

Stressed? Depressed? You are not alone

Many physicists find that establishing work–life balance is crucial to battling the COVID-related stresses of isolation, low productivity, and despondency.

“Maybe I am a failure. Maybe I don’t belong in academia. What is wrong with me?” wondered a postdoc in theoretical physics. Her research had stalled. The pandemic had her—along with much of the world—confined and isolated. The fact that she had a job and was not burdened with childcare responsibilities added to her feelings of guilt. “I was ashamed of myself for feeling depressed. I could barely get out of bed,” says the postdoc, who requested anonymity.

The virus, the isolation the pandemic requires, and decreased productivity are for many people intertwined sources of anxiety and depression. Jacqueline Baeza-Rubio is a physics major at the University of Texas at Arlington. In January she, her siblings, and her parents were sick with COVID-19; she was administering nebulizers to her parents every six hours around the clock while continuing her work on NEXT, a neutrinoless double beta decay experiment, and preparing for a new semester of coursework. Baeza-Rubio says she had depression before the pandemic and “being alone in a room all day is not good. I became paralyzed with stress and didn’t feel like working.”

The effects of the pandemic have been exacerbated by economic uncertainty and unemployment, racial unrest, political upheaval, and wildfires, tornadoes, and hurricanes, says Roxane Cohen Silver, a professor of psychological science, medicine, and public health at the University of California, Irvine. She sums up these events as “cascading collective traumas.” The effect on people varies by individual and circumstance and runs the gamut from making them short tempered to suicidal.

The impact on physicists mirrors the impact on society at large, says Daniel Lathrop, a physicist at the University of Maryland in College Park. “Without



VASHTI SAWTELLE

COMBINING CHILDCARE with remote work is a huge stress for many people. Vashti Sawtelle, a physics professor at Michigan State University, says she got two hours’ notice to switch to remote teaching last March. Her children, ages 2 and 5, took care of themselves—sort of.

spontaneous meetings in my office and the hallway,” he says, “I feel disconnected from my peers.” Research group leaders are on the front line in counseling, he adds, for which they have no training.

For a few physicists, work has improved due to the pandemic. “The travel was a large strain on my mental health, and not having it is a huge quality-of-life enhancement,” says a professor at the University of California, San Diego. “I’m kind of dreading going back to normal.”

Even those in good circumstances feel the strain. “I have enormous privilege—a great job, the ability to work and teach remotely, a nice house to be confined to, grown kids so childcare is not an issue, and on and on,” says Yale University astrophysicist Meg Urry. “I know it’s a hundred times worse for younger scholars and parents with young children,” she adds. “Yet I’m quite worn out. I find Zoom sessions valuable but much more tiring than in-person meetings.”

Among physicists who are particularly at risk are those who are most isolated or overwhelmed by taking care of dependents and other responsibilities. Students and academics often live far from their hometown friends and families; international scholars can be espe-

cially isolated. Graduate studies and the quest for tenure are notoriously stressful even in normal times. “There is layer upon layer of things people have to deal with that contribute to mental-health issues,” says Lance Cooper, director of physics graduate studies at the University of Illinois at Urbana-Champaign (UIUC). In terms of solutions during the pandemic, he adds, “We are making it up as we go along.”

Normalizing mental-health issues

People think that theorists can do things on their computers or scribble in their notebooks, says University of Pennsylvania theoretical physics professor Andrea Liu, whose research focuses on soft and living matter. “But it’s really a social activity. We are used to interacting all day long. And the casual interactions where you talk about work with people in the office or hallway are incredibly important for both science and mental health.” For those holed up at home, she notes, “maintaining focus and productivity is really hard. I am not worried about [my group’s] productivity, I’m worried about them.”

In 2017 Andrea Welsh, now a postdoc who works on nonlinear dynamics of



VIVA HOROWITZ finds she can work better when she has Zoom open with a friend. Horowitz is a condensed-matter experimentalist at Hamilton College in Clinton, New York. "My advice for mental health?" she says, "Block your self-view on Zoom. Don't stare at your own face all day."

biophysical systems at the University of Pittsburgh, founded an online support group for physicists with mental illness. At the time, she was part of the American Physical Society's Forum on Graduate Student Affairs and, having personally dealt with depression, was seeking ways to improve the climate for graduate students. Before the pandemic, the group had about 90 members. It's jumped to 198, purely by word of mouth.

