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EFSA

EFSA chief scientist Marta Hugas is seeking more than 200 scientists to conduct high-quality, regulatory-driven research .

GOVERNMENT

Perks of agency science

European Commission scientists enjoy work–life balance and dynamic career paths.

BY QUIRIN SCHIERMEIER

David Krasa had never worked in one position for much more than three years before he became a research-programme officer at the European Research Council (ERC) in 2009. After the German scientist earned his PhD in geophysics from the Ludwig Maximilian University of Munich in Germany, he gained research experience as a postdoc at the University of Hawaii at Manoa and the University of Edinburgh, UK. For Krasa, seeing the world was part of the joy of studying rocks and minerals.

But when he and his wife had their first child in 2006, he wanted something secure. "I love science," he says. "But job security and work–life balance become more and more important when you start a family."

Krasa had thought that research management, which involves organizing calls for proposals and coordinating administrative support for funded research projects, was a good option for permanent employment that would keep him in touch with science. In December 2008, he accepted a position as a research-programme officer for Earth sciences and solid-state physics at the ERC, which was set up two years earlier as the European Union's premier funding agency for basic research.

Krasa now oversees the review process for ERC grants in the physical sciences and mathematics. His role includes organizing and moderating panel meetings of independent reviewers and following up with principal investigators on the progress of their research. He no longer does bench work, but he interacts with scientists who do. Many proposals are far removed from Krasa's own scientific background, so he must quickly learn their content and position their ideas within a broader framework. "I'm dealing with brilliant people whom I might never have met otherwise," he says.

At the Brussels headquarters of the European Commission (EC), the executive arm of the EU, hundreds of officials administer the multi-billion-euro EU research programmes (including the ERC, which now represents almost 20% of the EU's overall research budget). Scientists also work in the EC's Joint Research Centre (JRC), a science and knowledge service based in Belgium, Germany, Italy, Spain and the Netherlands. The JRC generates and collates policy-relevant information for the EC and for ▶

regulatory authorities in all member states.

Fixed-term research positions and permanent jobs with a predominantly scientific profile are also available at specialized EU agencies, including the European Food Safety Authority (EFSA) in Parma, Italy, and the European Medicines Agency (EMA) in London, which will relocate to Amsterdam next year.

Scientists at EU institutions and agencies cannot choose which topics they work on. But the research they are assigned might profoundly influence rules and regulations that affect millions of citizens.

Officials and permanent research staff with the EC must have EU citizenship. Postdoctoral fellowships at the JRC are also open to citizens of 16 associated non-EU countries, including Switzerland, Norway, Turkey and Ukraine. Eligibility for traineeships is more flexible, but applicants from other countries must apply for special approval on the basis of their nationality.

The future of UK applicants for EU jobs depends on pending negotiations following Brexit. British EU officials and temporary agents — including researchers — have a right to request an exception to the requirement of EU citizenship. The EC has promised to grant exceptions generously and transparently.

TOUGH COMPETITION

Winning the job

The recruitment of trainees, postdocs and temporary research staff at the European Commission's Joint Research Centre and EU agencies is organized by the individual agencies. Job opportunities for specific positions are generally posted online.

The European Medicines Agency advertises its vacancies through its Jobs@EMA portal. Job opportunities at the European Food Safety Authority (EFSA) are posted on the agency's online recruitment platform. Unsolicited job applications are not considered. Under the European Food Risk Assessment Fellowship Programme, early- to mid-career scientists from national-risk-assessment authorities can apply for a 12-month EFSA fellowship.

The selection process for permanent positions is lengthy and arduous. Recruitment is centrally organized through the European Personnel Selection Office (EPSO). Candidates should have EU citizenship and speak at least two official EU languages. To compete for EU jobs, candidates must create an EPSO profile and enter all relevant information that outlines their background and motivation.

Those who are invited to the next stage of the competition will sit through a series of cognitive tests that measure their verbal, numerical and abstract-reasoning abilities. EPSO provides sample tests to help candidates prepare.

Vacancies for research profiles are typically filled through specialist competitions in which candidates undergo further oral and written tests in their fields of expertise. Some EU member states offer training for candidates in different stages of the selection process. **Q.S.**

COMPETITIVE APPLICATION

John Magan is deputy head of the photonics unit in the EC's Directorate-General for Communications Networks, Content and Technology (DG CONNECT) in Brussels. A physicist by training, Magan joined the EC as a programme officer in 1993 after his former employer, the German chemicals company Hoechst, closed down its laser-research department. "I wanted to help build a better Europe," he says.

