

CAREERS

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Cell biologist Phil Auckland escapes the city and the lab to catch some air on his mountain bike.

WORK-LIFE BALANCE

Break or burn out

Taking time off from work is crucial for avoiding stress and depression, and their potential consequences.

BY KENDALL POWELL

Twice a week, postdoc Phil Auckland leaves the lab at 5:30 p.m. and drives an hour out of Coventry, UK, to a mountain-bike racing track and hills. Here, he finds diversion and distraction from his research programme in a cell-biology lab at the University of Warwick.

“It requires so much focus and concentration, doing tricks and jumps, that you are not thinking about anything else,” he says. It helps that Auckland’s friends, who hail mainly from his days of professional mountain biking, have all manner of careers. “We don’t talk about work — it’s a complete escape.” His other hobby, sky-diving, also gives him a mental and physical

break from lab work. “When you’ve just thrown yourself out of a plane, work is the last thing that enters your mind.”

As Auckland finds with extreme sports, participation in hobbies and activities outside the lab offers important, even crucial, time away from the research environment. Taking breaks, experts say, is key to fighting burn-out, which can easily arise in research careers that require long hours of intense mental activity for weeks or months on end.

Although burn-out is not considered a medical diagnosis, researchers have described it as a combination of overwhelming fatigue and loss of motivation caused by chronic stress or frustration.

Graduate students and postdocs, who may

equate ‘working longer’ with ‘working better’, are particularly prone to working themselves into the ground, says Simon Davy, head of the School of Biological Sciences at the Victoria University of Wellington in New Zealand. Davy, who since his days as a PhD student has vowed not to work on Saturdays, says that he sees students slide easily into working seven-day weeks.

Some institutions and career-development offices have begun to recognize the importance of addressing mental health in the research workforce. Using an assessment of 12 mental-health symptoms, one team showed in a study published this year that one-third of more than 3,600 doctoral students surveyed in Belgium were at risk of developing mental-health problems, especially depression, as measured by having four or more clinical symptoms (K. Levecque *et al. Res. Policy* **46**, 868–879; 2017). Fewer than half as many people in comparable highly educated groups were at risk.

Burn-out among researchers can lead to more serious issues, such as depression, which should be diagnosed and treated by a professional. But by recognizing work patterns and warning signs of chronic stress in the lab or field, researchers can adjust their routines to avoid reaching the burn-out stage in the first place (see ‘Signs of burn-out ahead’).

Institutions also need to identify when early-career researchers are hitting a wall, says Kay Guccione, manager of researcher mentoring and coaching at the University of Sheffield, UK. “Your well-being is not only your problem — there is an organizational responsibility as well,” she said in a video chat in March sponsored by Vitae, a researcher-advocacy group in Cambridge, UK. She urges junior researchers to learn about their workplace policies and rights, as well as the institutional resources available should they or their peers need mental-health support.

Guccione, who trained as a molecular biologist before switching to researcher development, started the Twitter hashtag #takebreaksmakebreakthroughs as a way to remind herself when it’s quitting time, and to set expectations at her institution that graduate students shouldn’t work themselves into the ground. An initiative by the Academy of Medical Sciences in London uses #MedSciLife to feature examples of how researchers switch off from work, for example, by taking hikes or acting classes.

The type of break doesn’t matter. “Knit, play computer games, build chainmail — anything that is completely different from thinking about research questions,” says Guccione. ▶

► Researchers, she adds, should also pursue an extracurricular activity that gives them a sense of success and worth that is not tied to work.

OUR DAILY BREAK

PhD student Juan Pablo Ruiz, who studies blood stem cells in a joint programme between the University of Oxford, UK, and the US National Institutes of Health, founded Labmosphere.com, a website with articles on mental-health struggles experienced by junior researchers. People who are happy and satisfied perform more creatively and productively at work, he notes — an idea that is well supported by research. A 2015 study by a team at the University of Warwick found that workers were 10% more productive after watching a comedy video than a control group that did not watch it — and conversely, people who had experienced a major life shock from a family death or illness in the previous two years, and so reported lower happiness, were 10% less productive (A. J. Oswald *et al. J. Labor Econ.* **33**, 789–822; 2015). By boosting overall happiness, taking time off from the job could thus improve one's work, too.

