



ACADEMY OF FINLAND  
ANNUAL REPORT 2002

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IN THE BEST INTERESTS OF  
SCIENCE AND RESEARCH

RAPPORT ANNUEL 2002  
DE L'ACADÉMIE DE FINLANDE  
POUR LE MEILLEUR DE LA SCIENCE

### *Academy of Finland in brief*

The Academy of Finland is an expert organisation on research funding, dedicated to promoting high-quality research by means of long-term funding, science-policy expertise and work to strengthen the position of science and research.

The Academy's development efforts are geared to improving the career opportunities of professional researchers, creating high-quality research environments and taking advantage of international opportunities in all areas of research, research funding and science policy. The Academy has different types of funding instruments for different purposes.

The Academy and its four Research Councils cover all scientific disciplines. The Academy's annual research funding amounts to app. EUR 185 million, which represents 13 per cent of total R&D spending by the Finnish government. Each year Academy-funded projects account for some 3,000 researcher-years at universities and research institutes.

The basic research funded by the Academy of Finland produces new information as well as a growing pool of internationally competitive experts. The Academy operates within the administrative sector of the Ministry of Education.

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### *The many dimensions of research*

Multidisciplinarity, interdisciplinarity and transdisciplinarity are among the Academy's main policy lines, as set out in its research programme strategy published in 2002. Multidisciplinarity, interdisciplinarity and transdisciplinarity represent a major challenge for the process of reviewing research applications. Research programmes jointly administered by the Academy's Research Councils provide opportunities for crossing disciplinary boundaries.

Multidisciplinarity means that a research problem is examined from the perspectives of several different disciplines at the same time. However, there is only little direct interaction between the disciplines involved.

Interdisciplinarity implies deeper integration, with researchers making use of the concepts, methods and perspectives of other disciplines. There is systematic interaction between the researchers and disciplines involved.

Transdisciplinarity, then, means an essentially new, shared theoretical frame of reference and conceptual unity. At its very best, it can lead to the development of a whole new discipline. Another definition of transdisciplinarity says that end-users of the research results are involved in the research process from beginning to end.

On the pages of this Annual Report, a few research scientists describe the many dimensions of their research work.



ACADEMY OF FINLAND



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## IN BETWEEN DISCIPLINES

Complex though the words may seem, the idea behind multidisciplinary and interdisciplinary collaboration is simple enough: if one discipline does not have the resources to unravel a given set of problems, it makes sense for research scientists in different disciplines to join forces and work on those problems together.

The Academy of Finland covers all the major disciplines. Our four Research Councils each have responsibility for a number of disciplines and fields of research. Each of these have their own chairs and academic structures in universities and research institutes, nationally as well as internationally. Even in a conservative estimate there are at least as many fields of research as there are Member States in the United Nations. It takes a mathematician to figure out how many potential interdisciplinary interfaces that amounts to.

The organisation of science is not carved in stone, nor do the boundaries between disciplines and fields of research prohibit borrowing across those boundaries or the use of shared methods. Many fields of research are in themselves crossroads for different disciplines. At the same time, two opposite trends in development are at work. On the one hand, the field of science is becoming increasingly specialised and fragmented. On the other hand, new problems are emerging that require a collective input from research scientists working in an ever greater number of disciplines.

One of the most fundamental questions of science policy has always been that of research collaboration, whether in the border zones between disciplines (multidisciplinarity), across disciplinary boundaries (interdisciplinarity) or simultaneously within several different disciplines, sometimes even creating new disciplines (transdisciplinarity). It is no coincidence that the concepts of interfaces, networking and mobility are so prominent in the modern discourse of science policy. Crossing boundaries has become imperative to the search for new information.

At the same time as disciplinary spaces have become more dense, they have also developed a need to share and expand their space with others. This raises new challenges and opens up new opportunities. The Academy's Research Councils provide a unique platform on which to build up and to monitor the progress of multidisciplinary and interdisciplinary research cooperation.

Most of the Academy's funding instruments involve collective efforts across disciplinary boundaries towards common goals. A good example is provided by research programmes.

As well as being more firmly grounded in multidisciplinary and interdisciplinary approaches, research programmes of the future are set to grow in size. Already the design and implementation is a joint effort involving the research community, national funding bodies and end-users. The Academy also wants to see lay experts become involved in the preparation and planning stage.

