



INSTITUT DE FRANCE  
**Académie des sciences**

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## ***REPORT***

### ***ATTRACTIVENESS OF CAREERS IN RESEARCH***

The attractiveness of careers in research has undergone a serious decline in this country over the past decades. This observation holds for researchers in the major public research organisations and for teacher-researchers in our universities. In its analysis, the Académie des sciences has no wish to dissociate the problems posed by the attractiveness of these two types of careers in research. The same decrease in attractiveness is also found for the professions exercised by engineers, technical experts and administrators (personnel in the sectors ITA, ITRF and ASU<sup>1</sup>). This report will thus successively consider the possibilities for improving the attractiveness of the professions of researchers/teacher-researchers and then those of other personnel.

It is now recognised by this country's leading authorities that France's future, in the context of globalisation, will depend to a very large extent on the strength of its research, on its capacity for innovation and on the quality of its teaching in higher education. This implies, of course that France is able to recruit the best talents for these areas. However, we are currently witnessing a double haemorrhage in careers in research. Many young people gravitate towards our Grandes Écoles but on completing their studies, a very insufficient number of them go on to a doctorate and then to research. The same is true for students of medicine with considerable implications for our medical research which is increasingly undertaken without

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1 Engineer, Technician, Administrative in research and training, school and university administration

medical doctors. Moreover, many of the best students graduating from university abandon the paths of Masters and Doctorates to turn to other training leading to better remunerated professions. A second haemorrhage is currently observed among teacher-researchers and researchers who have made their reputation internationally through the high quality of their work and receive offers of considerably more advantageous positions in other countries; many of them leave our laboratories. This problem first concerned primarily the life sciences and now affects all disciplines, including mathematics and physics. This situation becomes a matter of particularly high concern on the eve of a massive number of retirements of researchers and teacher-researchers in the coming five years (almost a quarter of all staff or more than 15,000 posts).

The Académie des sciences has looked into this problem in response to a request from the Minister for Higher Education and Research. A reflection group was formed, centred on the President and one of the Permanent Secretaries. The group took notice of various reports on this subject which have accumulated over recent years. It interviewed various key figures, and also young researchers who have left France for what they judge to be better positions abroad. In addition, officers of the reflection group met with the State Councillor Monsieur Rémy Schwartz, who is chairing a commission tasked to reflect upon the future of personnel in higher education, and with the Senior Vice-President of the Conference of University Presidents (CPU, *Conférence des Présidents d'Université*) and his General Director. Furthermore, a meeting at the Ministry with representatives of various unions for the research professions was also organised. Finally, on 24 June 2008, the Académie, meeting in a General Assembly (so-called "*Comité Secret*"), examined this report to which it gave its unanimous approval.

In order to increase the attractiveness of careers in research, the Académie des sciences is proposing two key measures which could and should be put in place rapidly given the importance of research, innovation and teaching in higher education for the future of this country in the global context. These measures relate to career development and remuneration. The Académie is also proposing three important directions for reflection: the human, physical and administrative work environment of the researcher, the recognition accrued from the value of the doctorate, and the current teaching loads of teacher-researchers and their incompatibility with a high-level research activity. All these measures are grouped together in the report by order of urgency of implementation. For ITA, ITRF, and ASU co-workers, the Académie is proposing measures which go in the same direction and also relate to career development and remuneration.

## **SUMMARY OF PROPOSALS**

### ***HIGH-PRIORITY MEASURES TO BE IMPLEMENTED FOR RESEARCHERS AND TEACHER-RESEARCHERS:***

1. Revaluation of the remuneration of researchers and teacher-researchers is the first priority. This remuneration should become comparable to that of other trades in this country with a similar qualification (which was the case in the 1960s) and to that of researchers working in countries with which France is in competition. The Académie is putting forward proposals for improvements in status and incentives modulated by a rigorous evaluation.
2. The work environment of the researcher, both human and physical, requires considerable improvement. There is a need to facilitate the constitution of new teams, to rethink the age and level of recruitment, to create much more comfortable and flexible working conditions for doctoral students, postdocs and foreign researchers and, of course, to simplify the wheels of administration to the maximum.
3. A recognition of the true worth of doctoral theses, as is the case in countries where research and development are most advanced, and an improved positioning of doctors in the labour market, will mean that this diploma (the highest for a university) is finally taken into account in collective agreements and will also allow access to our major national professions.
4. There is an imperative need for a fairer teaching service which is compatible with high-level research activity. To that effect, the Académie is proposing several measures, both internal to the universities and in liaison with research bodies. The Académie wishes to see a progressive bringing together of the careers of teacher-researchers and researchers.

