



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

Voices

How Has the COVID-19 Pandemic Changed How You Will Approach Research and Lab Work in the Future?

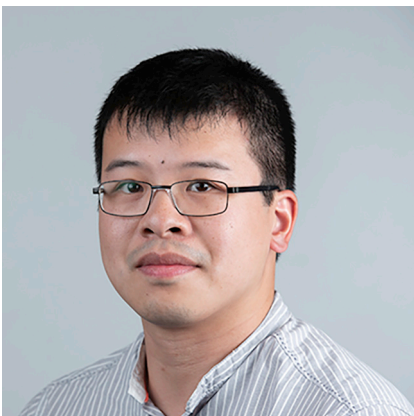


Karmella Haynes
Emory University

Strengthening up by Staying on Track

We could not pivot to COVID-19 research but managed to continue our work by making the most of digital platforms. My group is very young; our first member joined in April 2019, and by March 2020, we had two members and an ambitious funded project with a tight two-year timeline. I had invested seven years of work in applying synthetic biology to investigate and control gene regulation in triple negative breast cancer, which like COVID-19 has a disproportionate impact on African-Americans. I was too concerned about risking my career and the progress I had made by distributing bandwidth outside of the area I had already invested in. This prevented me from participating in COVID research, and my non-essential research activities halted for three months—no DNA cloning, cell culture, or exciting new empirical data.

Bioinformatics resources and my obsession with digital work platforms helped us to endure the wet lab dry spell. We were able to continue and improve critical aspects of research: data analysis, hypothesis building, and experimental design. In retrospect, the restrictive circumstances around COVID encouraged us to slow down, focus, and carefully consider the data. Intra-lab communication became more important and well developed as we avoided workspace crowding. Telework, especially for our new undergraduate researchers, was more authentic and impactful. The shutdown did not slow our growth as I had feared. I am now a proud and grateful group leader for seven trainees.



Christopher Yau
University of Manchester

Health Innovation after COVID-19

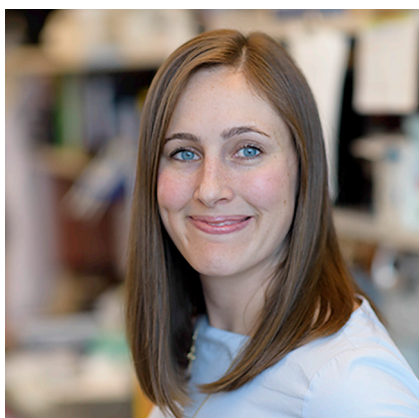
“Your research will be fine; all you need is WiFi and a computer.” At the start of the pandemic, many of my colleagues looked on in envy as my computational research continued unhindered while theirs ground to a halt. However, the problems my group tackle rely on interactions and the output of our experimental colleagues. Disruption to clinical activity and reduced laboratory capacity have led to fewer experiments and this slowdown is eventually filtering down to us. Furthermore, in the UK, where biomedical research depends so much on charitable funding, the economic impact of COVID-19 has been a double blow creating great uncertainty among collaborators. The systemic disruption to all aspects of life has made it evident that, in the aftermath of COVID-19, we will need more innovative and effective health systems than ever before. As a technologist, I lean toward a belief that technology offers the solutions to contend not only with the fallout of this pandemic but also those global health challenges to come. Therefore, my interest has increased in the clinical translation of our research ideas and how artificial intelligence solutions can be embedded more rapidly, but safely, in routine healthcare practice. Our recent contributions to the CONSORT/SPIRIT-AI guidelines (<https://www.clinical-trials.ai/>) represent just one small step toward that goal because COVID-19 has provided a startling reminder that we do not have an indefinite amount of time to see our research through to its end use.



Andrea Bild
City of Hope

Research Evolution

In cancer, selective pressure such as drug treatment can promote evolution of cells to new states. While there are many challenges with the pandemic, we have found that the increased pressure on our research program has created a few evolved states. Our team includes researchers across the United States as well as in Europe and Australia. While we have always held research meetings virtually, we now have working groups that meet weekly to solve the more complex research questions we face. This progression to a more involved and interactive working team (versus a presentation) has been fruitful, resulting in effective progress on research projects through team effort. In addition, the mindset that teams with geographical distances between them cannot function at the highest level has been proven wrong on a global scale. Research teams across the nation have worked together to solve COVID-19 related challenges at a rapid pace. Similarly, we have found that we are able to initiate new cancer-related studies and collaborations independent of location or requiring direct in-person meetings. Of course, many challenges exist during this time, and we look forward to post-pandemic research. However, we hope to continue some of the positive behaviors we have evolved. These new collaborative skills and distance technologies that we have acquired will enable to thrive across locations and teams.



Ashley Laughney
Weill Cornell Medicine

Thoughtful Introspection

Teddy Roosevelt said, “Do what you can, with what you have, where you are.” And we are amidst COVID-19, the worst pandemic experienced in over 100 years. Here, I would like to reflect upon responses to COVID-19 that may have a lasting, positive effect on how we approach research.