The Academy has international partners in each new research programme it is launching. Indeed multidisciplinary and multinational programmes will be one of the key aspects of the European Research Area, giving added weight and significance to interdisciplinary cooperation.

Measures of practical support are crucially important to the success of multidisciplinary and interdisciplinary cooperation, providing as they do the potential for true growth and development. All funding provided by the Academy of Finland is based on the recognition that researchers are the best experts with respect to the methods that are needed in the quest for new information. Cooperation across disciplinary boundaries is one of these methods.

Reijo Vihko  
President

## ENTRE LES SCIENCES

L'Académie de Finlande recouvre toutes les disciplines scientifiques. Chacun des quatre comités scientifiques recouvre de nombreuses branches de la recherche et de la science. Chacun a sa propre chaire et ses propres structures académiques dans les universités, les établissements de recherche, tant au niveau national qu'international. Même selon des estimations prudentes, il existe au niveau scientifique national et global au moins autant de disciplines scientifiques qu'il y a d'États dans l'Organisation des Nations Unies. Il faudrait un mathématicien pour calculer le nombre d'interfaces potentielles ainsi créées entre les disciplines scientifiques.

Le mode d'organisation de la science n'est pas immuable et les frontières entre des domaines scientifiques ne signifient pas qu'une discipline scientifique ne peut pas faire d'emprunts à d'autres ou n'a pas des méthodes communes. De nombreux domaines scientifiques sont déjà en eux-mêmes les carrefours de différentes disciplines. Il existe dans le même temps deux orientations de développement opposées. Le domaine scientifique a tendance à se spécialiser et à se diviser en domaines toujours plus restreints et plus denses. D'un autre côté, on découvre de nouvelles problématiques, qui exigent une collaboration entre les chercheurs de plusieurs domaines scientifiques afin de bien pouvoir appréhender les tenants et les aboutissants.

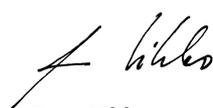
Depuis longtemps, une collaboration entre les cadres disciplinaires (pluridisciplinarité), au-delà des relations entre les sciences (interdisciplinarité) ou une collaboration parallèle dans le domaine de plusieurs sciences, créant même de nouvelles disciplines (transdisciplinarité) font partie des questions de base de la politique scientifique. Ce n'est pas un hasard si les interfaces, la mise en réseau et la mobilité font maintenant partie des nouveaux concepts les plus populaires dans le domaine de la politique scientifique. Dépasser les frontières établies est devenu indispensable et même une qualité dans la recherche de nouvelles connaissances.

Alors que les créneaux scientifiques sont de plus en plus denses, ils ont, dans le même temps, besoin de partager et d'étendre leur espace avec d'autres. Il est clair que ce phénomène fait émerger aussi bien de nouveaux défis que de nouvelles possibilités. En fait, les comités scientifiques de l'Académie de Finlande sont des terrains, des pépinières et des observatoires uniques pour une collaboration pluridisciplinaire et interdisciplinaire.

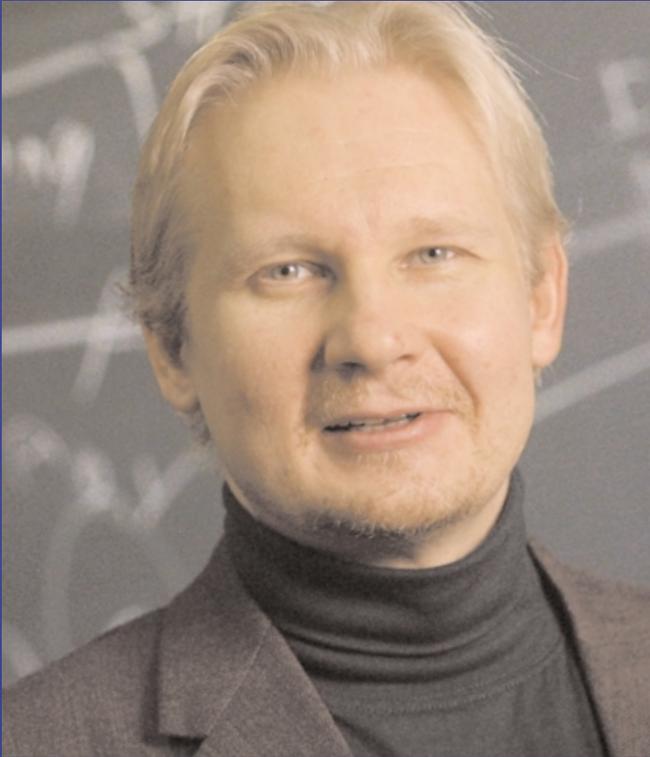
Nombre des principaux modes de financement de l'Académie de Finlande sont destinés en grande partie à couvrir les efforts des scientifiques travaillant en commun pour atteindre le but fixé. Parmi les meilleures illustrations de ce phénomène figurent peut-être les programmes de recherche.