Bench scientists should incorporate daily breaks into their routines, says Ben Mead, a PhD candidate in the Harvard-MIT Health Sciences and Technology programme in Cambridge, Massachusetts. He tries to maintain the mindset that graduate training is similar to a marathon, not a short race. As such, he doesn't take lengthy holidays, but takes daily breaks and brief holidays throughout the year.

Short breaks should be true time outs from the activity that is dominating a researcher's day and from thinking about any science, says Guccione. A coffee break with labmates while discussing the latest piece of lab equipment, or eating lunch while answering work e-mails or reading a research paper doesn't count. Ruiz's hospital workplace has a waiting room with an



Yuxuan Wang kickboxes her lab frustrations away.

aquarium, and he often eats lunch there to gaze at the fish and give his eyes a break from staring at cells under the microscope or at spreadsheet data. It also helps to look at landscapes, a cityscape or an urban river walk.

When struggling with a lack of motivation, Mead uses the 'pomodoro' technique to advance his work. The method, named after a tomato-shaped timer that its developer used, sections off tasks into 4 sets of 25-minute intervals, split up by breaks of 3–5 minutes and then punctuated by a longer one of 15–30 minutes. Mead sets his lab timer for 20 minutes of work, then gives himself a 2–3-minute break for social media or another distraction.

Lab supervisors recommend structuring the day so that hard, critical-thinking or technically challenging tasks happen during the hours of peak productivity, and easier, more-mundane work is done when focus wanes.

Many researchers recognize their daily patterns and dash to the gym when they are drooping, often in the late afternoon. As a university

student, Yuxuan Wang found that the best way for her to stick to a weekly exercise routine was by becoming an instructor for kickboxing and step-aerobics classes. She found similar work when she moved to Johns Hopkins University in Baltimore, Maryland, for MD-PhD studies in oncology. "The second I walk in the exercise room, I forget all my experiments that did not work or the paper that got rejected," says Wang.

WORKING DIFFERENTLY

Weekly breaks can also involve a switch up in research routines rather than time out entirely, and are important for giving scientists the stamina to face intense bouts of research or writing. When Auckland faces a particularly tricky line of experiments in his research on how chromosomes move around the cell, he does experiments in parallel that are easier and likely to yield positive results. "Then I'm not completely demoralized by having months go by without any data," he says. Even small successes, such as stitching together a needed piece of a DNA probe, can lift his spirits and help him to feel productive.

Postdoc Jenna Kropp often has 12-hour days doing multiple, back-to-back *in vitro* fertilization surgeries at the Wisconsin National Primate Research Center in Madison — work that allows no do-overs. When Kropp knows that such a day is coming, she'll often take the day off beforehand to ride her horse. Time spent outside is the best antidote to stress, she says; she often comes into work by 7 a.m. and leaves lab in the late afternoon to help with daily barn chores. "You have to listen to your body, rather than think, 'I have to be here from this hour to this hour,'" she says. The farm chores are mundane, but she still feels that she has accomplished something, she says.

Such solitary hobbies are great for letting off steam, but researchers should also make time for socializing outside the lab to get a regular reprieve from research questions. As the sole graduate student starting in her reproductive-physiology programme at the University of

RED FLAGS

Signs of burn-out ahead

Kay Guccione, manager of researcher mentoring and coaching at the University of Sheffield, UK, says that signs of burn-out are often interpreted by others as 'emotional', 'lazy', 'incapable' or 'needy'.

She and Tammy Steeves, a postgraduate coordinator at the University of Canterbury in Christchurch, New Zealand, encourage colleagues on their respective campuses to approach co-workers with compassion and empathy and check in with each other often.

"You want to be the fence at the top of the cliff, rather than the ambulance at the bottom," says Steeves.

If you see several of these warning signs of burn-out in yourself or your colleagues, alert

a mentor and seek help:

- Not going to work or not getting out of bed
- Losing interest in research that used to be exciting and interesting
- Not meeting basic needs — eating, exercise and family time, for example
- Making more mistakes than usual at work
- Everyday lab tasks, such as culturing cells, become a chore
- Inability to concentrate on numerical analyses or reading
- Being short, intolerant or overly sensitive with colleagues
- Catching illnesses more often
- Not sleeping well
- Feelings of low confidence **K.P.**

Wisconsin–Madison in 2015, Sydney Nguyen knew that she would need to find a group off-campus for socializing. She participated in a roller-derby camp during the summer after her first year, and loved it. She finds support and encouragement from her teammates, both on and off the track, and the sport's aggressive tactics gives her an outlet for frustrations. Practising and perfecting a difficult move lets Nguyen feel successful even if the week's lab work hasn't gone well.

