

# De la recherche fondamentale aux applications de la science ?

## Interview du professeur Marja Makarow, directeur général de l'European Science Foundation

par Christian Remenyi, *Nachrichten aus der Chemie* (GDCh), et Gilbert Schorsch, *L'Actualité Chimique* (SCF)

### Competition between ESF and ERC?

*"There used to be, but not anymore... In the future there may be again"*

**What is the role of the European Science Foundation (ESF) and what is the main difference between ESF and the instruments the European Union employs for research, such as the Directorate-General for Research?**

**Marja Makarow:** ESF is an autonomous organization, independent of political decision-making. This makes it very different, in an important way, from the European Commission, which of course has political input. ESF is not a funding organization. We are owned by 80 member organisations in 30 countries – for instance, the public funding agencies for fundamental research in these 30 countries, or public research organizations. Indeed these organizations that own ESF – its members – govern, that is, manage, about 85-90% of the public research funds used each year in Europe, which is about 30 billion euros. They use most of it in their countries. The member organizations created ESF to pilot European collaborative efforts in research.

### Do you have your own financial resources?

We do not have a pot from which we hand out money. The money is managed by these organizations in the respective

countries. The general budget that our member organizations pay to ESF is about 12 million euros a year for the staff here in Strasbourg. We have about 100 persons here, about 50 of whom are paid by the general budget and another 50 working on other contracts.

### Is this only an operational budget or can you use it for other purposes?

We also give out some money for research networking, but it's the organizations in the countries themselves that pay for the research that is carried out in those countries. For instance we have a European research programs scheme called the EUROCORES. This is one very important difference from the European Commission: we work on a bottom-up basis. The researchers directly propose themes for research programs to us. Then they are evaluated by experts and the best are chosen. After that we get the member organisations to fund the research itself, but they do this only in their own countries.

### What is the research budget your member organizations make available for research in Europe?

The entire public budget in Europe is about 30 billion euros per year, and out of that 0.4% is spent on EUROCORES. There are about 27 programs on different themes running at

## Une interview du professeur Marja Makarow : pourquoi ?

Professeur de biochimie et de microbiologie appliquée à l'Université d'Helsinki depuis 1983, nommée vice-recteur de cette même université dès 2003, Marja Makarow dirige depuis janvier 2008 – et pour une durée de cinq ans – la Fondation européenne des sciences (ESF : European Science Fondation).

Un Conseil européen de la recherche (ERC : European Research Council) – certes indépendant de la Commission européenne – vient d'être mis en place à Bruxelles en 2007. Quels sont les rôles respectifs de ces deux entités ? N'y a-t-il pas double emploi ?

L'Agence européenne des produits chimiques (ECHA : European Chemicals Agency), le bras armé de REACH, vient aussi de s'installer récemment à Helsinki. Que pense la biologiste de l'initiative REACH et de l'avenir de l'industrie chimique européenne ?

Dans l'Union européenne enfin, la Finlande est le pays qui consent l'effort de R & D – public et privé confondus – le plus important (plus de 4 % du PIB), avec des résultats qui lui permettent d'être régulièrement citée comme référence en matière d'innovation. Le pays ne dispose pourtant pas, comme les grands pays européens, d'administrations en charge de la recherche fondamentale. Comment expliquer ce paradoxe ?

Il était tentant de proposer à cette femme de convictions, à la tête d'une Fondation plutôt discrète, ces questions d'actualité. Elle a

accepté de rencontrer simultanément *Nachrichten aus der Chemie* et *L'Actualité Chimique*. Occasion d'évoquer le rôle de l'ESF, le problème des applications et de la communication de la recherche fondamentale.



the moment, with about 1000 researchers. About 66 funding organizations are paying for the research – this 115 million that is available just now. But the money does not cross borders.

**So each organization pays for...**

... its own researchers.

**Who can apply for such a EUROCORE scheme?**

Any researcher. It's completely on a bottom-up basis. Even the themes are proposed by the researchers, as I said. And then, of course, researchers also apply in teams to be part of these research programs, too.

**So applicants come with a concrete idea.**

Exactly. And then we have a very rigorous quality control procedure where the importance of the themes is evaluated. When a theme is accepted, the researchers get started and submit a joint research agenda, which we evaluate in a peer review system.

**Isn't there some competition between ESF and the newly formed European Research Council (ERC)?**

There used to be, but not anymore. In the future, there may be competition again. I say this for the following reason: there was a program for excellent young principle investigators (EURYI) that ended in late 2007. In this program, our member organisations put money into a common pot to fund outstanding young principal researchers. From 2004 to 2007, ESF managed this program, which was funded by a number of European funding and performing organisations (EUROHORCS). The EURYI concept was modelled by the ERC Starting Grant Scheme.

