

# How Early-Career Scientists Responded with Resiliency to the Space Created by the COVID-19 Pandemic

 Cite This: *ACS Cent. Sci.* 2022, 8, 294–296

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The pandemic persists as a global crisis with the loss of over 5.7 million lives worldwide, as well as the detrimental effects of long-term COVID and new variants. We extend our condolences and support to our colleagues throughout the scientific community. Although the struggles and resiliency of scientists have been documented throughout the pandemic,<sup>1–3</sup> these surveys and analyses tend to have a particular emphasis on established researchers. We surveyed our cohort of the 2020 CAS Future Leaders program, a group of 30 early-career scientists from 18 countries representing a wide array of scientific disciplines. Our experiences during the COVID-19 pandemic reflect the struggles early-career scientists have persevered through and how the resiliency of our generation suggests an increasingly adaptable, engaging, and inclusive scientific community on the horizon.

A theme we observed in the responses involved spaces—physical and abstract. Before the pandemic, we had carefully balanced our time and energy in both physical space (such as laboratories and classrooms) and abstract space (such as taking care of personal relationships and mental health). The pandemic created unique voids in our physical and abstract spaces, and we found ways to fill them with new goals, hobbies, and perspectives. While this has been a challenge, it has helped us grow as scientists (Figure 1).

## PHYSICAL SPACES

Responses from the CAS Future Leaders highlighted how scientific communities that are often fast-paced and overfilled

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with responsibilities in labs and classrooms, administrative tasks, and endless to-do lists were suddenly slowed down. This gave a space for us to think critically about how we prioritize our time, our future directions, and what inspires our passion for the sciences.

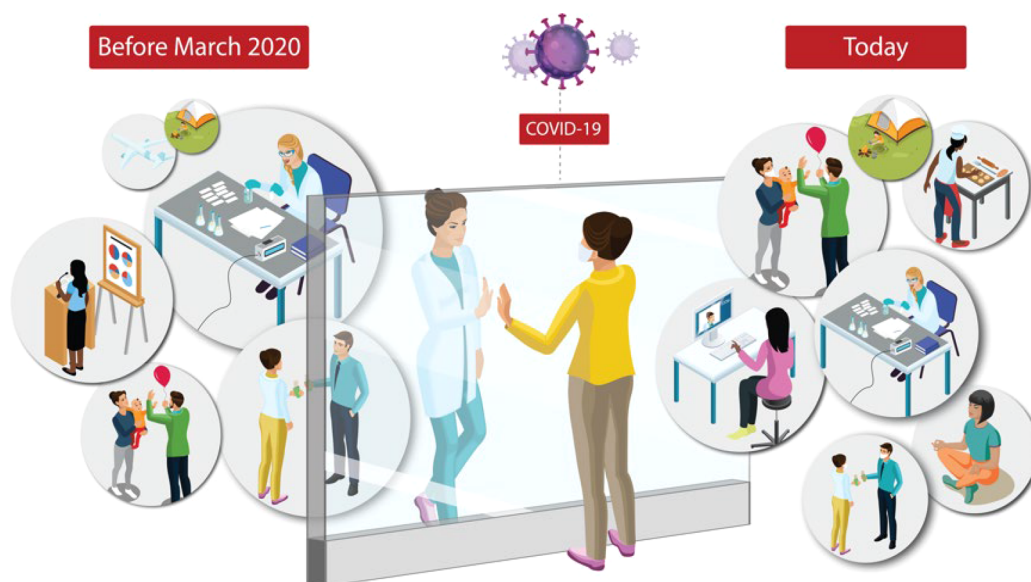
COVID-19 restrictions forced many experimentalists to work short shifts in the lab under relative isolation. While we have learned valuable lessons in experimental planning, organization, and time management, we also miss the unconstrained days in the lab. One of the beautiful facets of scientific research is its open-endedness; creativity is hard on a timer and by oneself. As one Future Leader expressed, “The pandemic forced me to be more efficient but also forced me to realize what parts I really loved about science (conferences, sharing ideas, talking with colleagues) and how much I struggled to do the work when stripped of those interactions.” (Monica L. Ohnsorg)

