30 October 2013

Science sans frontières: breaking down barriers with the HFSP

Established only 23 years ago, the Human Frontier Science Program already counts 23 Nobel laureates among its alumni. The organisation supports high-risk, high-quality research at the very limits of the life sciences and there is intense competition for the various awards it offers. Catie Lichten spoke to HFSP fellowship director Carmen Gervais.

What is the HFSP?

It was an initiative of the Japanese government back in the late 1980s. The government had recognised that the Japanese were very good at copying existing ideas but were not world leaders in innovation. It really wanted to give the country's researchers and students a chance to work with some of the top labs in the world. The starting philosophy was science without borders: that science should come first and the best ideas and teams should be supported in pursuing their goals. The idea was to look at unusual combinations of disciplines or unusual approaches.

The government announced its plan at a G7 meeting, and the other countries were fascinated. So the HFSP was initiated as a G7 programme, with the first competition in 1990. The Japanese government fully funded the first competitions, before the G7 began to contribute. Other countries have since joined; we now have 37 member countries.

The Japanese government still provides 40 per cent of our funding, which means the return on investment for all the other member countries is very high. We don't restrict participation to member countries; the principal applicant for a grant has to be from a member country, but the other team members don’t.

What areas of the life sciences do you fund?

It goes across the board: evolution and ecology, plant science, neuroscience, molecular biology, genetics and a lot of biophysics. Applications for grants and fellowships in synthetic biology and materials science are really on the rise this year.

Areas that the HFSP does not fund include applied clinical research, drug development, applied agricultural and environmental research, and ecological projects to discover species or monitor protected habitats.

The big challenge is in understanding our philosophy and what we’re trying to achieve. The HFSP is a small organisation with an annual budget of less than $60 million (£37.4m). Our member countries give us funds, but they also have their own national programmes with peer-review systems that are fantastic at supporting excellence. What their systems have more difficulty with is supporting unusual ideas—the high-risk research that people on traditional committees are unsure about. The HFSP is the organisation that they turn to, because we can support that research.

So the HFSP provides funding in a range of areas but doesn't give out many grants. What are you looking for in the teams?

The team has got to come together with different or unusual disciplinary combinations. It must propose high-risk research and pose a problem that the members must work together to solve. No preliminary data is necessary.

As for the size of the team: teams of two get $250,000, teams of three get $350,000 and teams of four or more get $450,000 a year for three years. Young Investigator Grants are typically for teams with two or three members, whereas Program Grants are for teams with three or four. It is hard to build a team of more than four members who are truly able to work together.

Successful teams are 97 per cent intercontinental. That ensures that you have different research cultures coming together around the table. National agencies have difficulty achieving that. In Canadian international grant programmes, the lion's share will go to collaborations between Canada and the United States. In Europe there's a similar phenomenon. We call these bicycle collaborations: when countries with similar perspectives, accustomed to each other's way of approaching problems, work together.

We look for small collaborative teams with clear plans for ongoing interactions. The proposal should describe how the members are going to get together, when, where and why. It should also say how they're going to share data. One of the common risks with cross-disciplinary work is that a computer scientist, for example, is brought in but not consulted early on. The team members should start by planning together.

Peer-review committees really like mixed-age teams. There will be some early-career people who really know the technology and are motivated to learn things and apply them, and some more experienced people who know the research field and what's been tried through different approaches. Those are the teams that seem to be the most well-rounded.

What is the application process like and what are the success rates?

There's just one competition a year, and the next call is in December. The first stage is the letter of intent, a short two-page document in which you wow the committee with your idea and team. We get 750 to 800 of these every year and they all go to the 26-member review committee. The committee sends in its scores, and then a subset—the selection committee—comes in for a face-to-face meeting. Its members discuss the top third or so and invite 90 to make a full application. This first stage has about a 12 per cent success rate.

The review committee looks at each of those 90 applications and discusses every one at a second meeting. There are also between four and six mail reviews for each application, so they all get a really thorough peer review. At this stage, the success rate is 35 per cent. Overall it's 4 to 5 per cent.

UK applicants are very competitive. From 2009 to 2013, teams with principal applicants based in the UK accounted for just under 10 per cent

of the letters of intent and received about 13 per cent of the awards. They are second only to US-based principal applicants, who make up about 30 per cent of the applicants and awardees.

Does that mean it helps to be based in the UK or US?

Not at all, and having a big name on your team doesn’t confer any advantage either. We have people who will put a big prize winner on their team thinking, “Now we’ll get it.” It never works. The teams with the right members—people who have the appropriate expertise and who have to work together to make progress because on their own they could never do it—are the ones that get through.

What is the difference between Young Investigator Grants and Program Grants?

It's the same programme and same funds, but to apply for a Young Investigator Grant, every person on the team has to be within five years of getting their first independent position and within 10 years of getting their PhD. If even one team member doesn't meet those criteria, the team becomes a Program Grant applicant. In peer review, the young investigators are evaluated as a group so that reviewers have appropriate expectations in terms of independence and CVs.

About 20 per cent of grant applicants are young-investigator teams. The mean age for young investigators is 37; the mean age for the Program Grants is 46.

Any other tips?

You need a totally new approach. It doesn't matter if it's high risk.

Typical problems are that teams are not truly teams or that their proposals are overambitious. Another problem is that teams submit an exciting letter of intent but the full application comes out looking just like the standard research programme of the lead applicant. For young teams, it can be difficult to be aware of what's already been done, so reinventing the wheel is a danger.