"My main concern," Welsh says, "is that a lot of people are falling through the cracks. They feel forgotten about. The community they had before is gone for now." The support group members interact on a Slack channel, where they share goals and report on their progress, seek advice on difficult and delicate academic and nonacademic situations, and discuss the effects of poor mental health on their day-to-day lives. Welsh also gives talks on mental health to physics departments, at conferences, and to experimental collaborations.

Since the start of the pandemic, the number of physics graduate students at UIUC who report struggling with their mental health has increased considerably, says Cooper. He has spoken with 75 or so of the department's 320 PhD students, and he checks in every week or two with about 15 of them. When research is not going well, many graduate students find teaching to be a confidence booster, he says. But with the pandemic it's harder to engage a class online, and graduate students feel their teaching is

ineffective. They also tell Cooper they aren't learning as much themselves, in part because they can't study in groups. And they worry about the job market. "It's a big feedback loop." One of the hardest things is convincing students to tell their advisers when they are struggling, he continues. "They want to seem superhuman to their advisers."

The postdoc who requested anonymity eventually told her advisers about her depression and feelings of incompetence. "It was a big help," she says. She also posted about it on social media. "That led to an unexpected number of people writing to me that they felt the same way. It lifted the guilt." One adviser told her about her own struggles, and another suggested she take a real break. She had been taking a day off here and there, but that didn't help her mood or productivity. Because of visa issues and the travel ban imposed by President Trump (see "Revised travel restrictions drive scientists away from US," PHYSICS TODAY online, 10 March 2017), the postdoc, who is in the US from Iran, hadn't seen her family in seven years. In September 2020 she was able to travel to Iran after she received her green card. "I came back feeling like my old self," she says. "Now I am as productive as I was before the pandemic."

Grant Parker is a graduate student at the University of Texas at Arlington who is based in Madison, Wisconsin, where he works on the IceCube experiment. He has felt both self-pressure to be more productive and paralysis, he says. "It's taken a

