

CAREERS

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SETH AMMAN



Computational biologist Gaia Bistolfi writes novels for young adults.

CULTURE

Cultivate the muse

Creative writing can enrich scientists' research.

BY SUSAN MORAN

Writing fiction allows neuroscientist David Eagleman to ask the big questions that science can't yet answer. He had written several non-fiction books about perception and cognition, and had scripted and presented a television series on the brain. These are ways to disseminate science to the broader public, but his more-recent fiction writing has allowed him to explore and wrestle with the biggest ideas, he says.

"These are the questions that live some distance beyond the cycles of papers and grants," Eagleman says. *Sum: Forty Tales From the*

Afterlives (Pantheon, 2009), a collection of stories that explore human identity from the perspective of those who have died, was translated into 29 languages and turned into two operas. "I feel that fiction picks up right where my science leaves off," says Eagleman, at Stanford University, California, and who is also chief executive of Braincheck, a company that uses technology to measure brain function. "I can prove X, Y, Z in the lab, but what happens beyond that? Fiction asks the big 'what ifs,' which are the most powerful inroad into everything we're doing."

Whereas Eagleman's non-fiction articles and books translate his scientific research for a broader audience, his fiction takes him well

beyond the field of neuroscience. "To some degree, they're really separate worlds — writing journal articles and writing fiction — and that's fine with me." He's currently writing a novel, *Eon*, about the cosmos that spans more than 200 billion years.

Science is a creative process. Researchers must be inventive and ingenious as they design new experiments, seek funding and try to publish results. But those who find time to squeeze creative writing into their life at the bench (and the laptop) report that there is a pay-off. Whether they write poems, stories, blogposts or novels, the act of writing creatively can help to unleash the ➤

► spark that fuels original research.

Little information is available worldwide on the number of researchers who pursue creative writing informally or as a moonlight gig. But anecdotally, many scientists are drawn to pen creative work. Their interest comes at an opportune time, when consumer publications and platforms such as blogs are increasingly inviting researchers to write about their work or their personal experiences as scientists.

One can start writing creatively through a variety of routes. Some include writing for one's institution's website, joining a local writers' group or attending a university course or an outside workshop on creative writing (see 'Practice makes perfect').

Astrophysicist and author Gregory Benford launched his creative-writing career while a graduate student at the University of California, San Diego in the 1960s. Since then he has published 31 science-fiction novels and 223 short stories. Now an emeritus faculty member at the University of California, Irvine, he credits his fiction writing for some of the theories he has created as part of his scientific research. "You can devise thought experiments beyond the real and into the possible," says Benford, who is now an adviser on Breakthrough Starshot, a privately funded initiative to develop a fly-by mission to Alpha Centauri. "Fiction aids scientific discovery and thinking. It makes me a better scientist and researcher."

Benford's Galactic Center Saga, for instance, a series about a galactic war between mechanical and biological life, led him to study radio maps of the real Galactic Centre, the rotational centre of the Milky Way. He devised a hypothesis about the radiating filaments observed in the centre, and published his first paper on the subject in 1988. "Even today it seems like a viable model," he says. And it's a

two-way street. His 1980 time-travel novel *Timescape* (Simon & Schuster, 1980) was based on research for his PhD thesis, and imagines an ecological disaster that takes place in 1998. His 1970 story, *The Scarred Man*, anticipates a computer virus.

For many writer-scientists, creating poems, song lyrics or fiction helps them to unwind and to access and practice a different way of thinking, even if they don't deliberately try to channel their muse into their academic thinking and writing. "When molecular research becomes frustrating, I can recharge my batteries, giving free rein to my creativity," says Gaia Bistulfi, a computational biologist at D'Youville College in Buffalo, New York. She writes novels in the young-adult genre and blogs for her young audience about social issues and her life as a writer-scientist. "Fiction writing has helped me reconnect with my community and find renewed purpose for my scientific research as well."