### ***HIGH-PRIORITY MEASURES TO BE IMPLEMENTED FOR ITA, ITRF AND ASU PERSONNEL:***

1. The careers of all those affected in higher education establishments and research bodies should be able to develop much more rapidly; a shortening, or even elimination, of the time taken to pass from one grade to another should be contemplated and the number of possibilities for promotion should be increased.

2. Remuneration should be increased according to formulae similar to the proposals for researchers and teacher-researchers.

## ***HIGH-PRIORITY MEASURES TO BE IMPLEMENTED FOR RESEARCHERS AND TEACHER-RESEARCHERS***

### **1. SIGNIFICANT REVALUATION OF THE REMUNERATION IN RESEARCH PROFESSIONS**

The salaries of French researchers and teacher-researchers are notoriously inadequate in comparison with those in neighbouring major scientific countries. The situation has been aggravated over decades, not only at the international level but also at the very heart of the French civil service. Several studies on the salaries of graduates working in the various sectors have provided a striking demonstration of the considerable gap which has arisen between those who chose a career in research and teaching and those who chose some other career in either the private or the public sector. This inadequacy of salaries is particularly serious for the brightest elements who are enticed by foreign climes or attracted to careers other than in public research or higher education.

The increase in remuneration should have a dual objective:

- to revalue the salaries of researchers and teacher-researchers as a whole,
- to situate the remuneration of those at the level of the international competition.

Two additional aspects should be considered in connection with this revaluation of remuneration: improvements in status, on the one hand, and an increase in incentive earnings and various other forms of assistance, on the other hand, based on a rigorous evaluation.

#### ***- Improvements in status***

- . The remuneration of teacher-researchers and researchers at the start of their career should be increased significantly. The Académie strongly urges that when a teacher-researcher or a researcher is recruited, the number of years of research undertaken during doctoral studies and during the post-doctorate, should be fully taken into account and should make it possible to enter the various bodies at a high level. This is a key measure which would involve a better remuneration at the start of a career and would have repercussions throughout the career. It should also make it possible for these years to count towards retirement, without touching grade-related boundaries.
- . In order to allow greater fluidity in career development as a function of the quality of work, duly evaluated, the Académie proposes a relaxation of the length-of-service criterion with a

system of accelerated progression between echelons (levels of seniority within a grade) and an easier transition between classes (performance levels within a grade). The evaluation would naturally have to recognise excellence in research and teaching, and also in numerous other important duties entrusted to teacher-researchers and researchers.

- . The creation of an exceptional category for research fellows should be considered, following the example of the exceptional category for Readers; this would offer prospects for good researchers who did not wish to undertake managerial tasks.

### **- Improvements in incentives**

The Académie proposes a significant reevaluation of the system of incentive earnings as follows:

- For teacher-researchers, the Académie proposes a doubling of the incentive bonus for the management of doctorates and research (PEDR, *prime d'encadrement doctoral et de recherche*) and an increase in the number of its beneficiaries. The ways in which the beneficiaries of this incentive will be chosen need to be reviewed taking into account the provisions of the so-called LRU law<sup>2</sup> and with a view to quality as described below. The incentive could be replenished by the establishment's own resources. This measure could be modulated as a function of individuals based on an objective evaluation.
- For researchers and teacher-researchers, the Académie proposes the creation of an incentive for excellence of research to be awarded to the best performing staff, for example to around 20% of the staff. It should provide the latter with a global increase in remuneration of 30% to 100%, modulated as a function of the quality of the research, duly evaluated. The Académie accepts the idea that a teacher-researcher who performs particularly well should be able to combine an incentive for management of doctorates with an incentive for excellence of research.
- Assistance with accommodation is a fundamental but often neglected aspect, in particular in the retention of young researchers and teacher-researchers at the start of their careers. This assistance may take various forms:
  - . 1. an incentive on installation,
  - . 2. the building of accommodation intended for them by the urban communities,
  - . 3. a guarantee deposit which the establishments could put down in the case of rental leases,
  - . 4. a supplementary residence allowance for those working in the major cities where the cost of living is particularly high, notably in Paris.

These measures will place us on a more level playing field with the offers which our best teacher-researchers and researchers receive from foreign university organisations.