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In the vacated space of their physical classrooms, educators found entirely new ways to interface with and engage students.<sup>4</sup> We realized the importance of learning communities that foster a sense of togetherness and psychosocial support. Two Future Leaders shared their growth as educators: “I had

Published: March 23, 2022





**Figure 1.** Redefining what makes up our physical and abstract spaces in response to the COVID-19 pandemic.

students in different countries with different personal circumstances, and I had Post-its on my wall to keep track of different students' progress. I also received advice from the university counselors on how to help my students reach out to mental health resources on campus." (Safia Z. Jilani) and "As a researcher who's passionate about harnessing technology to support learning, the pandemic became a valuable opportunity to integrate strategies and improve learner engagement for online learning." (Fun Man Fung)

The virtual space created through online seminars and conferences since 2020 meant that we had global opportunities to learn from and interface with colleagues like never before. In the eyes of an Australian Future Leader, "The prevalence of online seminars and conferences that popped up during 2020–2021 meant that we had opportunities to attend seminars and workshops and interact with our international peers. I do admit I quite enjoyed being able to tune into an RSC seminar series while cooking dinner!" (Carol Hua). The pandemic has changed our physical spaces, and we are still learning how to take advantage of and transform them in our growth as scientists and educators.

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### ABSTRACT SPACES

Collectively, we expanded our abstract space in which our shared experiences fostered an atmosphere of empathy and support.<sup>5</sup> We acknowledged the shared uncertainty and

stresses caused by the pandemic and engaged in more discussions about mental health in our community. We used this space for conversations regarding diversity, equity, and inclusivity to take place in our institutions.

Beyond scientific and academic progress, the pandemic challenged us to rethink what success means and what matters most to us as individuals, such as work-life management. We allocated some of the newly created space as personal space by stepping in to support our families, being intentional with time outside of research, enjoying newfound hobbies, and adopting self-care practices. When lockdown restrictions began, many of us fled into nature to hike, backpack, bird watch, and exercise. We also learned that our homes could be productive places, proving it was possible to "separate personal life and work life within the same space." (Maria Emilia Dueñas)

On a broader scale, we have learned to keep an open mind and accept that circumstances might be different than what we expect or can even imagine. "Moving forward, I will remind myself that my career trajectory can completely shift in a short amount of time. It's best to keep our options open and be willing to adapt to new situations that arise" (Parinaz Fathi) and, "Life is now! You never know what is going to happen tomorrow; thus, don't waste time on doing things that you don't enjoy doing." (Agnes Thorarinsdottir) We have learned to be more versatile and to adapt. The pandemic has given us a new understanding of time: "We like to think that tomorrow will be the same as today. We procrastinate under the assumption that we can complete our tasks at a more convenient time; this is not the case. From the pandemic, I have learned to take advantage of opportunities today rather than tomorrow." (Joshua Tropp)

Beyond scientific and academic progress, the pandemic challenged us to rethink what success means and what matters most to us as individuals, such as work-life management.

The pandemic has created voids for all of us, both physical and abstract. As we continue forward, we aim to keep some of the new priorities and learned lessons in these spaces. The resiliency of young scientists suggests a bright future ahead. We gathered three lessons from our experiences during this time:

- (1) Making space in our lives can be an intentional and powerful act.

Sometimes traumatic events, such as a pandemic, force new space into our lives by taking things away. With resilience, we can intentionally build physical and abstract spaces into our lives that allow us to grow.

- (2) Filling that space is important and can be deeply personal and purposeful.

Each CAS Future Leader filled their voids differently. Many turned to family, some took to baking, others began collecting house plants, a few took up running, hiking, or powerlifting, and one of us even became ordained to officiate their housemates' wedding. In addition, many of us proceeded to procure our degrees, grants, and new positions, despite the challenges we faced.

- (3) Protecting what we fill our space with is essential to strengthening our scientific community.

In recognizing the pain and loss from this pandemic, we encourage you to reflect and take in the positive things that resulted from the collective, forced change we all experienced as a scientific community.

We all have spaces that were changed and created in this pandemic. How have you filled or reframed your space? What will you do with that space, and how will you use that space to move forward? We have entered the pandemic together as a community, and we have the space and ability to make it better.

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#### Funding

The authors declare no funding for this editorial piece.

#### Notes

Views expressed in this editorial are those of the authors and not necessarily the views of the ACS.

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