CAREERS

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Hobbies can be more than just a welcome distraction from the complexities of a scientific career — they bring many other benefits.

WORK–LIFE BALANCE

Play time for researchers

How hobbies can boost scientists' productivity and creativity.

BY JULIA ROSEN

When Audrey Kelly isn't catching toads and analysing their DNA to study how species hybridize, she makes bread. Kelly is a fifth-year PhD student at the University of North Carolina, Chapel Hill, and she learnt to bake from her father before she moved away for her undergraduate programme. "It's kind of like a science experiment," she says, "but you get to eat it at the end."

As she does in the laboratory, Kelly records her methods and results in a notebook, but she doesn't take it too seriously: the hobby offers a break from the stress of doing science. "You're not as worried about screwing up," she says. "Your career's not on the line."

Many scientists struggle to take time away from the never-ending demands of research — and to flout the pervasive culture of overwork — to pursue personal interests. Kelly says that she sometimes feels guilty when elbow-deep in dough. "If you are not working yourself to the bone and crying yourself to sleep every night," she asks rhetorically, "are you working hard enough?" Many surveys reveal that academic scientists regularly put in overtime; one poll, conducted by *Nature* in 2016, found that more than one-third of early-career researchers worked for more than 60 hours a week (see *Nature* **538**, 446–449; 2016).

But evidence suggests that hobbies such as Kelly's nourish more than just the belly. Research has linked participation in leisure activities to many measures of physical and mental well-being, from reduced blood pressure to a sense of belonging[1,2]. Many scientists say that their hobbies provide them with crucial opportunities to relax, to find satisfaction in completing small, defined projects and, occasionally, to make the kinds of insightful leaps that propel science forward.

The key is to stop feeling bad about having interests outside research, says Alex Clark, associate vice-president of research at the University of Alberta in Edmonton, Canada, and co-author of a book called *How to be a Happy Academic* (2018). "We need to stop seeing hobbies and work as zero-sum games," he says.

PICKING A PASTIME

The first step in cultivating a hobby is to deliberately set aside personal time in which to pursue it, says Bailey Sousa, Clark's co-author and director of the International Institute for Qualitative Methodology at the University of Alberta. "We have 1,440 minutes in a day, and if we don't have control of that time," she says, "someone else is going to."

Carving out free time can be challenging, but there are strategies for success. Jingmei Li, a cancer researcher at the Genome Institute ▶

of Singapore, uses most of her holiday time for diving trips. She had always feared swimming in the open ocean, but decided to face down her fear and got her scuba certificate ten years ago. Now, she's hooked and goes diving around the world.

Edward Davis, a palaeobiologist at the University of Oregon in Eugene, schedules time each week in which he tries not to work. He prefers to leave this time unstructured and follow his interests. His aim is "to not feel as though I have a bunch of additional goals I have to set for myself". He spends up to ten hours per week on hobbies, and explained in a 2013 blogpost that he found a good work–life balance when maintaining three extracurricular interests.

Jennifer Hertzberg, a palaeoceanographer at the Old Dominion University in Norfolk, Virginia, tries to do errands such as laundry and grocery shopping during the week. That way, she can keep the weekends free for her hobbies, which include doing jigsaw puzzles and assembling miniature Lego kits of birds and other animals. "I've amassed this whole collection; it's like a zoo," she says.

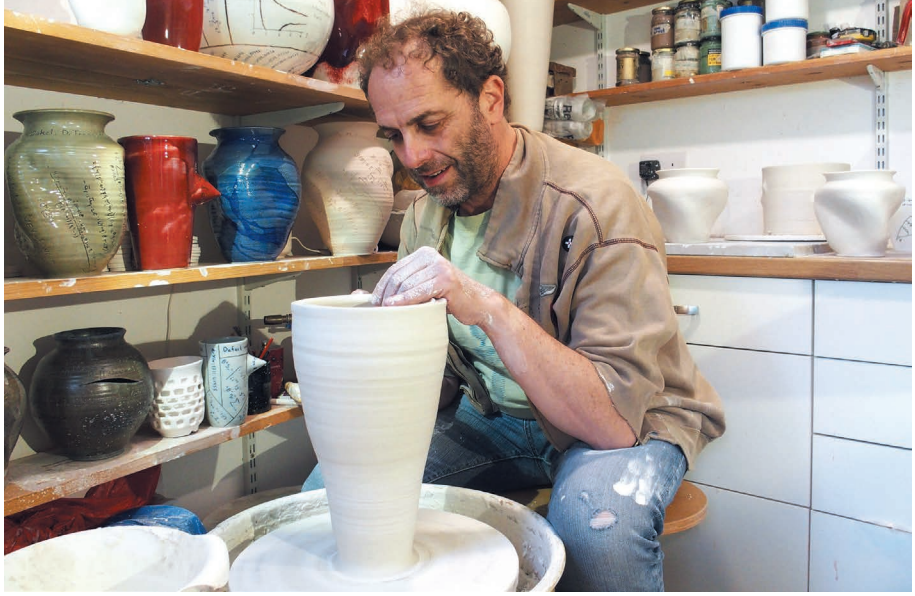
Hertzberg has enjoyed building with Lego since she was a child, and Clark says that looking back at childhood interests is a great place to start when seeking a hobby. "It may have been something you did when you were younger, but that fell to the wayside as you got sucked into a scientific career," Clark says. Alternatively, he recommends an activity to share with partners, friends and children.