Il apparaît déjà que les programmes de recherche de l'avenir seront non seulement pluridisciplinaires et interdisciplinaires, mais également des globalités toujours plus importantes. Outre les chercheurs, plusieurs acteurs nationaux participant au financement, ainsi que d'autres qui bénéficieront de la recherche, collaborent déjà à leur mise en place et à leur réalisation. Pendant la phase de conception des programmes, l'Académie de Finlande souhaite également bénéficier des compétences et des visions de spécialistes externes.

La pluridisciplinarité et la collaboration entre les disciplines scientifiques exigent du travail et des activités concrètes pour se réaliser. Cela ne diminue en rien les possibilités de croître et de se développer encore plus de certains domaines scientifiques isolés. Tous les modes de financement de l'Académie sont basés sur l'idée que les chercheurs sont en mesure de décider par eux-mêmes des meilleurs moyens permettant d'obtenir de nouvelles connaissances. La collaboration au-delà des limites des disciplines scientifiques est un de ces moyens.



Reijo Vihko  
Directeur général



## MULTIDISCIPLINARY SOLUTIONS TO THE INFORMATION FLOW

Researchers at the University of Jyväskylä Laboratory of Data Analysis are working to develop new solutions that will help business companies cut through the growing information overload. "The Academy of Finland is providing substantial support to new basic research that does not yet have immediate application at industry level", says Head of the Laboratory, Dr. Pasi Koikkalainen.

The work that is done at the Laboratory is a multidisciplinary exercise. "Our research combines statistics and computer science in a novel way. On the applications side multidisciplinary cooperation is even more important. Our methods have already been adopted in educational sciences, physics, biology, engineering sciences, forestry and epidemiology."

Opened in January 2002, the Laboratory is concerned to analyse and explore all kinds

of real world information. "Our methods help to establish what is relevant in information and what is not. In a sense it's an exercise in the clarification of knowledge", Dr. Koikkalainen explains.

In the future, the Laboratory hopes it will be able to concentrate entirely on new research and training and leave the job of commercialising and marketing the methods developed by the Laboratory to separate applications companies.

"This is a young field of research and the people who work with us are also young. The Academy's research programmes have recognised the needs of both. The decision to grant us access to the ComMIT Graduate School provided a major boost to our operation and opened up an important avenue for our postgraduate students", Dr. Koikkalainen adds.

## FINNISH RESEARCH AT THE INTERNATIONAL FOREFRONT

European countries are investing heavily in research and product development with a view to promoting the development of the information society and to strengthening their international competitiveness, sustainable growth, social cohesion and employment conditions. In 2002, the European Union launched the Sixth Framework Programme for Research, earmarking EUR 17.5 billion for the purpose in 2003–2006.

Over the five-year period from 1995 to 2000, the growth of research investment in Finland was among the fastest in the EU area. Figures compiled by the European Commission show that Finland was at or near the top of the list of best performers in terms of VC funding for start-up firms, scientific publishing, the patenting of new innovations, the investment of business profits into R&D, and the proportion of research scientists, postgraduate researchers and women researchers. Finland has in place a highly efficient and competitive innovation system.

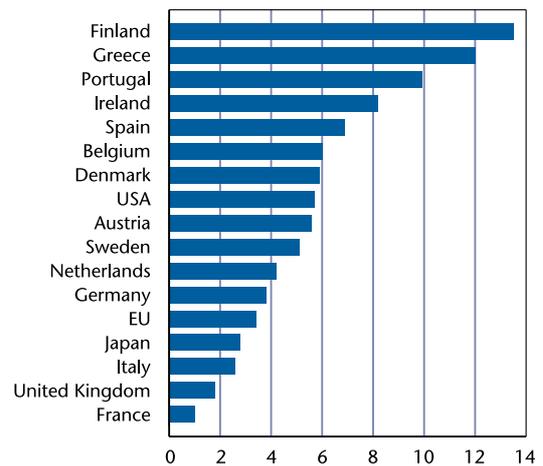
In 2001, Finland accounted for 0.7 per cent of the OECD countries' combined R&D investment. Finland's R&D spending as a proportion of GDP was the second highest in the OECD, standing at 3.4 per cent (EUR 4.6 billion). Estimates for 2002 put the figure at 3.5 per cent.