KP

KIMBALL PHYSICS

Excellence in Electron
and Ion Optics

**DON'T SETTLE FOR
POOR PUMPING...**

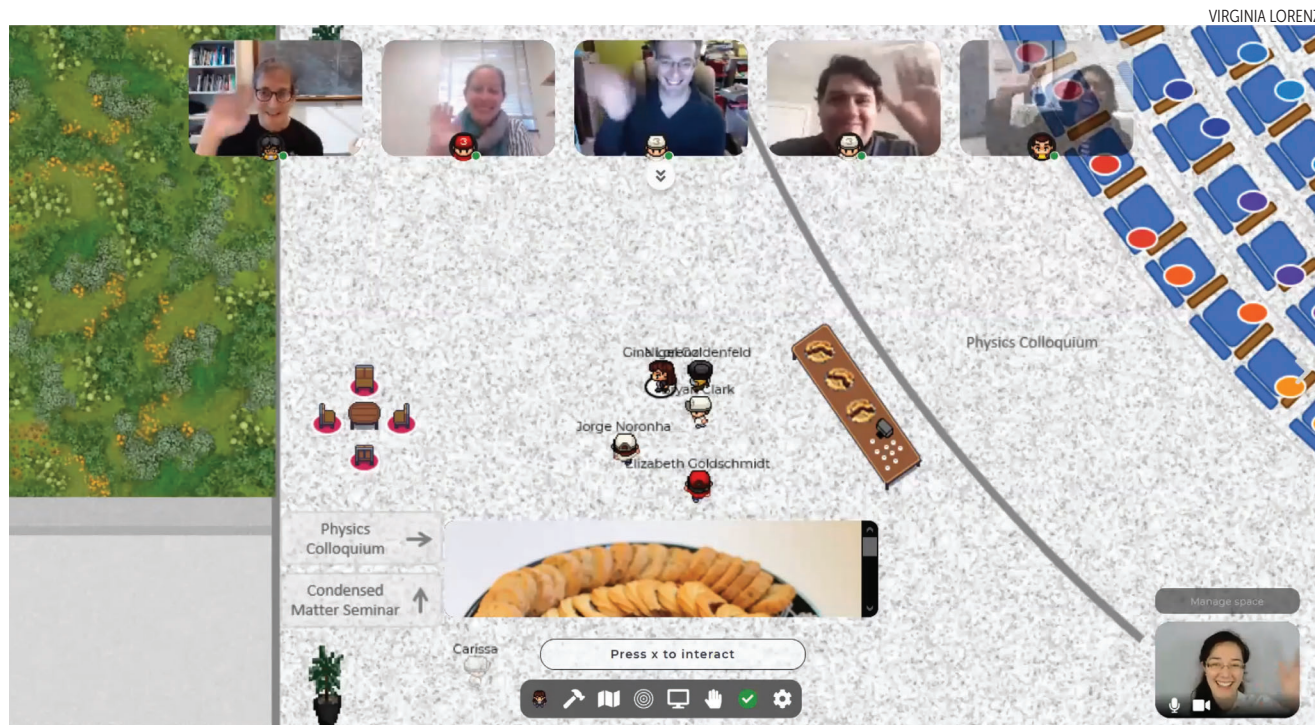


6.0" Spherical Octagon UHV Vacuum Chamber with High Conductance Pumping Port

- 180 L/s vs. 28 L/s
- Optical Axis X, Y, Z
- 316L Stainless or Titanium Custom
- (1) 4.5" CF Pumping Port
- (2) 6.0" CF, (7) 2.75" CF Ports
- External Bracket Mounting Groove for Turbo Pump
- Grabber Groove Internal Mounts all Ports

Find out more

www.kimballphysics.com



VIRTUAL REALITY is catching on for socializing and poster sessions. Here, faculty members at the University of Illinois at Urbana-Champaign are engaging in pre-seminar “cookie time” on gather.town. As your avatar approaches other avatars, you can hear and see the video of the corresponding people increasingly clearly and then join their conversation; it provides a simulation of reality that allows for some of the spontaneity people miss with Zoom. Visible at this meeting from 23 September 2020 are, from left, physicists Nigel Goldenfeld, Elizabeth Goldschmidt, Bryan Clark, Jorge Noronha, Vidya Madhavan, and Virginia Lorenz.

while to figure out how to beat the feelings of isolation.” He and fellow graduate students schedule online chats and coffee breaks and in-person, masked, socially distanced walks. The pandemic is prompting discussions about work-life balance, he says. “Having these conversations is important, because otherwise we overwork or let guilt get to us.”

Hidden impacts

Physics students and faculty tend to be high achievers who are good at carrying on despite impairments, says Walter Freeman, who teaches physics and astronomy at Syracuse University. “Mental-health impacts do not always show up in our work, but that doesn’t mean the impacts are not there.”

“When we went remote, my job got harder,” says Freeman. “I sat in front of five monitors at home—with classes, a department Slack channel, a Zoom tutoring monitor, a stylus to write with.” Sitting in front of a bank of flashing monitors for 14 hours a day “was not good for my own mental well-being,” he says.

Freeman teaches more than 1000 students a year. He faces competing demands of engaging good students, helping weaker ones, dealing with the increasing numbers of cheaters, and responding to students’ personal problems. “I get a ton of email that is some variant of ‘I’m having personal problems and have not turned in my work,’” he says. “I want to be supportive, but I also have to figure out what to do with them academically.”

The university doesn’t want student suicides on its watch, says Freeman. “They tell faculty to send students to mental-health professionals.” But students’ issues often lie at the nexus of mental health and academics, he says. “What I desperately need from my institution is support in figuring out what accommodations are appropriate for students who say they have personal problems, many of which are subacute mental illness. I need support in building connections between people doing academics and people doing counseling.”