Expanding creativity in a resource-limited setting. First, it must be said that even the greatest scientists are not continuously churning out new ideas—creativity and productivity wax and wane. It only takes one good idea to change the course of a field. Second, we must acknowledge that creativity is something that can and should be cultivated. COVID-19 frustratingly triggered a massive halt at the bench and strained our financial resources. However, this pause precipitated critical assessment of existing data, priorities and experimental approaches—unburdened by preconceived notions, excessive travel or administrative demands. Such introspection and unrestricted thinking is something that we must actively demand of ourselves and our trainees, and will certainly lead to greater insight and more effective use of funds.

Spending wisely the resources you have. Starting my lab during a pandemic and as the mother of two young girls, I have become acutely aware of the importance of resource management – how to maximize the utility of my time, data acquired, and the strength of individuals in the lab. What resources do I have? Are there alternatives? Scientific interchange through virtual platforms has proliferated in response to COVID-19. With this extended reach, it is important that we continually ask ourselves what is the best and most efficient means to test a hypothesis. Collaborative work accelerates discovery, mitigates risk and enhances reproducibility.



Leonardo Morsut
University of Southern California

A Clear Mind Can See the Path Ahead

In terms of wellbeing, there are few things more important than sleep, says my yoga Guru Rod Stryker. If I may refine this for a (junior) PI, I would say there are few things more important than time-management. For me, 2020 has been a Master's class on time-management. My working spouse and I share childcare responsibilities for our two young children equally. Every night before bed, we sit with our calendar apps open partitioning the few effective hours that we will have available for work the next day(s). Having less time to work meant a strong push to improve time-management skills: delegating, saying no, asking for reduction of service requirements, prioritizing, self-care, allotting specific time to specific tasks (mornings are more for creativity and problem solving, afternoons for tasks requiring less brain power). Interestingly, my yoga and meditation practice in the morning has helped both with self-care and, somewhat surprisingly, with prioritization: when thoughts settle, the most important thoughts surface. I guess it is in this sense that they say that meditation does not take time, it makes time!

One big help came from another adjustment due to the pandemic: remote working. I see that, overall, it helps me work more efficiently; one reason may be that it makes the breaks from tasks more replenishing as I get to go in my backyard or spend time with my family. Additionally, it has normalized Zoom meetings, which inspired me to connect with distant colleagues as easily as I connect with department ones. For example, we run a successful session of "Journal Club with the author" during lab meetings where we invite the authors of the paper under discussion.



Xia Yang
University of California Los Angeles

Meet the Moment

The COVID-19 pandemic has brought us unprecedented challenges. In addition to delays in bench experiments and hurdles for teamwork, it is difficult for PIs to supervise lab staff and train and teach students, and lab members find it challenging to obtain guidance, learn skills, discuss research, ask questions, and get feedback. Researchers with childcare responsibilities struggle more intensely with work-life balance. Zoom fatigue is real, and maintaining mental and physical health is testing.

As we adapt to the new reality, positive opportunities are emerging. Drastically reduced traveling and daily commute during remote work is now making time for research and family. With the transition of seminars, conferences, and meetings online, we find it easier to access cutting-edge science, share our research with the community, and connect with existing or new collaborators. The pandemic also makes us rethink our research directions and ask new questions previously unthought of, such as how to make our contributions to combat the pandemic. Expansion of computational research that fits the remote work and social distancing requirements becomes a more natural choice, and more trainees are now motivated to pick up computing and analytical skills.

The pandemic is life-changing, but we researchers are trained to endure hardships, be creative with finding solutions, and bring discoveries no matter what. It is up to us to turn the ordeal into positive and impactful actions.



Judith Zaugg
EMBL, Heidelberg

Intriguing Variation

The COVID-19 pandemic hit us in early spring 2020 when our institute decided to fully shut-down within a couple days' notice. Our group is mostly computational, so we were less affected than others and most people were able to continue to work from home—moving our meetings online and our conversations to messaging. The only real disruption was lack of child care.

I decided to stick with our research direction, which aims at understanding the fundamentals of gene regulation and epigenetics in areas such as cancer-microenvironment, auto-immune and neurodegenerative disease. These are all of high biomedical importance and should not be put on hold. Since many of our studies involve immune cells, we currently develop a comprehensive, framework for investigating gene regulation in different types of immune cells. Thus, in the long run, we will make use of the amazing COVID-19 data resource that is being generated by the scientific community.