EU-funded research in photonics operates under heavier application pressure than it did 25 years ago, he says. His unit now oversees an annual budget of €100 million (US$114 million) to develop laser and sensor technologies for medicine and industry. Programme officers are not experts in everything; Magan must read the literature and consult with independent experts to identify cutting-edge research topics for inclusion in the EC's thematic work programmes, which are redefined every two years.

A senior programme officer might administer more than 12 large research collaborations at once, requiring almost a generalist's knowledge, says Magan. His own expertise ranges from optical- and fibre-laser systems for industrial purposes to medical sensors and silicon chips with various applications. "You lose out on doing actual research," he says. "But I like my job better than bench research where I might work, day in, day out, on just one narrow project."

Still, a research programme manager's job is not without frustrations. "We can only fund about 1 in 10 to 1 in 20 proposed projects," he says. "It really disappoints me that so many good ideas don't get funded."

The EC also employs some 2,000 researchers in the JRC across 6 units in 5 countries (see 'Winning the job'). Doing science in an EU context is quite different from academic or industrial settings. "When we interview job candidates, we make sure they understand where they are applying," says physicist Elisabetta Vignati, head of the JRC's Air and Climate Unit in Ispra, Italy. "People who are mainly interested in basic research are better off at a university. But for researchers who are open to looking at science from a policy-relevant angle, the JRC might well be the right place."

The JRC does not carry out blue-sky research, but it supplies a constant feed of scientific information to support EU policies — including energy, health and the environment — in all phases of implementation. Vignati's unit, for example, produces models for local authorities to design action plans in line with EU climate and air-quality regulations. This involves lab science, such as on chemical properties and atmospheric fluxes of pollutants, as well as monitoring activities in the field. JRC researchers are encouraged to publish their results in peer-reviewed journals, but they are under less pressure to publish prolifically than their academic peers.

"Here, I can work for the benefit of many thousands of patients instead of just a few."

The knowledge hub's mandate means that scientists with the JRC institutes in Brussels; Geel, also in Belgium; Ispra, Italy; Karlsruhe, Germany; Petten, the Netherlands; and Seville, Spain, must continuously liaise with policymakers and authorities. "Our scientists must know EU legislation, and they must understand how policy making works," says Vignati. "And they must also learn that talking with politicians is very different from talking to scientists."

JRC research might have a direct impact on EU policies. For example, the EC in 2015 reduced the target for the use of transport biofuels in the EU, after JRC researchers warned that indirect land-use changes might negate greenhouse-gas savings from biofuels.

Few EC researchers work on the same subject for years on end. Michele Vespe, a migration researcher at the JRC Knowledge Centre on Migration and Demography in Ispra, developed radar remote-sensing technology for oil-spill detection and maritime surveillance before he switched to analysing big data and alternative data sources on migration.

Likewise, Ispra-based chemical engineer Bernd Gawlik switched his research focus from waste and soil to wastewater treatment and manure management when sustainability became increasingly popular in the EU. "I know of no other place in science where you can work as flexibly and interdisciplinarily as at the JRC," he says. "As a chemist, you might collaborate with economists, social scientists or artificial-intelligence researchers."

EU-employed scientists need not worry too much about funding. But they are not free to do what they like, and they must follow strict internal procedures concerning workflows, reporting and transparency, Gawlik says. They are encouraged to explore their ideas — but before starting something new, they must obtain approval from management, which could take months. In addition, EU officials must weigh their words carefully, especially when making public claims that might contradict political mainstream thinking. And when conflicts arise between the EC and EU member states, the JRC might be asked to produce scientific evidence under extreme time

pressure. "When we are asked for urgent advice, we work around the clock for days," says Gawlik.

AGENCY SCIENCE

At EU regulatory agencies, scientists are tasked with rigorously testing potentially opposing claims concerning health and the environmental risks of drugs, chemicals and foodstuffs. The EMA, for example, evaluates applications for marketing authorizations of medicines and monitors the safety of approved drugs across their life cycles. "Our role is to ensure safe, effective and quality medicines for patients, who may need new treatment options," says Pavel Balabanov, a Bulgarian neurologist who joined the EMA in 2008 after six years of clinical experience. "I really liked working with patients. But here, I can work for the benefit of many thousands of patients instead of just a few."

Regulatory-driven research requires an interest in research methods (including statistics), project-management skills and a solid understanding of the regulatory framework in which the agency operates, says Marta Hugas, EFSA chief scientist.

The agency provides the EC, the European Parliament and EU member states with scientific advice on health risks related to human and animal food. EFSA scientists must handle and communicate uncertainty and sustain an evidence-based position in public debate over controversial issues such as the safety of genetically modified crops, says Hugas. The agency currently employs about 200 biologists, chemists, toxicologists, plant researchers, nutrition researchers and veterinary scientists who are in steady consultation — and who often become coauthors of meta-analysis and review articles — with leading experts in their fields. It plans to hire up to 100 scientists over the next few years. "We are looking for rigorous researchers at any career level who are interested in risk assessment for the public good," says Hugas.