“We need more compassion”

Like so much of the pandemic response in the US, remote teaching and advising is ad hoc and left to individuals or indi-

Getting help

- ▶ US National Suicide Prevention Lifeline: 1 (800) 273-8255
- ▶ Thrive Lifeline: 24/7 support from qualified crisis responders in STEM; <https://thrivelifeline.org>. Text anytime: 1 (313) 662-8209
- ▶ Grad Resources, National Grad Crisis line: 1 (877) GRAD-HLP and more at <https://gradresources.org>
- ▶ Active Minds: Mental health resources during the COVID crisis, <https://www.activeminds.org/about-mental-health/be-there/coronavirus/>
- ▶ 7 Cups: Caring listeners for free emotional support, www.7cups.com/



LACK OF MOTIVATION and stress are both exacerbated by the pandemic. Mateus Carneiro and his girlfriend never intended for their small apartment in Brooklyn to double as their offices. Brookhaven National Laboratory, where Carneiro is a postdoc, supplied the chair he is seated on. When one of them needs to make a phone call without disturbing the other, they go out to the balcony.

vidual departments. Remote teaching and learning leads to detachment on both sides, says Maryland's Lathrop. Grades are down, and more students are withdrawing and failing. "The students' lack of engagement and their anxiety causes me stress," he says. "I hadn't realized how much the person-to-person contact meant to me as an educator. Interacting with students energizes me. I want them to succeed."

While many instructors are understanding toward their students, others expect business as usual. That's been Baeza-Rubio's experience with some of her classes. Due to an ulcer in her eye last fall she wanted to turn in work late, but her instructor said no, and told her to wear an eye patch. Baeza-Rubio knows of students who lost family members to COVID-19 and were told to produce an obituary to be granted deadline extensions. "We need more compassion," she says.

Similarly, Mateus Carneiro says he has observed international students stuck in dormitories being given little support related to COVID-19 while being pushed to be productive. "It boils down to the individual adviser," he says. "But academic culture generally is not very supportive toward graduate students. And COVID-19 has made it worse."

Carneiro, who is from Brazil, is a postdoc at Brookhaven National Labora-

tory. Before the pandemic, he went to Brookhaven a couple times a week. Other days he worked on calculations of neutrino cross sections in cafés near his Brooklyn apartment. Being cooped up with his girlfriend in an apartment never intended for 24/7 living, with social and work interactions limited to Zoom, is stressful, says Carneiro. "Not having spontaneity is a big loss." Work responsibilities have become "ethereal," he says. "Everyone is stressed and productivity is low, so my colleagues didn't notice I wasn't doing much. It made me feel guilty." The COVID-19 virus itself is also a source of anxiety, he says. "I cannot afford to get sick." When he realized he was depressed, he consulted a doctor. Medication seems to be helping, he says.

"I've had graduate students simply vanish; they stop communicating," says astrophysicist Angela Speck, chair of the University of Texas at San Antonio physics and astronomy department. "We have to take a holistic view of what's going on."

Official measures

Most US universities reopened experimental labs last summer with reduced capacity (see "University researchers get back to their experiments," PHYSICS TODAY online, 16 July 2020). That doesn't necessarily lead to increased social interactions, though. Pepijn Moerman is a



In the Art of Making Lasers

High performance lasers with dependable excellence



C-WAVE.
Tunable
Lasers.



C-FLEX.
Laser
Combiners.



COBOLT.
Single & Multi-
line Lasers.

HÜBNER Photonics
hubner-photonics.com



postdoc at Johns Hopkins University who works on orchestrating self-assembly of microparticles using genetic regulatory networks. He goes into the lab two or three times a week. "I see people in the lab, but because we all know the time [for experiments] is limited, there is much less interaction than before the pandemic." For theorists, going onto campus likewise doesn't increase interactions, says Penn's Liu, "but it does offer a quiet workplace for some people."

