

applications. That includes not only the strategizing, but also writing the majority of the application.

Some scientists already hand off much of the writing to others. Cath Ennis, a project manager and grant writer in Vancouver, Canada, might contribute an abstract, literature review, impact statement or budget, depending on the scientists' needs — but never the research plan itself. "Our role is to take all the jobs that we can from the principal investigator, so they can focus more on the research," she says.

Other grant professionals stick to editing — but that's more than just dotting i's and crossing t's. Grant editors consider content, clarity, logic and flow.

Grant professionals can be found in a variety of places: some work for a company and others as freelancers whereas some institutions have in-house specialists (see 'How to become a grant writer'). "Start talking early," advises Marriott, who is also a virologist at Baylor College of Medicine in Houston. "Even if you don't have a grant ready yet, even if you don't know what you're going to write." It's beneficial to get on an editor's calendar as early as possible, because by the time the deadline rolls around, they could have many scientists clamouring for their attention. Later on, editors may be still able to help, but in a more limited fashion, she says.

Scientists tend to look for someone with a PhD and the right technical expertise. But the match doesn't have to be exact. "I've edited grants about nuclear physics," says Ennis, whose background is in cancer biology. "I can still catch a typo when someone's put 'proton' instead of 'photon'."

Equally important, Ennis says, is to look for editors who specialize in the kind of grant one's after — say, NIH, Horizon 2020 or foundation grants. Every programme has its own requirements, and the professional should know those inside out.

With candidates in mind, the next step is to get to know them. Ask a potential editor or writer about their process, and the services they do and don't provide, advises Cherry. "It's a lot more than just, 'What's your fee and how soon can you get this done?'" she says.

Timing and costs are, nonetheless, key questions. It's best to get an estimate in advance to avoid a surprise charge later. One should also ask for a confidentiality clause in the contract.

Then, be prepared for plenty of back-and-forth. "Remember that it's a collaborative process," says Cherry. "Don't be afraid to bring up concerns and make sure you're really collaborating." ■

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## TURNING POINT

# Climate guardian

*Veerabhadran Ramanathan has modelled greenhouse-gas dynamics and quantified the chlorofluorocarbon (CFC) contribution to Earth's global warming. His work at the Scripps Institution of Oceanography in La Jolla, California, shows that CFC-replacing hydrofluorocarbons (HFCs) also have a potent climate-warming effect. This finding led in October to HFCs being added to the Montreal Protocol on Substances that Deplete the Ozone Layer. He has engaged for a decade with religious leaders to act on climate change.*

### When did you realize that science alone might not galvanize climate-change action?

Many of my colleagues and I could see that, by mid-century, we'd shoot past 2-degrees warming, yet there was no public support for the drastic actions needed to steer us away from the cliff. I was discouraged and depressed. Then I got an e-mail telling me I'd been elected to the Pontifical Academy of Sciences in Vatican City, a body of only 80 members, one-third of whom are Nobel laureates.

### How did your early contact with the Vatican affect your outlook?

I initially thought the e-mail was spam. Before I got involved with the Vatican, I didn't have the foggiest notion that religion could help to combat climate change. I've since gone on record to say that global warming has to be taught in every church, synagogue, mosque and temple before we are likely to take the sort of drastic actions necessary to head it off.

### Where did your involvement lead?

At a meeting hosted by the Vatican in 2011, I teamed up with Dutch Nobel laureate Paul Crutzen to focus on glaciers. That opened my eyes to the power of the Church. In the meeting's scientific report, we included a prayer to protect humanity. There was tremendous opposition, but I stood behind its inclusion. We saw the potential of mobilizing religion to help, and proposed a Vatican-hosted meeting on sustainability. This took place in 2014 under Pope Francis.

### What happened after that meeting?

In a *Science* paper that followed, we pointed out that we need a moral revolution: solving climate change requires a fundamental shift in humanity's attitude towards each other and nature (P. Dasgupta and V. Ramanathan *Science* **345**, 1457–1458; 2014). Faith leaders can make such a revolution happen. After the sustainability meeting, I had two minutes to



give a summary to the Pope in the car park. I showed him that 50–60% of climate-warming pollution comes from the wealthiest people on the planet. The bottom 3 billion contribute just 5%, but will experience the worst effects of climate change. That appealed to the Pope. He asked what to do. I told him to ask people to be better stewards of the planet.

### Did you get backlash for contacting religious leaders?

I was shocked — no pushback. Scientists know we need to think outside the box. It has become a moral, ethical issue.

### What happened after the Pope's encyclical, or church directive, last year on the environment?

It had a huge impact on the Paris summit, in which 175 nations agreed to limit climate-change activity. A survey of people who saw the Pope during his US visit showed a statistically significant effect on how people view climate change. Pope Francis has done what he can. It's up to us to take it from here.

### What does the election of Donald Trump, who won 80% of the evangelical vote, mean for climate strategy?

The US elections and the president-elect saying that the United States would withdraw from the Paris agreement hung over November's United Nations climate-change meeting. But I don't see the vote for Trump, by evangelicals or otherwise, as a vote against climate change. I think most people are protesting against economic inequality. The elections made my work with religious leaders ten times more important. We urgently need a non-political forum where we can talk about climate change. ■

INTERVIEW BY VIRGINIA GEWIN

This interview has been edited for length and clarity.