The government allocated EUR 1.4 billion to research and development in 2002, an increase of around EUR 48 million on 2001. Government research expenditure as a proportion of public spending, excluding central government debt servicing, stood at 4.5 per cent. Research expenditure showed a nominal increase of 3.5 per cent on the figure for 2001. In real terms there was hardly any growth, marking the end of a sustained trend since the early 1990s.

The biggest spending increase in the state budget for 2002 was recorded for the Ministry of Education: the figure was up by EUR 27.5 million. By contrast the Academy of Finland, which operates under the Ministry of Education, saw its funding decrease from EUR 187.1 million to EUR 184.9 million.

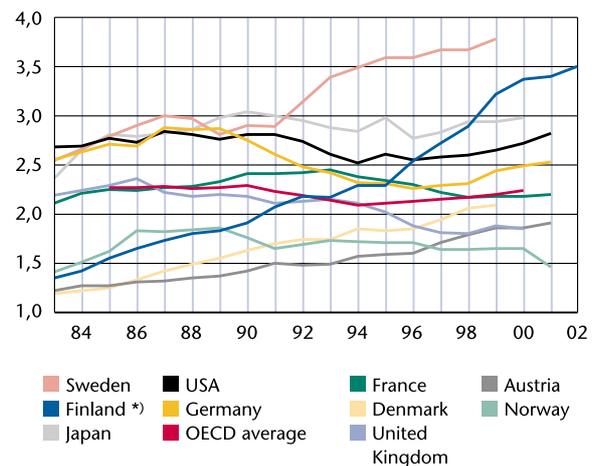
In 2002 core funding for universities and research institutes showed an increase, whereas figures were down

R&D investment – average annual real growth (%) \*)



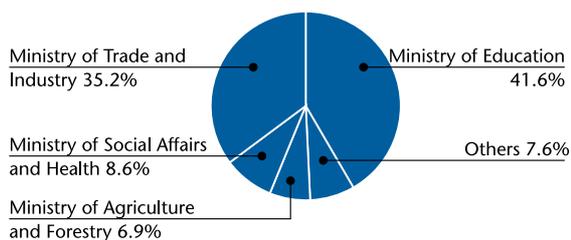
Source: European Commission, 2002  
\*) 1995 to the latest available year

R&D investment in selected OECD countries (R&D spending as % of GDP)



Source: OECD, Main Science and Technology Indicators 2002  
\*) Estimation, Statistics Finland

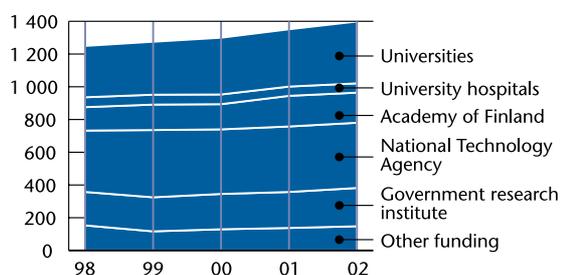
### Breakdown of government R&D spending by administrative sector in 2002



### Government R&D spending by distributing organisation in 2001 and 2002

Organisation	2001 mill. €	2002 mill. €	Change mill. €	Change nom. %	Change real. %
Universities	349.8	377.6	27.8	7.9	4.6
Academy of Finland	187.1	184.9	-2.2	-1.2	-2.8
National Technology Agency	400.1	398.5	-1.6	-0.4	-3.5
Government research institutes	219.8	233.8	14.0	6.4	3.1
University hospitals	56.7	56.7	0.0	0.0	-3.1
Other funding	137.7	148.1	10.4	7.6	4.2
<b>Total</b>	<b>1 351.2</b>	<b>1 392.1</b>	<b>40.9</b>	<b>3.0</b>	<b>1.4</b>

### Government R&D spending by distributing organisation in 1998–2002, current prices, EUR million



for non-earmarked funding awarded on competitive basis through the Academy of Finland and the National Technology Agency. The changes were not significant, but represented a deviation from the trends of earlier years.