Bistulfi has published four novels (as Gaia B. Amman), which explore social issues such as eating disorders, sexuality and drug abuse. For years she wrote peer-reviewed papers on molecular biology, but she says that it wasn't until she started writing novels that she gained the voice and courage to extend her neutral scientific writing to penning opinion pieces. She sent a Correspondence item to *Nature* (G. Bistulfi *Nature* **502**, 170; 2013) calling on scientists to reduce, reuse and recycle lab waste. "I would have never thought to do that before my experience as a novelist," says Bistulfi. "Fortified by my writing experience, I gathered the courage to express my thoughts in a format that did

not require standard deviations and graphs."

While writing fiction appeals to some scientists, others find non-fiction — such as blogs, essays or books — about their own research or research field to be the most accessible genre. Beth Shapiro, an evolutionary molecular biologist at the University of California, Santa Cruz, had been at the bench for 13 years before deciding to try her hand at popular scientific non-fiction. She wrote her first book, *How to Clone a Mammoth: The Science of De-Extinction* (Princeton Univ. Press, 2015), because she wanted to communicate to a non-scientific readership the differences between the science fiction of de-extinction and what was technically feasible — and what might become feasible in the future. Shapiro also wanted to show how emerging genetic tools could be used to enhance beneficial traits in existing animals to help them survive in a changing climate. "I enjoyed the freedom to write a popular book," she says. "It was a relief from writing a journal article. And I think it made me a better writer."

Penning the book helped her to write manuscripts more clearly. "I had to be able to communicate complex ideas in a simple way, but without cutting corners or leaving out the important parts," she says. "This translates to academic publishing. Nobody ever complained that a manuscript was too easy to understand." Another benefit is that researching the book deepened her understanding of the field well beyond her specific research. "It forced me to dive into literature that is tangential to my everyday research but critical to understanding different components of de-extinction," says Shapiro.

For those who want more immediate reader interaction, blogging is popular. Hanneke Meijer, a palaeontologist at the University of Bergen in Norway, is one of a team of researchers which contributes to Lost Worlds Revisited, a palaeontology blog for *The Guardian* newspaper in London. "I enjoy telling people what my research is about," she says. "I like the exposure it gives my research, and it's a way to highlight my field. Blogging is a nice way of showing people there's a lot more to palaeontology than dinosaurs and mammoths." Between researching for her blogposts and writing them, Meijer says she has learned to think more broadly as a scientist and to step back and ask herself, partly for her readers, why her research and the broader field are important to the public.

Meijer likes to weave some of her own experiences and perspectives into her posts, which she cannot do in her papers. Personalizing them provides a 'hook' into the story, she says. She adds that it helps to make the post more interesting and allows non-scientists to relate more closely to research and to palaeontology itself.

If all of this sounds as though it takes a lot of time, it does. "I work all the time," says Bistulfi. And the time sink isn't the only downside of

GET STARTED

Practice makes perfect

Here are some tips and resources for launching into creative writing.

- Keep a daily journal. It can focus on your research life or anything else. A popular tool for daily writing is Julia Cameron's book *The Artist's Way* (Putnam, 1992). Other books on the craft include Anne Lamott's *Bird By Bird* (Anchor Books, 1980); Natalie Goldberg's *Writing Down the Bones* (Shambhala, 2010); Stephen King's *On Writing* (Hodder, 2012); and Elizabeth Gilbert's *Big Magic* (Bloomsbury, 2015).

- Form or join a writers' group in your city. Some public libraries and book stores offer space and structure for such groups, and groups can be found on Meetup.com and

other online connectors.

- Take a workshop or course. Many universities offer one-off and semester-long writing courses and programmes in specialities such as memoir-writing and poetry. Private and non-profit organizations also offer writing workshops, many led by writers. One is the Iceland Writers Retreat in Reykjavik, an annual series of workshops and panels over several days led by writers from around the world. Another option is the Freefall Writing Workshops held in Europe, Australia, Canada and the United States, where seasoned writers teach multi-day and online workshops for beginning and experienced writers. **S.M.**



Evolutionary biologist Beth Shapiro is a published science non-fiction author.