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2 French law no. 2007-1199 of 10 August 2007 on the rights and responsibilities of universities

The Académie is conscious that all these measures together will necessitate the putting in place of specific financing. The simplest solution would involve direct allocation, in the form of an additional budget, where the amounts the establishments need would guarantee the payment of the salaries in question. Modelling of the measures described in this report reveals a sum of the order of 250 million euros per year. However, this expense is vital if this country wishes to face up to a challenge of this importance.

To complement this arrangement, one might also envisage the taking of a contribution from the establishment's own resources by the levying of a percentage on research contracts. The setting aside of an amount for each contract, to be paid into a special fund belonging to the body paying which would deliver the bonuses and incentives described above, would avoid the drawback of having too direct a link between the researcher and the levy, and would give a high profile to the researchers contributing to the prosperity and fame of the institution which employs them.

Going against the current trend which insists that any advantage acquired should be irreversible, the Académie believes that it would be reasonable to suggest that the increases in incentive earnings should not be automatically renewable, but subject to regular evaluations, as is the case in other countries..

#### ***- Evaluation methods for the allocation of salary bonuses***

The Académie would stress that the proposals laid out above require an absolutely irreproachable evaluation system which would make it possible to identify the most effective teacher-researchers and researchers who would be likely to benefit from an increase in their remuneration. This system should necessarily include a significant component which is external to the establishment, and should be based on international standards.

The Académie proposes the following procedure:

- . Researchers or teacher-researchers who believe they would benefit from an incentive for excellence of research make an individual application to their line managers who forward it with their comments to the evaluation committee.
- . The evaluation is performed by a committee with a broad external component, both national and international. For teacher-researchers, one might envisage a type of jury whose operation would be comparable with that of the IUF (*Institut Universitaire de France*). For researchers working for research organisations, it would be necessary to set up *ad hoc* independent international committees. Of course, no evaluator should be liable to evaluation himself/herself in the same context.
- . The final decision on the allocation of incentives and their level falls to the applicant's line managers.

## **2 - ENVIRONMENT FOR RESEARCH ACTIVITY**

The environment in which researchers practise their work in France is not up to the level of that of its main competitors and partners. Numerous shortcomings which should be easy to put right at little expense, currently lead to a great wastage of energy, time, and not least, money.

### ***- Autonomy of teacher-researchers and researchers***

Many young researchers complain that, contrary to the prevailing situation in other countries, our structures only promote a very gradual access to a true autonomy of scientific and financial decision taking. It is essential that we should be able to give such autonomy to researchers who wish for it, aspire to it and have the talent for it, early in their career. This may be in the form of contracts, like those which already exist (ATIP contracts at CNRS, AVENIR contracts at Inserm, ANR "young researchers" programmes, and European ERC contracts), which will require considerable development and updating (duration, funding and logistics, staffing). It is essential to put in place, at the end of these contracts, the evaluation which will make it possible to transform the most effective groups into stable structures.

### ***- Age of recruitment***

Today, there is a *de facto* disparity between, on the one hand, the practices of the international employment market for young researchers which imposes a period of global mobility (sometimes 5 years or more) before stabilisation, and, on the other hand, the French position which calls for the recruitment of these young researchers to permanent posts (public or private) immediately after their doctorate. The various disciplines in France have different positions on this point: the life sciences tend to favour long stays abroad before any permanent recruitment, while physics and mathematics frequently recruit at the end of the doctorate. This disparity between disciplines would be partially abolished if the key measure proposed above were to be adopted (taking into account doctorate and post-doctorate years for the level of recruitment).

France, unlike most other countries, opted for the allocation of permanent positions in research on recruitment a long time ago. For many young people, this is undoubtedly the strong point of the attractiveness of careers in research in France and should, therefore, be conserved. It will offer numerous opportunities in the years to come, if the posts vacated by those retiring (estimated at more than 15,000 for the next five years) are effectively replaced. However, the Académie believes that, alongside the permanent positions offered in competitions each year, it would be reasonable to create very well remunerated fixed-term

positions (3 to 5 years) with social and debt protection, for the numerous French and foreign researchers who wish to carry out high-level research for a limited period, but do not envisage making a career for life in a French university or research organisation.