A traineeship at an EU agency raises young scientists' employability, Hugas adds. Chemist Alessia Amodio, now an EFSA trainee, wanted something new after two years of postdoctoral research in nanotechnology at the University of Tor Vegata in Rome and the University of Melbourne in Australia. She enjoys the variety of tasks in regulatory-driven science, but hasn't yet decided whether she prefers 'desk' science over bench research. She hopes that her experience in both worlds will open doors to whatever career path she might choose.

"I've been through many challenges and I've learned many new things," she says. "I'm not scared at all about what might come next." ■

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COLUMN

Forge your own path

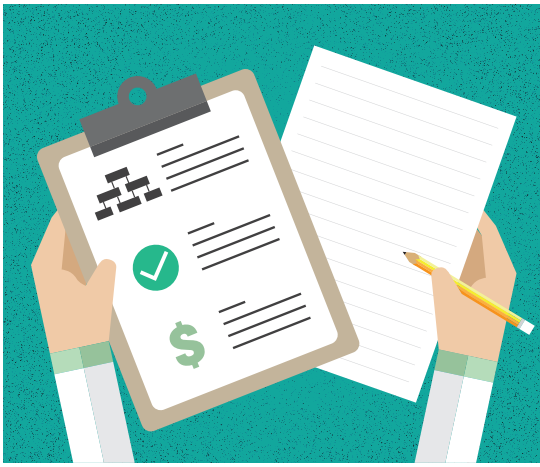
Propose a fellowship that can propel you into your ideal career, say **Crystal M. Botham** and **Tanya M. Evans**.

Looking to win a US graduate or postdoctoral research fellowship? Don't focus only on your current research: you'll need a proposal that outlines your specific goals for career development and training.

Most US fellowships, such as the National Institutes of Health's National Research Service Awards, support research-related and professional activities. These might include taking extra courses or giving a talk that will enhance the award recipient's training experience and improve their potential for success. But the most common mistake we see applicants make in our coaching sessions (and that we made ourselves) is to focus only on their research. That's just one component of a winning application.

We encourage graduate students and postdocs to design a path that will complement their previous training and help to propel them towards their next career stage. We've developed an outline for incorporating training goals into fellowship proposals. Here are the basics:

- Write down what type of scientist you want to become. Are you aiming for an academic career at a research-intensive institution, a career with a focus on teaching, or do you see a non-academic path in science? Which research area most intrigues you? What approaches and methods excite you? It is also helpful to list the publications, grants and presentations that could emerge from this training opportunity.
- Describe experiences or outcomes that show your potential. Emphasize the evidence for your high potential by noting the publications, awards and research you have that illustrate creativity or technical skills. We know from experience that it is easy to be discouraged at this point, but your history, which defines who you are today, is not everything.
- Highlight career growth and development areas that need attention. We have noticed that trainees who are able to delineate gaps in training, or in the experience they need to move on to their next career stage, are highly successful at documenting the need for and value of the proposed training. We recommend describing 3–5 training goals, such as obtaining specific technical training, gaining laboratory management skills or establishing new collaborations.
- Design a thorough training plan. Anchor this plan around your goals to address specific areas for growth. You can include campus-seminar series, visits to a collaborator's lab to learn a technical skill, oral or poster presentations



ADAPTED FROM JA INTER/GETTY

at scientific conferences, courses on specific research topics or professional-development skills such as management or scientific writing, mentoring or teaching. Throughout the proposal, you must make a compelling case that your future success depends on your getting this and career-development and research training. Explicitly state, for instance, that you need the proposed technical skill to complete one of your specific aims and future research goals.

We've found that discussing specific goals is crucial for successful fellowship applications. For example, we coached a postdoc on revising a proposal that reviewers had described as having a "cookie-cutter training plan". It listed proposed activities without linking them to the postdoc's background and trajectory.

In the revision, the applicant described how the plan addressed their specific training goals: to cultivate a certain technical skill, for example, the postdoc would complete specific coursework and work in a collaborator's lab for three months. The proposal was funded.

Remember, too, that the exercise of completing this application is useful; even if you don't win the grant this time, the experience that you gain will make you a stronger contender for the next one. Perhaps even more importantly, you will be armed with a clear plan for reaching your career goals and research milestones.

Crystal M. Botham *directs the Stanford Biosciences Grant Writing Academy at Stanford University in California.* **Tanya M. Evans** *is a neuroscientist at the University of Virginia in Charlottesville.*