*

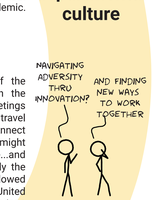
Networking differently

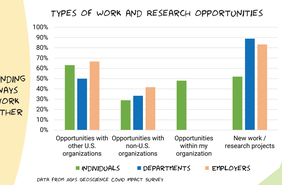
I started...really taking advantage of the virtual networking opportunities...With the transition to hybrid or fully virtual meetings that's allowed me to really stretch my travel budget to attend some meetings and connect with some colleagues virtually that I might not have the opportunity to otherwise...and that's been the other asset is certainly the switch to virtual and hybrid has really allowed not only for domestic here in the United States but also for broader connections internationally as well as with colleagues that I probably wouldn't see but you know once every four or five years if I was lucky prior to the pandemic. ~ *recent graduate*

Multiple modes

I have also a lot of alternatives now, so students are sick or something else comes up and they can't come to class. They can do and all online lab alternative. They can do an online field trip alternative. So a lot of additional resources and supplements that are all online that weren't created before the pandemic. ~ *academic faculty*







Learning new skills

When I was...looking at...post docs, they all had some sort of coding component to them and I didn't have...and I enrolled in...a data analytics certificate [program] and...the first two semesters are essentially like a the first ones [in] a coding boot camp that I did online adjacent to my PhD. The skills I got...I have used them and in publications ...So that I think that was the one thing I wouldn't have had unless I went outside of my degree program is...working with Python or having formal training and doing some coding for analysis 'cause again you can always teach yourself but the scripts I wrote before I knew the rules are not exactly but most efficient or user friendly or or anything like that. ~ *recent graduate*

As far as research goes we actually had lots of undergraduates help with creating those classroom virtual activities and we were able to have them scan all of the samples that we would normally be giving out as hand samples in class but they were able to scan them so that they could be rotated in 3D for a virtual lab for a lot of our like intro and mineralogy type classes and so the students were able to learn how to use the various imaging scanners that we were using for those projects and come in on their own when nobody else was in the building to scan them for us and and send them to us to make the labs out of so that ended up being counting for their undergraduate research experiences. ~ *academic faculty*

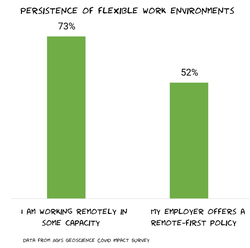
Looking ahead

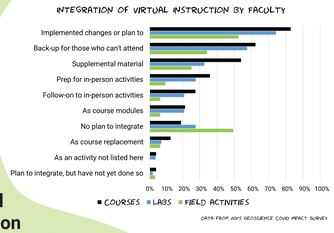
Hybrid options

Our students and their committees can now choose the format (in person, online, or hybrid) for a thesis/dissertation proposal and defense. We also now are allowing more flexibility with regard to course substitutions. ~ *academic department*

We had substantial funding to get our institution ... technologically ready for a post COVID world. So we were able to integrate audio and video cameras in all of our classrooms, so last spring. This concept of hyperflex classrooms, where the faculty member is there face to face with a group of students. But the students who just can't make it to class that day, child care issues, they're sick, can still log on, see the classroom, participate, ask questions. That has been a big shift in terms of the way we do things inside the classroom. And I think that's something that will continue in a post COVID world and may be the new standard. ~ *academic dean*

Flexibility in work





Virtual integration

For the seminar series, actually I think moving forward we're planning to keep doing kind of about half of our speakers virtual and about half in person. The benefit to the in person is the students get to have lunch with them, the faculty have dinner with the person. We have individual meetings. So it's not just their talk, but we have to be able to fly them in or, you know, pay for their travel. And so what we found is that by being able to do a mix [of in-person and virtual], it gives the faculty a little bit of a break each week..It allows us to bring in speakers from broader areas, and so we've been able to have I think a bit more kind of higher profile speakers periodically because we can do that virtually. And at this point, so many people are used to doing that, but it's not a major ask. - *academic faculty, recent graduate*

Personal connection

People are more understanding I think and flexible with one another and especially in terms of family events and and personal needs and I just hope we remain understanding of one another and giving each other the space we need to not just be effective scientists but also you know good people and good family members and and things like that and I think we are seeing that I just hope it's something that sticks. ~ *academic faculty*

How did you navigate and overcome pandemic-related challenges?

We invite you to share your experiences with an oral history interview.

Oral History Opt-in Form

Funding for this project is provided by the National Science Foundation (Award #2029570). The results and interpretation of the survey are the views of the American Geosciences Institute and not those of the National Science Foundation.