In 2002 the Academy of Finland accounted for 13 per cent of government research spending, compared to 14 per cent one year previously.

## SEPARATE STRATEGY FOR INTERNATIONAL COOPERATION

In 2002 the Academy's Board adopted a separate strategy for its international operation. The Academy of Finland has dynamic national characteristics and hopes to form an integral part of the international science system. The Academy's aim is to consolidate its status as an active and influential force in European science policy, an established global player and an attractive partner in cooperation. A further goal is to make sure Finnish researchers are well prepared for international work and for promoting science internationally.

During the past year public debate on science policy, both at home and internationally, was dominated by the European project of drawing upon knowledge and knowhow to make Europe the world's leading economic area by 2010. With this objective in mind, work is now under way to create a consistent and uniform European research policy as well as a European research and innovation area that will promote economic growth and social development.

During the reporting period the Academy contributed actively to the debate on the internationalisation of national research systems, international cooperation in research and research funding, and on the new challenges faced in research. In several contexts Finland was commended for its exemplary commitment and the practical steps it has taken towards the building of the European Research Area.

Along with Sweden, Finland is the only country in Europe that has exceeded the spending targets set by the Barcelona European Council in March 2002 for research, development and innovation: the requirement is that by 2010, Member States should increase their spending to three per cent of GDP. The Academy has for its part sought to find concrete ways and avenues of collaboration that could help to promote the development of the ERA and European science policy and at once to strengthen

national research.

The question of increasing European funding for basic research emerged as a key issue in the debate on the ERA. During its Presidency Denmark hosted in October 2002 a conference under the title, "Do we need a European Research Council (ERC)?" The Academy's President took part in the conference as an invited panellist. In his capacity as member of the European Science Foundation Governing Council, the President also took part in the discussions waged within the Foundation about the ERA and the blueprints for a European Science Council (ERC).

The Academy's President is a member of the European Research Advisory Board (EURAB), which advises the European Commission in matters concerning science and technology policy. In 2002 the President chaired the "ERA and Enlargement" working group, which prepared EURAB's recommendations to the Commission regarding the impacts of EU enlargement upon the implementation of the ERA and the development of science and technology policy in the candidate countries.

The EU's Sixth Framework Programme for Research is an important tool in the implementation of the ERA. Not only will it support research projects in priority areas, but also other forms of national cooperation that have important benefits to science and research. In Finland most of the national responsibilities within the Sixth Framework Programme are shouldered by the Academy and the National Technology Agency. These responsibilities include supporting the preparation of project proposals, communication and advice, and the promotion of inter-

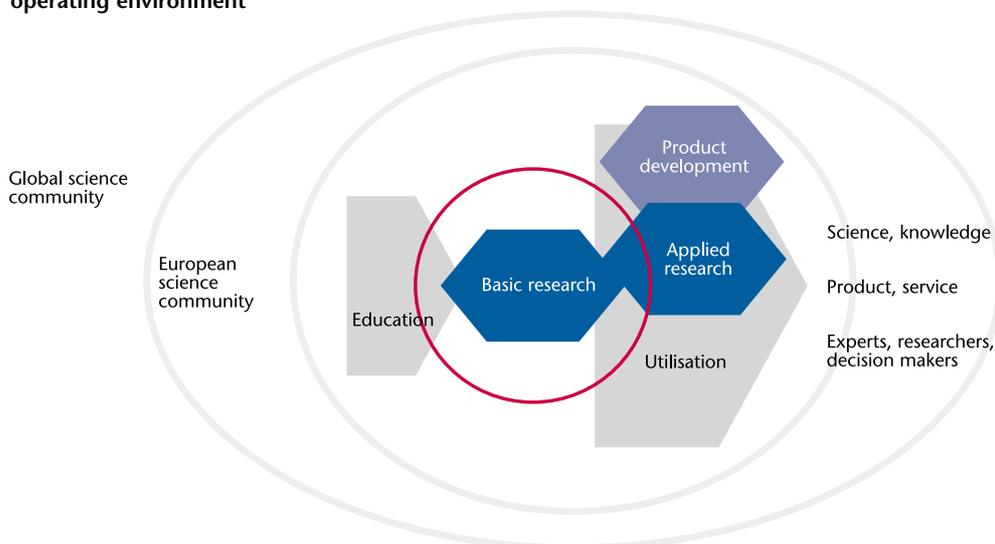
national networking. The programme involves 17 themes or activities; the Academy has primary responsibility for eight. Furthermore, the Academy of Finland and the National Technology Agency Tekes are jointly responsible for the programme Coordination of research activities "Strengthening the Foundations of ERA". In the Fifth EU Framework Programme that ended in 2002, the Academy was responsible for the national coordination of two thematic and two horizontal programmes.