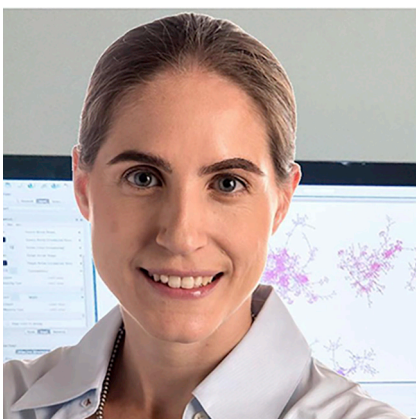
One fundamental aspect that COVID-19 has highlighted, is the amazing complexity of our immune response. It simply stunning, how different people react to the (seemingly) same infectious agent. Already before the pandemic, our group had a strong interest in understanding genetic, epigenetic and phenotypic variation across individuals, including during aging. This aspect has now gained a whole new level of importance and we will continue to derive fundamental principles from studying variation across individuals, including COVID-19 patients.



Patrick Hsu
University of California Berkeley

Pivoting to COVID-19 Research

As California was shutting down in March due to the pandemic, I was thinking about ways that we could help. Many rapid antibody tests were becoming widely available on the U.S. market, and there were lots of questions surrounding them: Do the tests work? How widespread is the virus? What does immunity mean? When can I go back to work? With collaborators at UCSF, we sprinted to launch an early effort to test the tests—as many as we could get our hands on, using hundreds of blood samples from COVID-19 patients at San Francisco hospitals (<https://doi.org/10.1038/s41587-020-0659-0>). Our work was able to contribute to improved quality control and regulation of these tests, and to the global discussion around what we can and cannot interpret from antibody positivity. Such serology tests, however, cannot diagnose the presence of an active infection. I wanted to diversify the centralized diagnostic lab model, which was struggling with swab or RNA extraction kit shortages and long test turnaround time. With colleagues at UC Berkeley and Gladstone, our group is working on new ways to use CRISPR enzymes to develop point-of-care viral tests. I hope that stronger infrastructure for pathogen detection will enable increased community surveillance testing for COVID-19 and future outbreaks. It has been deeply inspiring to see the creative research happening worldwide to respond to this pandemic, which is showcasing the power of collaborative science to improve human health.



Vera Pancaldi
INSERM Centre de Recherches en Cancerologies (CRCT); Barcelona Supercomputing Center

Questioning Priorities

Contacts on social networks made me appreciate the gravity of the situation before it hit. Seeing the events in Italy from close reinforced my feeling that most people were underestimating the threat. I reacted soon. Not trusting the VPN connection, by the time the French lockdown started we had hurried to take our computers home. Lab-life was rearranged around more frequent meetings and increased online chatting, which are now our day-to-day. Finding a new work-life balance took time and some mild, possibly COVID, symptoms were a clear reminder that health, physical and mental, had to be put above all else. Closing our very limited wet-lab only marginally delayed experiments, making me feel privileged compared to colleagues who had to sacrifice animals and years of work. A COVID channel appeared in our lab chat, we saw connections with immunology and cancer. I found myself involved in TERAVOLT, an international project born out of the desperation of Milan oncologists to help the world by collecting data on lung-cancer and COVID. High impact papers came fast, after chilling personal accounts of the catastrophic situation. But we continued our research, discovering the perks of online events. Despite some COVID network medicine projects, our focus has remained on immuno-oncology. Leading a young

team, I didn't think the effort of catching up with the COVID gold rush was worth it. The impact on patients and clinical trials will be lasting, so cancer research must be a priority.



Srividya Iyer-Biswas
Purdue University

Reimagining the Future

This has been a brutal and merciless year for many of us. Even more so for many who do not have the comfort of faculty life and attendant benefits.

Yet there are silver linings. An opportunity to reimagine how we do research, and what we see as primary roles of members of faculty. There is an explosion of virtual workshops, seminar series, and conferences. With it, exciting new opportunities to learn of research and researchers from many parts of the world, and start intercontinental collaborations. I have taken advantage of these opportunities to start new collaborations, diversify my research interests, and to go back to (virtual) "school" to retrain myself on specialty topics. All from home! And at practically no financial cost! How different is my personal trajectory as a result? Last year I would not have guessed the *topics* my group and I are now writing papers on, with the benefit of terrific synergies with international collaborators.

Suddenly we are in an environment where we are also fundamentally rethinking how we can give back to the community. Personally, I was fortunate to be an early adopter of these opportunities: I am one of the founders and organizers of the extraordinarily popular weekly BPPB (BiologicalPhysics/PhysicalBiology) Virtual Seminar series. It has an international following of 1500 researchers! By design, this series seeks to draw biological physicists out of their niche research silos. For me, this has led to several interesting offline conversations, and some exciting synergies. Community is important, and a virtual community is easy to gather, but sustaining one needs intentional effort. As an elected member of the APS-DBIO Executive Community, along with Orit Peleg, I have started the "Living History" series, an initiative to record personal histories of acclaimed biological physicists. We hope this initiative will inspire early career people to consider a life of doing research in biological physics, thus growing the pipeline for the entire community.

I am fortunate to work with an extraordinary group of advisees, who have taken the challenges in their stride, and gone above and beyond to continue to do outstanding research under trying circumstances. Nevertheless, I feel that the pandemic has highlighted the need to put the humanity of people first, and question the values implicit in a 'publish or perish' culture.