***- Recruitment of postdocs***

Henceforth, postdocs will play a vital role in research laboratories worldwide in a job market which has become global. The case of French postdocs, referred to earlier, merits special consideration regarding the entry to careers in research (both public and private), and its various forms. As far as foreign postdocs in France are concerned, the present system has major inadequacies relating not only to social status, but also to the duration of contracts, the level of remuneration, and the flexibility and responsiveness in recruitment, which explains the present excessively low number of high-level foreign postdocs in French laboratories of all levels. In particular, the recruitment of these foreign postdocs should be made much more flexible and responsive. Such recruitment should be provided for and decided upon at any time of year by laboratories which have received the corresponding financing. The present committees which allocate postdoctoral awards operate in an inadequate manner and lack the responsiveness needed to be internationally competitive. In addition, the remuneration of these postdocs should be as attractive as that available in competing countries. This would be greatly facilitated if one continued not to incorporate social security contributions for pensions and unemployment into this remuneration, while taking precautions to reinstate the corresponding annuities for the minority of post-docs who settle in France when they become established in a higher grade. Finally, assistance towards accommodation of the type described earlier for young researchers would be a highly attractive factor for foreign postdocs.

This question of post-doctoral researchers in our French research system is crucial and should be comprehensively reviewed in order to provide France with the necessary competitiveness. The Académie is currently drawing up a report on this question, to which reference should be made (Report of the Science and Society Committee on postdocs).

***- Creation of chairs for high-level foreign researchers***

The Académie proposes extending the principle of certain chairs already dedicated to this purpose. In particular, complete freedom would have to be given, by special authorisation, for salaries to be fixed at competitive levels, possibly via open-ended private-law contracts, and to permit a catching-up on retirement annuities if necessary. The autonomy of the universities and the foundations for cooperation should facilitate the implementation of these measures.

***- Administrative simplification***

Teacher-researchers and researchers are confronted with an excessively heavy, complicated and inefficient administrative system: multiple front offices, inadequate command and management models, frequent difficulty in the application of credits, particularly when they come from several sources, which may lead to significant delays. In addition, the level of administrative supervision of teams and laboratories has deteriorated to the point of reaching an alarming level. Here too, solutions may be accessible from now on *via* the increased autonomy of the universities (see LRU law) and the possibility of creating foundations for scientific cooperation like those put in place for the RTRA (*Réseau Thématique de Recherche Avancée*, thematic network for advanced research) and the RTRS (*Réseau Thématique de Recherche et de Soins*, thematic network for research and care).

Interesting measures have been proposed by the "d'Aubert Commission", but it seemed to the Académie reflection group that one should go considerably further in the administrative simplification, in particular by putting in place true *a posteriori* controls which are far from being a reality in France.

Moreover, care will have to be taken to restore the balance between the administrative support for the laboratories and the central administrations, including at the level of incentive payments.

### **3 - RECOGNITION OF DOCTORAL THESES AT THEIR TRUE VALUE**

Most French research schools are currently making a major effort to improve quality in order to widen the training of their doctors and their broad skills profile, beyond the academic excellence attested to by the doctorate. This quality, which is verified and indispensable in recruitment to the public bodies, may also qualify the doctors to work in private enterprises. The latter, including both major groups and SME, still recruit too few doctors in France, unlike in other countries. France's own schools of engineering still do not accord the thesis its rightful place in the training of their students. The PRES (*Pôles de Recherche et d'Enseignement Supérieur*) may be the place for an urgent and vital change in the training of this country's scientific elite. Moreover, engineers without a thesis, in multinational teams, will probably be decreasingly considered *a priori* as potential leaders.

The inadequate recognition of the value of the doctoral thesis in the job market means that doctoral students' prospects of breaking in to French private enterprise are far too weak, which dissuades a number of the best students from committing themselves to those sectors.

Urgent work is thus required to ensure the recognition of the doctoral thesis in collective agreements, in the same way that the President of the Republic committed himself to this in his campaign, and to provide an example in the higher echelons of the civil service by promoting the entry of holders of a doctorate to major public entities.

#### **4 – PROGRESSIVE COMING TOGETHER OF THE CAREERS OF RESEARCHERS AND TEACHER-RESEARCHERS**

The teaching services of Readers, which have grown by 50% since 1984, are not very compatible with high-level research and the attractiveness of university careers is seriously affected by this. A reduction of these services, and an increase in systems such as the IUF or tours of duty lasting several years in bodies open to the most original research projects, would make it possible to return to a situation which is much more favourable for research as far as teacher-researchers are concerned.

Three proposals can now be made:

1. A major lightening of teaching loads (at least one quarter to one third) with redefinition of what recognised teaching activities represent in a world in which methods are rapidly becoming more modern and in which pure researchers are teaching less and less. This lightening should be even greater for newly appointed Readers. The reduction of their duties to one third of the current level of service over their first three years was recommended ten years ago, but the recommendation has not yet been put into effect. .