The Academy is closely involved in several EU projects, including the Training Network for National Contact Points (TRAINNET), the Coordination of Genomes Research Across Europe (COGENE), the European and Developing Countries Clinical Trials Programme (EDCTP) and the Internet press centre for European science and arts (AlphaGalileo).

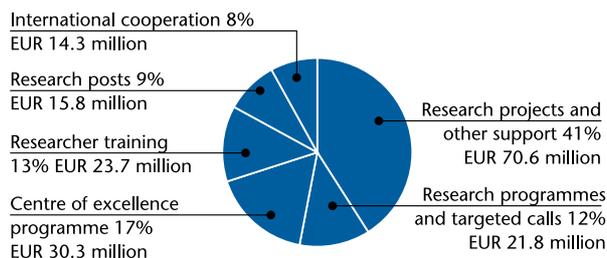
European research funding bodies have also innovated new forms of collaboration. The President represents the Academy of Finland at the European Union Research Organisations Heads of Research Councils (EUROHORCs), and in 2002 he acted as Chairman of this body. The Academy decided to contribute to the European Young Investigators Award (EURYI) in 2004–2008. Founded by EUROHORCs and administered by the ESF, this scheme is designed to create the first broadly-based, centrally administered European research funding pool.

The Academy's cooperation with stakeholders in different countries and regions has increased several times over. In 2002, the Academy had bilateral international agreements with 25 countries and 37 foreign organisa-

### The Academy's role in the national and international operating environment

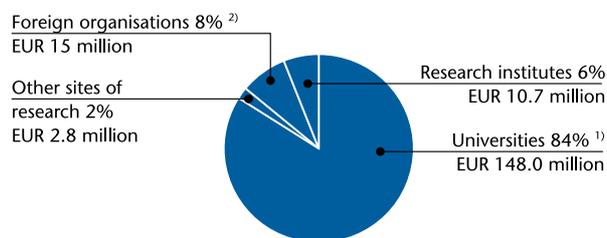


**Academy of Finland research funding decisions by type of funding in 2002, total EUR 176.5 million <sup>1)</sup>**



<sup>1)</sup> includes membership fees to international research organisations

**Breakdown of Academy of Finland research funding by site of research in 2002, total EUR 176.5 million**



<sup>1)</sup> includes university hospitals

<sup>2)</sup> includes membership fees to international research organisations

tions. The most common types of collaboration specified in the agreements were research project cooperation (23 agreements), expert evaluations (16), researcher training courses (11), researcher mobility (27) and information exchange (24). Centre of excellence cooperation was started with China.

The Academy is committed to networking its research programmes with those run in other countries and to work closely with funding organisations in those countries. All Academy research programmes launched in 2002 involve international funding cooperation.

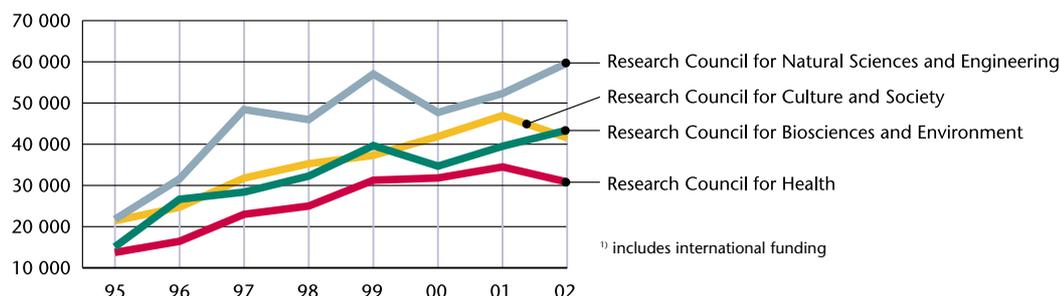
The Academy is an active member in Nordic research organisations, the European Science Foundation, the European Organization for Nuclear Research (CERN) and the European Molecular Biology Laboratory (EMBL). Through these avenues, it seeks to promote and facilitate the participation of researchers in building up international cooperation.