**ERC just took over...?**

Yes, they took over our concept and expanded the volume. ERC multiplied it by 10. We stopped our project then. But we must not regret this. You could say we piloted it. Today there is no competition at all, because the ERC funds principal researchers. We don't fund individuals anymore: we fund research programs. But since the ERC is still evolving, in future they may want to start also research programs. Then we may end up in a competitive situation after all.

**Are there also synergetic effects between ESF and the European Research Area (ERA)?**

Absolutely. The synergetic activities are at the strategic and political level. You probably know that the Commissioner for research has an independent advisory committee called the European Research Advisory Board (ERAB), of which I happen to be a member. This means that even though people were nominated *ad personam* and not as representatives of their home institutions, ESF viewpoints are still discussed and are part of commission level strategic work. This board defines long-term strategy for European research for the future – up to the year 2030! So ESF is represented in many important strategic bodies that are trying to shape European science policy at the Commission level. I also think it is important that ESF has a clear and open dialogue with the European Commission.

**Do you stay in touch with the recently formed European Research Council (ERC)?**

ESF has no direct contact with ERC just now, but we very much hope to have a good working relationship with ERC

## La Fondation européenne des sciences

Créée en 1974, avec son siège à Strasbourg, l'« European Science Foundation » (ESF)<sup>(1)</sup> est chargée de coordonner la recherche fondamentale européenne dans trois domaines essentiels des sciences dures : Physique et sciences de l'ingénieur, Sciences médicales, et Sciences de la vie, de la Terre et de l'environnement. Les organismes français suivants sont actuellement membres de l'ESF : ANR, CNRS, CEA/Direction des sciences de la matière, IFREMER, INRA, Inserm, Institut de recherche pour le développement (IRD), représentés individuellement. L'Allemagne n'y est représentée que par quatre organismes : la Max Plank Gesellschaft et la Helmholtz Gemeinschaft des centres de recherche allemands d'un côté, la Deutsche Forschungsgemeinschaft et l'Union des Académies allemandes des sciences de l'autre.

La Fondation s'est fixé trois objectifs avec les instruments correspondants :

- des « Forward Looks », des « Exploratory Workshops » et des Comités d'experts – sur la physique nucléaire ou les problèmes marins par exemple – pour la stratégie de recherche ;
- des « Research Conferences », les « EUROCORE Programmes » et des « Research Networks » pour les synergies de recherche ;
- les « ERA-Net » et les actions COST – dont l'action « Chemistry, molecular sciences and technologies » concerne directement les chimistes – pour le management direct de la science.

Si ces actions directes sont restées limitées à 52 millions d'euros en 2008, les administrations qui constituent l'ESF dépensent environ 30 milliards d'euros par an pour la recherche fondamentale. Ces sommes sont à comparer aux 52,3 milliards d'euros du 7<sup>e</sup> PCRD pour la période 2007-2013, soit 7,3 milliards d'euros par an<sup>(2)</sup>.

(1) [www.esf.org](http://www.esf.org)

(2) Schorsch G., Mise sur orbite de « l'Europe de la connaissance ». « To-day is the future » (Bruxelles, 7 mars 2007), *L'Act. Chim.*, 2007, 310, p. 12.

in the future. ESF provides peer review services to communities: this is something we could propose to ERC – to work together to provide names of experts and reviewers...

**Do you get financial support from the European Commission?**

We now have contracts with the European Union and the Commission for specific scientific operations, with ESF as the coordinating body. So there are several ERA networks where we are coordinator; and of course then we get compensation for expenses for that contract. We have another important collaborative contract with the Commission and that is COST: a European cooperation in the field of scientific and technical research. We serve as implementing agency for COST and provide technical services. We also provide COST with a legal status, so their finances are handled here in Strasbourg, and we set human resources policy. But COST gets its money from the Commission: 210 million euros from the 7<sup>th</sup> Framework Program.

## Science and applications of science?

*“Taxpayer's money must feedback”*

**Scientific programs must have at least some benefits for ordinary citizens, the environment, health and so on. How do you ensure this connection?**

Traditionally ESF has concentrated very much on fundamental research. COST has an additional mission: utility for society. I see it as a moral obligation of research and

researchers to understand that taxpayers' money must feed back into society in the form of societal and cultural and economic development. We don't have programs that address this question directly and we have to think about how to organize this. I think we all understand that fundamental – free research is the platform for ground-breaking innovations. But we must also understand time constraints – the amount of time different scientific disciplines take to realize their usefulness. We have to pay attention to this...