2. Broadening of the *Institut Universitaire de France*: the IUF is seen as a model by everyone. It makes it possible to reduce the teaching duties of the best teacher-researchers by a substantial percentage. It is regrettable that the initial measure, which involved assigning a fresh post to a university from which a member had been promoted to the IUF, has been abandoned. The Académie proposes a very significant increase (at least a tripling) in the number of positions created at the IUF, above all for juniors.

3. Creation of long-duration detachments (several years) to the EPST (*Établissement public à caractère Scientifique et Technologique*) research organisation, for young teacher-researchers: this idea, which comes from CNRS, has the advantage that it provides the possibility of a complete, but not definitive immersion in research for the best young teacher-researchers, duly evaluated. As at the IUF, these detachments should undoubtedly be associated with a significant but temporary decrease in teaching services. Such periods could be offered several times in the career, to those teacher-researchers who present researched judged, according to an appropriate evaluation mechanism, to be particularly remarkable.

#### ***HIGH-PRIORITY MEASURES TO BE IMPLEMENTED FOR ITA, ITRF AND ASU PERSONNEL***

The Académie is very conscious that competitive research in this country rests largely on the quality of the engineers, technical experts and administrators who work in our establishments. In parallel with the improvements it is proposing for teacher-researchers and researchers, it is recommending several measures, some of which could be implemented rapidly, which would increase the attractiveness of these professions.

- Faster career development for staff whose professional contribution and contribution to research, or to its administration, are outstanding. These people, recognised by the Director of the Laboratories or the Administration, should be able to benefit from rapid advancement through the reduction or elimination of obligatory transition times. On the other hand, it seems crucial to increase the number of possibilities for advancement. As we have recommended for researchers, the evaluation of the quality of work should involve an opinion external to the research Laboratory or the Administration concerned. In this case, that might be a college similar in its principle to one which collates proposals for promotion at the regional level.

- A more dynamic system of incentives should allow the Directors or, if proposed by the Director, the authorities of the Establishment, to recognise the quality, in all its forms, of the contribution of employees to the common effort. As for researchers and teacher-researchers, we recommend that an external entity should be called upon to validate this contribution. We also recommend that the laboratories should be able to reserve a reasonable proportion of their external resources (with the exception of recurring support) for the improvement of the incentives for the most meritorious.

- To complement these two points, we recommend the development of staff mobility between the universities and the research bodies: this mobility may be both functional and geographical and should be accompanied by promotions. It would make it possible to strengthen the motivation of staff and at the same time provide increased support to the best laboratories. As for teacher-researchers and researchers, we propose assistance on installation, in particular in the major cities.

## IN CONCLUSION,

The Académie believes that it is vital for the future of French research that the attractiveness of careers should be significantly and very rapidly improved. One particularly important measure will be the taking into account of doctoral and post-doctoral years at the time of recruitment for all teacher-researcher and researcher personnel. Another series of high-priority measures relates to the career development and the allocation of important incentives to the most meritorious people, for researchers, teacher-researchers, engineers, technical experts and administrative personnel simultaneously. This point is essential and will make it possible to raise the remuneration of certain personnel to the level of those in competing countries. Such a measure will demand an irreproachable evaluation of individual performances. The Académie is conscious that, taken together, all the measures proposed will have a high cost and will require a true political will at the height of the stake represented by this country's capabilities in research, innovation and higher education. The report does not limit itself to remuneration, but also proposes improvements to the research environment which could be introduced rapidly and at a low cost.

Finally, there should be a commitment to a broader reflection to analyse the reasons for a partial disaffection of our society, or a certain disenchantment with the sciences and their progress. Scientists must contribute to changing this situation, which is not restricted to this country, and the Académie is ready to commit itself in this direction. .

July, 9, 2008

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ANR : *Agence nationale de la recherche*  
ASU : *Administration scolaire et universitaire*  
CNRS : *Centre national de la recherche scientifique*  
CPU : *Conférence des Présidents d'Université*  
EPST : *Établissement public à caractère scientifique et technologique*  
Inserm : *Institut national de la santé et de la recherche médicale*  
ITA : *Ingénieur - Technicien - Administratif*  
ITRF : *Ingénieur, technicien- recherche et Formation*  
IUF : *Institut universitaire de France*  
LRU : *Loi relative aux libertés et responsabilités des universités*  
PEDR : *Prime d'encadrement doctoral et de recherche*  
PRES : *Pôle de recherche et d'enseignement supérieur*  
RTRA : *Réseau thématique de recherche avancée*  
RTRS : *Réseau thématique de recherche et de soins*