Supervisors can support healthy work-life balance by fostering conversations about well-being and by being a good role model. Tammy Steeves, a conservation geneticist at the University of Canterbury in Christchurch, New Zealand, sets clear expectations in her group for taking time off. She encourages supportive lab interactions over competition, and says that this style helps young scientists to admit when they are struggling with balance. Her group has a simple motto: "Everyone here is smart and kind — don't distinguish yourself by being otherwise."

Steeves, who is also a postgraduate coordinator for the School of Biological Sciences at Canterbury, emphasizes to students the importance of managing their well-being and incorporating self-care. She's found that an easy way for international students (and herself) to visit family abroad each year is to tack extra time on to conference travels. She and one of her students reached an agreement this year that he could telecommute temporarily from the United States, where he has family and friends, while analysing and writing up his data. Her mentoring style, she says, helps students to feel comfortable about proposing such arrangements.

Many young scientists say that they value efficiency in their work more than total time put in — a key part of self-awareness that prevents burn-out. Wang says that colleagues may find her staring out her fifth-floor window with a cup of tea when she needs to decompress and recall the bigger picture. "I'm working with patient samples, and those are patients with cancer," she says.

Aside from their own mental health and well-being, researchers who take care to avoid burn-out and reset their minds and bodies regularly might see better returns in their data, too. "The science we generate is richer," says Steeves. "Lots of people come to the science table from different places, and we all need to take care of their well-being to keep them there." ■

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COLUMN

A mentor's acid test

Mutual respect, guidance and support are key to a fruitful relationship with trainees, says **W. Larry Kenney**.

I've mentored PhD students for 30-plus years, guiding 24 of them through a research-intensive doctoral programme with their integrity and sense of humour intact. And I've learnt some lessons along the way.

Give your graduate students responsibility, power and credit. Good students are resourceful and insightful. Teach them that it's OK to give wrong answers, because that steers the discussion in the right direction. Each student in my lab takes primary responsibility for one or more projects, beginning as early as their second semester. That sense of ownership breeds both attention to detail and focused progress towards the success of the project.

Modern-day science is a team sport. Foster strong teaching–learning relationships among all members of your research team. Senior PhD students help mentor junior colleagues, and postdocs help mentor senior PhD students. To foster these interactions, we create multilevel research teams for each project.

Only mutual respect can create a true team mentality. I think every student inherently wants to do the right thing and be a valued contributor and — given the opportunity — will rise to the occasion. My students know that if they do their jobs with a sense of pride and integrity, I will always support them.

Help your students to feel valued Each PhD student comes in with unique knowledge, quirks, skills and abilities. It makes no sense to treat them all equally. However, it is vitally important to treat them all fairly.

Create the right culture Your career path should serve as the roadmap for your students' burgeoning development as young scientists. Your positive accomplishments become their professional goals.

Help your students to develop professionally. Get them to professional meetings as often as possible, and introduce them to the big names in your field. Teach them to write grant

proposals with realistic budgets and to review manuscripts; most importantly, challenge them to think and reason under pressure.

Seek and deserve allegiance. Little is more off-putting than going to a professional conference and hearing students complain about their graduate programme, university or mentor. It reflects poorly on them and on their mentor. If you hope for loyalty and trust from your students, make sure that you deserve it.

Evaluate prospective mentees' character, motivation and work ethic. Simply being a good judge of people is one of a mentor's most important traits. Applicant statements that say, "I am extremely interested in your research area and am also considering marine biology and maybe taxidermy," tell me that the student isn't ready for directed doctoral studies. I also rely heavily on input from my current team about an applicant's potential fit.

If you can't laugh with your students, find another job. I love academia because of my relationships and interactions with my PhD students and postdocs. They love to share stories about me, and I laugh harder than they do because I don't mind them seeing me as fallible and, well, because they are darned funny. My students know that my joking about our mutual missteps in an open and appropriate way is a sign of caring.

Retreat to advance. As my lab has grown, integration, planning, organization and project staffing has become more challenging. Some years ago we began having an annual lab retreat: 2–3 days off-site where we combine science, fun and team-building. We return with proposed meeting abstracts, publications and grant proposals, and a renewed sense of camaraderie.

Enjoy the journey. ■

W. Larry Kenney is the Marie Underhill Noll Chair in Human Performance at Pennsylvania State University in University Park, Pennsylvania, USA.



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