***Doesn't the Millenium Prize<sup>(1)</sup> intend to recognise specially technological developments, like the Web, the LED (light emission diodes) by Nakamura or the drug release concept by Langer this year?***

As chairwoman of the Millenium Technology Prize jury last year, I have had a fantastic opportunity to witness the development of fundamental research findings into ground breaking innovations. Last year we got it crystal clear that the ground breaking innovations were single person ideas. They were not conceived in programs. Nobody asked for them. It was not a pull but a push. But they were so exceptional people that they realized that there is utility and they drove both lines in parallel. None of them had shifted completely to application. They never left the fundamental research.

***What do you think about REACH and the future of the chemical industry?***

Well, REACH is concerned first with safety of chemicals. The business of checking chemicals is a huge, but absolutely necessary task. When the discussion began about where the European Chemical Agency (ECHA) should be located in Europe, Finland was one candidate. We made a big effort to bring ECHA not only to Helsinki but to the campus of the university. But we were told that this is not relevant, because ECHA was only an office, so it didn't need to be in the intellectual environment of chemical research. Maybe we didn't really understand, but we thought it would have profited from this living environment. Anyway, the decision was made to place it in the middle of Helsinki.

REACH is also important for dealing with problems arising from the world of nanotechnology. Chemical components may change their properties at the nanoscale. There is a great opportunity here. This information, which is now gathered by REACH somewhat bureaucratically, should actually sparkle with new research questions. And it would if there were some interaction between research and this body of information. Specifically, what comes now is the chemical science domain. Material science now touches chemistry very closely, doesn't it? I'm not a chemist, I'm a biologist. But my understanding is that chemistry as a subject somehow sounds old fashioned to young people, and many, many chemical departments have difficulty in Europe attracting students nowadays.

***Not only chemistry. It's the same in other scientific disciplines.***

Chemistry should reinvent itself as far as designation of study subjects and communication are concerned. But we are touching on these new areas! Material science has a fantastic potential for innovation when we are touching on nanotechnology, which is something entirely new, isn't it? This should then inspire young people, and I think this is one of the ambitions of the field of chemistry.



Gilbert Schorsch, Marja Makarow et Christian Remenyi (de gauche à droite).

## Communication of science?

***"Things have gone wrong because communication was not in place"***

***You cannot explain to youngsters and the general public what science is because they do not have the scientific background to understand you. But they live with examples and applications of science in their everyday lives: that is where you can reach them with explanations. Industrialists could be good mediators. What should be done to narrow this communication/information gap?***

An open university is the answer, I think. I'm not talking about "life-long learning", but a university that would open itself to society, that would listen to the needs of industry. To try to understand and then to react to needs: this is the key. Universities could make strategic alliances with industry and with other partners in society to promote this kind of interaction and get to understand each other better. The faculty department structure is very restrictive. It is very rigid and does not really allow for this kind of partnership. So the universities themselves should create this kind of horizontal partnership with industry and society at large so they can act more quickly and be more alert to the needs of society.

***Do you think that scientists would be interested?***

For instance, I had a very nice experience in Helsinki with Nokia. The previous research director of Nokia was Yrjö Neuvo, who is now on the European Institute of Innovation and Technology board. We came up with the idea of putting Nokia researchers together with our fundamental mathematicians. They had a workshop and a miracle happened. The fundamental mathematicians, who had never thought about utility before, came to understand that the ambitions of industry are very high. So now they have a flourishing interaction. This is why we need a common language and a common understanding. And it is also important to have mobility between industry and academic researchers in both directions.

***You have it in the States***

... yes, but not in Europe. And one of the first things is to understand and acknowledge each other's merits.

***What does ESF recommend for a good communication of science between scientists and the general public?***

I think it is not enough to just talk on and about this community of research, societal needs, major challenges, research being able to meet the major challenges at least – the usefulness to society. What we need are mediators. Society is a partner here! And we need the professionals – that is, the media – to communicate between scientists and the civil society. We need them to enlighten the civil society about what is relevant to the advancement of science and then to bring the feedback from the society back to the researchers. And then there is the factor of legislation there in the background. There are so many points in science where things have gone wrong because communication was not in place. Take the debate on genetically modified organisms in Europe for instance. And so my personal opinion is that the media are there as our partners. Essential partners. We have to have this flow of information and a diversity of opinions, too, and use new communication technologies and the web. In fact, the people within our

society are more and more knowledgeable today, and this is a great plus for us.

***We thank you for helping us to better understand the important role of your Foundation and for your openmindedness for a direct and constant dialogue between science and industry. Isn't this the Finnish model for innovation?***

Of course it is...

***We thank you also for your idea to involve the press better and deeper in the dialogue of science with the public opinion. We need to address it more with metaphors than with scientific explanations.***

Exactly...

(1) Le prix Millenium a été créé par la Finlande en 2004, pendant technologique du prix Nobel scientifique.



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