Dean Simonton, a retired psychologist at the University of California, Davis, suggests that researchers analyse their own dispositions for clues about which pastimes might be the best fit for them. Those who are verbal thinkers, he says, might most enjoy reading, while those who think in visual terms might prefer something like painting or photography.

Signing up for a short course, class or workshop, or joining a group such as a choir, offers ways to explore new hobbies. A set schedule of meetings or rehearsals demands that scientists make time for the activities. Davis's newest interest is making custom knives for himself and to give as gifts. He belongs to a local group for enthusiasts, and attends meetings and workshops to hone his skills. The club also helps him to expand his social network. "I have more and different people that I'm talking to, and more and different ideas I'm exposed to," he says.

REAPING REWARDS

One of the biggest benefits for scientists in pursuing hobbies is that they give the mind a rest from the rigours of research. Everyone — including scientists — can get stuck in ways of thinking that prevent them from finding a solution to a vexing problem, no matter how hard they work. "You can't get outside the box you're in," says Simonton. Evidence suggests that taking a break[3] or doing something different[4] can help to weaken those associations and improve problem-solving, by revealing a new approach or an overlooked detail[4].



Theoretical physicist Nadav Drukker does pottery in his spare time.

NADAV DRUKKER

One option for mentally unplugging is exercise. Davis says that almost every good idea he's had came to him while he was working out and letting his mind wander. And that's not the only benefit. Davis dabbled in sport as a youth, but got serious about swimming during his PhD programme at the University of California, Berkeley. "I noticed that my health was flagging as a consequence of the stress that I was under," he says. Exercising improved his fitness levels and helped to both mitigate his chronic asthma and relieve work-related pressure. "Vigorous exercise helps burn some of the stress hormones that are produced when you are worrying about being successful," he says. It might also have helped him to become a better researcher; studies suggest exercise boosts various brain functions[5].

"We need to stop seeing hobbies and work as zero-sum games."

Eventually, Davis decided that he wanted to do triathlons, so he began to read books on becoming a runner. He learnt how to progress safely and efficiently as a novice, but also noticed that he had begun to feel more competitive. When this happens with a hobby, he says, it can add pressure instead of relieving it. So he made a conscious decision to pursue his own internal goals and not to compare himself against other competitors.

Nadav Drukker, who studies string theory at King's College London, relishes the opportunity to improve at pottery. Having mastered the basics, Drukker now makes pieces inspired by his work and decorated with equations. Last year, he had a solo exhibition at a London gallery that nearly sold out. He says that the pieces combine his love of physics with his love of ceramics, and provide a unique way to share his highly theoretical research with broader audiences.

Doing pottery also offers a break from research, which was what initially drew Drukker to the activity in graduate school. His work mostly involves "sitting in front of a calculation that I don't know how to solve", he says. Eventually he realized that taking time off from physics increased his productivity. He says that shaping clay on the wheel gives his brain a rest when he starts going in circles, and that he finds the activity almost meditative.

Hobbies can also provide a sense of accomplishment when researchers are stuck in a rut at work. Hertzberg thinks that handling the tiny Lego blocks has helped her in the lab, where she uses tweezers to pick microscopic fossils out of ocean sediments for analysis. ("I have a steady hand," she says.) But what she likes most about her puzzles and Lego kits is that she can complete them in a relatively short amount of time while she labours on long-term scientific projects. "It's sort of like instant gratification," she says.

INSPIRATIONAL INTERESTS

Beyond offering the brain a breather, pastimes can also lead to inspiration. Simonton, who studies genius and creativity, says that reading about Buddhist philosophy influenced Nobel-prizewinning physicist Murray Gell-Mann's theory of subatomic particles. And when astronomers first caught a glimpse of the Moon through a telescope, Galileo quickly realized that the shadows on its face indicated that its surface was rough and mountainous — not smooth, as Aristotle had believed. That's because Galileo had dabbled in painting, and had learnt how to represent 3D objects on a flat canvas.

Often, the synergy of ideas happens by accident, Simonton notes. "It's not obvious," he says, "that an interest in painting would be useful to an astronomer." But to set the stage for serendipity to strike, researchers must assemble a broad set of knowledge and experiences to pull from. Any hobby helps, but the easiest option is to read material outside the scientific papers in one's discipline, says Simonton, who has an upcoming book on creativity called *The Genius Checklist* (2018).