The Finnish science policy system and the concrete steps taken in the field of science and technology policy continue to attract much positive attention. In 2002, almost 280 foreign visitors were received at the Academy.

**RESEARCH FUNDING**

The Academy of Finland has various means of research funding at its disposal: these include project funding that is open for general application, research programmes, centre of excellence programmes, and posts for Academy Professor and Academy Research Fellow. Almost all research projects involve researcher training, periods of working abroad and international cooperation.

**Academy of Finland research funding by Research Councils in 1995–2002, thousand euros <sup>1)</sup>**



<sup>1)</sup> includes international funding

In 2002 the Academy of Finland spent EUR 176.5 million on supporting high-quality basic research, EUR 6.8 million less than in 2001.

There is intense competition for Academy research funding. All applications are reviewed by experts, and the final choice of projects to be funded will be based upon their statements. In 2002 the Academy received applications worth EUR 829.8 million. The total amount of research funding awarded was EUR 176.5 million, or 21 per cent of the value of all applications. The number of applications received was 4,916, of which 2,541 were successful.

Research projects accounted for 39 per cent of all funding granted by the Academy of Finland in 2002. Research programmes and targeted calls accounted for 12 per cent, centre of excellence programmes 17 per cent, researcher training 13 per cent, research posts 9 per cent and international cooperation 8 per cent.

In 2002, 5,300 persons worked a total of 2,830 person-years with Academy research funding. More than four-fifths or 84 per cent of all Academy research funds were awarded to researchers working in universities or university hospitals.

## THE ACADEMY AIMS TO PROMOTE PROFESSIONAL CAREERS IN RESEARCH

The Academy's long-term science policy aim is to advance the career opportunities of professional researchers. It devotes special attention to promoting the careers of women and young researchers, to creating high-quality research environments and to taking advantage of opportunities

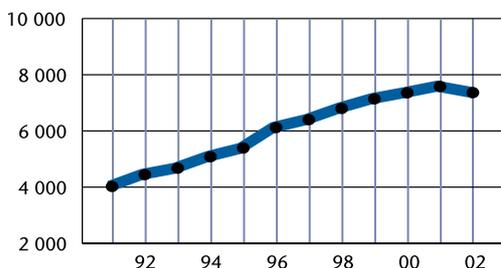
for global cooperation in research, research funding and science policy.

Most of the Academy's support for researcher training is provided in the form of project funding. In addition, the Academy's Research Councils award annual grants to support graduate schools that are run by the Ministry of Education. At year-end 2002 there were 108 graduate schools in Finland, with 1,426 doctoral students pursuing their studies with Ministry of Education funding. In addition, it is estimated that some 2,500 students are working towards their doctorate with funding from other sources.

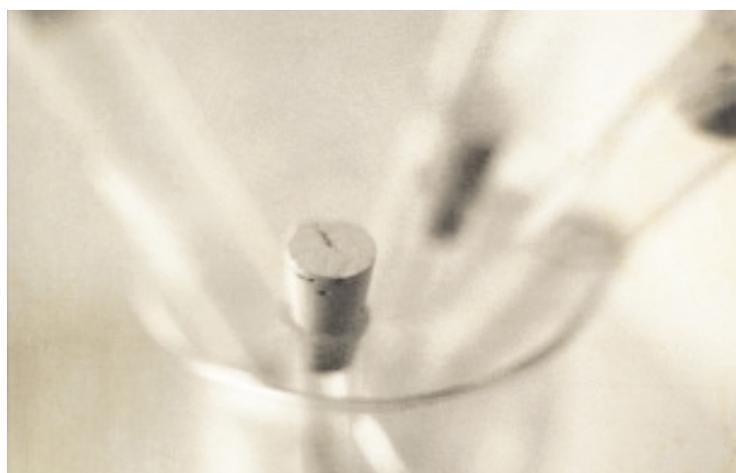
The Academy's aim is to ensure that one in five of those who complete the doctorate have the opportunity to gain the qualifications of professional researcher through tenures in research either in Academy or university positions. Since the reorganisation of the graduate school system, the main accent in the Academy's development efforts has shifted to supporting postdoctoral research careers, both through research posts and research appropriations. In 2002 the Academy's Research Councils awarded 190 two-year grants for newly-graduated PhDs starting out on professional careers in research (postdoctoral researchers). At year-end 2002 there were 230 posts for Academy Research Fellows and 38 posts for Academy Professors.

