

Athlete–scientists like to sweat

By Vivien Marx

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Some scientists find ways to balance their love of athleticism with research.

Neuroscientist Kaspar Podgorski enjoys trail running, kayaking, backcountry skiing and mountain biking. He's done much rock climbing on long technical routes in the mountains. Type 1 fun, he says, is fun while you are having it, and type 2 fun only feels fun after the fact. "Climbing is a mix of both," he says. Much of it is "pure joy." There's the joy of unlocking a physical or mental puzzle, the beauty of looking at the world from up high, the aesthetic perfection of a clean rock face split by perfect line holds, he says. Climbing is also hard work, patience and a bit of pain, which is where similarities to science come in. Science is also a lot of work and usually has no immediate payoff, says Podgorski. "To be a scientist I think you have to be comfortable with type 2 fun."

"Climbing makes me happy," says Kaspar Podgorski.

He recently moved from the Janelia Research Campus to the newly founded Allen Institute for Neural Dynamics, where his group uses imaging to study how neurotransmitter inputs to individual neurons are integrated. And they work on ways to measure many neuromodulators at once from multiple interacting brain areas. Climbing, he says, takes strength, endurance, flexibility and mental skills such as technical knowledge, problem-solving, planning and overcoming fear. It's a lifelong activity that can continue after injuries, which he, too, has faced. He makes training a social activity with friends. "At home, I use a hangboard to train my fingers, I lift weights and I do calisthenics," he says. He commutes either on his bike, running or kayaking.

The sport has taken him to beautiful places all around the world, introduced him to people and cultures and shaped his strongest friendships. Physical activity is beneficial to

our bodies and our brains. "Climbing makes me happy, and getting away from the lab on a climbing trip makes me that much more motivated when I get back," he says. Some of his best scientific ideas have come to him in the mountains, "maybe because stepping out of the everyday routine helps me think about things in new ways."

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"Rugby is so much fun," says Elizabeth Bradley. As an undergraduate at MIT, she was on the university rugby team and participated in the US national championships. After three concussions she switched to rowing, joining the rowing team. Daily training taught her time management, she says. You can't put homework off, "you've got to do it now."

As an MIT graduate student, she was on the US national rowing team and trained twice daily. Her advisors Gerald Sussman and Hal Abelson were supportive, says Bradley. Back from practice, "I would fall asleep in the beanbag chair in my office for an hour or so," she says. Then she would get to her research.

She is now on the computer science faculty at University of Colorado Boulder. Her expertise is in chaos theory and applied mathematics. In her research and collaborations with researchers at the Santa Fe Institute and BioFrontiers, a cross-disciplinary University of Colorado institute, she guides colleagues in avoiding some pitfalls in data science, one of which is using default parameters on data analysis tools. Turning those "knobs" can entirely change results. Another peeve: researchers who report only processed, "beautiful" data, not the raw data alongside it.

Rowing may look effortless, "but it's not," says Bradley. It's a constant battle to maintain technique in the face of pain, she says. "Your whole body's screaming." Bradley competed in the World Rowing Championships in 1986 and 1987, finishing fourth and fifth, respectively. At the 1988 Olympic Games, her team placed fifth in the women's coxed four event.

She no longer rows but is an avid skier. "Sport teaches you how to focus, and how to concentrate in ways that involve your physical body as well as your brain," she says. It teaches teamwork, too. She values "white space," a strategic, mentally airy time in a crowded day. She gives each member of her group bound notebooks. Armed with just the notebook and a pen and no computer, she asks them to "think and write" in a coffee-shop.

University of California San Diego researcher Gene Yeo has finished two Iron Man triathlons, a number of half Iron Man competitions and full and half marathons. Iron Man is a 2.4-mile open water swim, a 112-mile bike ride and a 26.2-mile run. Swims and runs are especially good "for digesting a scientific problem," he says. He pushes away smaller issues and prioritizes next questions related to his work on RNA processing in the cell and the role of RNA-binding proteins. Yeo also has co-founded companies and, separately, alliances to coordinate COVID-19 efforts.

These days he's more of a rock climber, but all athletic activities require frequent "check-ins" with yourself, your body and your mind, he says. That's useful in science, too. "Success in science isn't really a sprint," he says. A paper is usually not a one-year sprint; most discoveries take five to ten years. "It's all built from many small achievements" that build on one another.

"Success in science isn't really a sprint," says Gene Yeo.

Training for a race is like that, too. During long rock climbs, which he often does with his wife, one has to be thinking about each move. One point of rest energizes you to approach the next point. "There's a lot of strategy involved," he says. As in science, "marathon-running and training is all about pace," he says, and celebrating the big and small wins.

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