Asking the brain to do different activities also builds cognitive flexibility, Simonton adds. Li says that diving has taught her greater attention to detail. Spotting well-camouflaged creatures under water requires heightened senses

and the ability to see the unexpected — just like scouring data for new insights. "The answer is right there," she says. "One just needs to have the right frame of mind to see it."

Despite the clear benefits of hobbies, however, they aren't always valued in the culture of science. "People actually hide their hobbies, or pretend they don't do anything outside of work, because they are worried about what people will think," says Sousa. But that's starting to change. For instance, the UK Academy of Medical Sciences launched its MedSciLife campaign in 2017 to highlight researchers who cook, craft and engage in all kinds of other non-academic activities. Social media has made it easier than ever for researchers to share personal interests.

Clark says that senior scientists can serve as role models and help to boost the acceptability of pastimes by making their own hobbies part of their professional identity. "That broadcasts important cultural signals that success in science and having a life need not be incompatible," he says. In fact, Clark argues, whereas researchers feel pressure to publish often, their legacy depends more on the quality — not the quantity — of their work. "That compels us to think about what makes us best placed to make the best contributions," he says. "And really, that is a way of living that is focused on creativity, innovation, vibrancy — and not on just producing more." ■

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CORRECTIONS

The Careers Feature 'Crunch time for data' (*Nature* **557**, 745–747; 2018) erroneously stated that an image from Planet was unavailable owing to a security concern. In fact, the reason for its unavailability was not specified. Also, DigitalGlobe is headquartered in Westminster, Colorado, not in Boulder.

The Careers Feature 'It takes more than a vow' (*Nature* **558**, 149–151; 2018) erroneously stated that Dorceta Taylor is director of diversity, equity and inclusion for the whole of the University of Michigan. In fact, she is head of these affairs just for the university's School for Environment and Sustainability.

BACK STORY
Deforestation detective

Ecologist Lahiru Wijedasa at the National University of Singapore submitted a paper in 2015 that warned of future dangerous carbon emissions from Indonesia's peatland forests. The paper was finally published this month (L. S. Wijedasa et al. Glob. Change Biol. *http://doi.org/cqtm; 2018). Wijedasa explains how his views changed during the process.*

LAHIRU S. WIJEDASA

Why do peatland forests matter globally?
Peatland forests are carbon-rich swamps that have formed over centuries. In Indonesia, massive areas have been drained to grow crops, particularly oil palm and acacia. In 2011, the Indonesian government imposed a moratorium on issuing licences to clear land for industrial-scale development. But in 2015, fires on cleared lands produced more emissions than did the whole of Europe. Indonesia now has a Peatland Restoration Agency, which reports to the president and is mandated to restore 2 million hectares of peat forest by 2020. Our paper shows, however, that 51% of emissions will come from areas that have already been drained and are used for industrial agriculture.

That's bleak. What is the take-home message?
First, we need to maintain our remaining intact forest, of which 45% is not in protected or moratorium areas. My data show that 48% of the moratorium area isn't even peat swamp forest. Second, we'll need alternative forms of agriculture, so that communities can grow crops on wet peat soils.

Why did it take 3 years to publish your paper?
I submitted the paper in 2015. We went through four rounds of review and redid a lot; for example, we initially had three emissions scenarios, but increased those to the 18 defined by the Intergovernmental Panel on Climate Change. However, it was eventually rejected on the grounds of insufficient novelty. We then submitted it to *Global Change Biology*, which published it within three months.

Were your predictions higher than expected?
Data on peatland emissions have been controversial — in part, because some industry-funded studies have generated lower numbers. To address all potential scenarios, we assessed land-cover change from 1990 to 2010 using LandSat satellite imagery. Then we estimated emissions from peat between 1990 and 2130 for a range of agricultural expansions.

How did your views change?
Initially, I had thought that big palm-oil and acacia companies were solely to blame. But after spending more time in Sumatra and other areas of Indonesia, I saw that many of the company-owned forests are among the better-managed areas. Also, some of the palm-oil and acacia companies have set aside prime land for conservation, and have lobbied the government to protect forest that they legally could have developed. I now think that companies are part of the solution.

Did you consider community farmers?
Yes. Smallholders accounted for 60% of conversion outside the original government-designated areas. Whereas I might once have argued to restore all peatlands, I now better understand how much smallholders depend on the land, and that they clear forest to improve their livelihoods. Finding opportunities for sustainable agriculture could eliminate 51% of future emissions.

Does your work let palm-oil and acacia companies off the hook?
No. There are good companies and terrible companies, but the few companies who step up to work with the government are often the targets of bad press. Good companies are the best potential partners in conservation because they have the finances, enforcement ability and motivation — owing to public opinion — to protect these lands. And company-driven conservation has worked several times in Indonesia. It also offers a way for firms to atone for past deforestation in a country that desperately needs that help. ■

INTERVIEW BY VIRGINIA GEWIN

This interview has been edited for clarity and length.