KRIS KRÜG/POPTECH

moonlighting. Published work, particularly if it is not connected to one's research, can raise eyebrows among colleagues and superiors. And, like many aspects of research itself, writing can be a lonely pursuit. But many maintain that it becomes a compulsion. "Once you do something you love," says Bistolfi, "it doesn't feel like work."

Some researchers weave their work into their writing. Clinical epidemiologist Anne McTiernan co-wrote *Breast Fitness* (St. Martin's Press, 2000), which explores the connection between exercise and a lowered risk of breast cancer. She then started Grandma Doc, a blog that discusses health care and her life as a researcher, physician and grandmother.

McTiernan decided to build the blogposts into a larger, more cohesive body of work. Thus began her coming-of-age memoir *Starved: A Nutrition Doctor's Journey From Empty to Full* (Central Recovery Press, 2016), which delves deeply into her childhood struggle with both anorexia and obesity, and her adult life as a medical practitioner and researcher at the Fred Hutchinson Cancer Research Center in Seattle, Washington. McTiernan says that writing the book has helped her to excavate long-buried emotions that give her insight into her patients' struggles and improve her research. "When you're writing a memoir, it puts you in touch with feelings," she says. "It has reminded me how difficult it is to have weight issues. Now I really feel for those patients in clinical trials who have been trying to lose weight."

Osmo Pekonen, a mathematician at the University of Jyväskylä in Finland, finds a connection between maths and poetry. "The art

of poetry is a matter of condensing meaning into a single beautiful and striking line, and a mathematical formula does the same," he says. Like poets or philosophers, mathematicians explore the realm of the spirit, whereas physicists, chemists and others deal with matter, adds Pekonen, who writes poems, reviews, essays, and books about poetry and poets.

He has organized an annual international conference called Bridges on the link between maths and poetry, and is book reviews editor for *The Mathematical Intelligencer*, a magazine published by Springer that explores the human side of maths. "Like a new mathematical theory, creative poetry can encompass an entire world in a condensed form," he says. "Mathematical rigour and poetical fantasy inform each other in my thinking. Mathematics seems to represent structure while poetry carries the spirit."

Although creative writing poses its own challenges, researchers who dive into it say that it makes their life, including their work, more rewarding and diverse. "My science-fiction writing and my research continue to inform each other," says Benford. "To me, it's absolutely essential to life balance that I have writing on the side." ■

Susan Moran is a freelance writer in Boulder, Colorado.

CORRECTION

The Careers feature 'Code alert' (*Nature* **541**, 563–565; 2017) gave the incorrect affiliation for Andrew Durso. He is actually at Utah State University in Logan.

TRADE TALK

Support system



Panagiotis Vagenas studied substance misuse and its effect on HIV transmission while he was a staff scientist at Yale School of Medicine in New Haven, Connecticut. Now he works for the non-profit Project

Concern International (PCI) in San Diego, California, where he helps scientists in the field to design and carry out their projects.

How did you start out on this track?

What's always motivated me is trying to help people. So in 2010, I did a master's in public health after a postdoc in basic HIV research at Rockefeller University in New York City, and eventually joined Yale.

Why did you leave Yale?

I failed to get a grant I applied for, and thought it was time to move on.

What do you do now?

I advise field teams at PCI on how to answer a research question — from forming a hypothesis and helping to write the research protocol to going through the ethics approval process. I make sure that everyone follows the same standard of high-quality, rigorous research as in academia.

Why do you like the job?

I can clearly see the impact of my work. Last summer, I went to Guatemala, and met some people involved in PCI's micro-financing programme for women. Many told me that the programme had helped them to find a social network and become financially empowered. That experience made it all worth it.

Do you have any regrets?

I made the right choice in leaving Yale. Three months after starting this job, I found out I'd been funded after all. It was a bittersweet moment — but I withdrew my application.

What advice would you give anyone hoping to change careers?

I had to soul search to work out what I wanted to do. I was extremely proud to be a faculty member at Yale, but you need to think about who you want to be and make a bold move when you feel that it is right. ■

INTERVIEW BY JACK LEEMING

This interview has been edited for length and clarity. See go.nature.com/2k2nh2n for more.