COVID-19 testing is the key to staying open for many universities. At UIUC, for example, entry to campus requires being tested twice a week. The University of Arizona introduced testing with saltwater gargling samples, which is more sensitive and comfortable than the nasal swab. Through wastewater monitoring, last August that university also discovered two positive cases in a dormitory with several hundred residents. At Hamilton College in upstate New York, condensed-matter experimentalist Viva Horowitz says she feels less stress about going to campus because everyone is tested regularly. As for the students, she says, "they may be more afraid of being quarantined than of catching the disease." Horowitz says the "darkest moments" of the lockdown came when she realized she was afraid to spend the holidays with her mother and grandmother and was upset not to.

Horowitz studies diamond nitrogen-vacancy centers and two-dimensional materials. She was supposed to go up for tenure this year but has accepted her institution's offer to delay by a year. "The pandemic slowed down my research because of lack of lab access and for emotional reasons," she says. It also interrupted existing and new collaborations with colleagues around the country. "I don't know if a

tenure delay or anything could make things fair," she says. "The university can't make it right that I was making research plans that I can no longer carry out."

Most institutions are offering an option to pause the tenure clock. Other measures campuses have taken to help faculty and students include inviting them to submit a statement with their promotion and tenure applications about how COVID-19 has affected their work, skipping student course evaluations (see *PHYSICS TODAY*, January 2020, page 24), extending deadlines for dropping courses, and installing improved air filters. The University of Arizona's College of Science created an emergency committee to guide graduate students and postdocs in campus reentry during COVID-19, says physicist Elliott Cheu, the college's interim dean. "Some teaching assistants were worried about teaching in person. It was getting dicey," he says. The college decided case by case whether in-person teaching was necessary.

Vashti Sawtelle is on the faculty at Michigan State University, where her research focus is physics education. She has two small children and shares childcare with another family; her husband is an essential worker. The university has done nothing to help with childcare, she says, but it did conduct a survey, and just telling the college how the pandemic affected her work life was "a big deal." One thing that has been hard on her mental health is that "it seems everyone expects you to have sorted things out by now, without any formal acknowledgment of what each family is dealing with. Academia wants you to keep doing what you usually do."

Money is another source of uncertainty. Institutions have allocated funds for COVID-related expenditures; testing

alone can cost millions of dollars. UIUC is making funds usually used for travel available to students to cover insurance copays for off-campus counseling visits, says Cooper. At the University of Arizona, some departments have hired additional graders for large classes. At the same time, many institutions have frozen hiring and are being forced to cut budgets. Speck at San Antonio, for example, had to cut spending in her department by 15%. "We combined large online introductory classes and cut about seven adjunct faculty," she says.

Individual principal investigators have mostly continued to pay their graduate students and postdocs. NSF and other funding agencies have largely permitted "no-cost extensions," which allow researchers more time to spend existing awards. Although there was some talk about "cost extensions," which would have provided more money to existing grants, that hasn't materialized. Given people's lower productivity, PIs are concerned about accomplishing what they promised and winning future grants.

James Pennebaker, a social psychology professor at the University of Texas at Austin, has studied a decade's worth of language in Reddit comments. "COVID has had an unbelievably big effect in the degree of anxiety that people express," he says. One marker, he explains, is that people's comments have become "stupider and less logical." For some individuals and groups, the pandemic is especially tough, he says, pointing in particular to people who live alone and to young people "who are at an age where they need to network." In the academy, he says, "everyone is a bit terrified about the implications of the economy and funding for basic research."

Toni Feder

The undermining of science is Trump's legacy

The past four years saw interference in the scientific process, inaction on climate change, and a weakened federal science workforce. Artificial intelligence and quantum information science benefited.

"It's fair to say that in the scientific community, the four years of the Trump administration are going to be remembered as an intense moment of searing

pain, one that is best forgotten as soon as the damage is repaired," says Representative Bill Foster (D-IL), Congress's sole PhD physicist.

"It would have been hard to imagine a president doing as much damage to science and Americans' trust in science and the application of science to so many problems this country faces," echoes Neal Lane, science adviser to President Bill Clinton and a former NSF director. "We've been through four years of hell."

"At the broadest level, on discussion of the issues in our body politic, [the Trump