The Academy of Finland has consciously sought to promote women's careers in research. Over the past five years the proportion of women in Academy Research Fellow posts and postdoctoral researcher positions have increased: on average the proportion of women among those appointed to the position of Academy Research Fellow has been five percentage points higher than their proportion among the applicants to these posts. In 2002,

International publications by Finnish researchers in 1992–2002



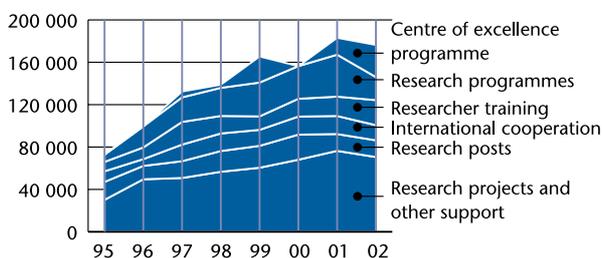
Source: Web of Science / Institute for Scientific Information



## European Research Area (ERA)



## Academy of Finland research funding decisions by type of funding in 1995–2002, thousand euros



### Science policy objectives of the research programmes funded by the Academy of Finland

- Developing research environments
- Coordinating scattered research capacities
- Promoting multidisciplinary, interdisciplinarity and where possible transdisciplinarity
- Developing national and international cooperation between researchers, funding bodies and end-users of research results
- Increasing the international visibility of Finnish research in a joint effort with researchers, research organisations and funding bodies
- Promoting researcher training and professional careers in research

close on one third or 29 per cent of all Academy Professors were women; among Academy Research Fellows the figure was 34 per cent, among postdoctoral researchers 51 per cent.

In 2002 the Academy continued to support the international mobility of researchers in many different ways. Most of this support was channelled in the form of general research funding. In addition, researchers working abroad have received grants for this purpose (EUR 2.4 million) as well as funding based on bilateral agreements (EUR 1.6 million).

Within the framework of agreements on bilateral researcher exchange, 201 Finnish researchers spent a total of 6,130 days working abroad in 2002, while 412 foreign researchers spent 14,763 days in Finland.

The Academy took an active part in planning the EU-coordinated Mobility Centre that will work to promote researcher mobility.

## GROWING INTERNATIONALISATION AND NETWORKING

The Board of the Academy of Finland adopted in 2002 a new research programme strategy for 2003–2007. The strategy gives special attention to the growing challenges of internationalisation and to the need to improve and develop cooperation within national and international research and technology programmes. Research programmes are important ways of strengthening new emerging fields of research, raising the quality standards of research and achieving an international standard of performance.

Four new research programmes (Baltic Sea, Life as Learning, Microbes and Man and Proactive Information Technology) and the targeted call Wood Wisdom II were launched in 2002. Together, they have a combined budget of EUR 21 million.

In November 2002 the Academy took the decision to start up seven new research programmes, earmarking EUR 41.3 million for the purpose. These new programmes are Russia, the Environmental, Societal and Health Effects of Genetically Modified Organisms, Social Capital and Networks of Trust, Systems Biology and Bioinformatics, Industrial Design, Health Services Research, and Future Electronics.

In 2002 the Academy had a total of 21 ongoing research programmes (see page 42). Seven research pro-

grammes ended; these were the programmes on Structural Biology, Global Change, Process Technology, Biodiversity, Electronic Materials and Microsystems, Ageing, and Media Culture.

The Academy stepped up its collaboration with other funding organisations. All in all the Academy had cooperation with 26 domestic and foreign research funding bodies in both the public and private sector.

Seven ministries were involved in the preparation and funding of Academy research programmes. In addition, funding was made available by three other public sector organisations. Five Finnish foundations and three other private sector funders contributed.

Funding was received from eight foreign funding bodies, six from Sweden, one from France and one from the United States. Six of the Academy's ongoing research programmes involve international funding cooperation. In 2002 there were six Academy research programmes that were sponsored by public or private sector funders from two countries.

The Academy of Finland had extensive cooperation with the National Technology Agency Tekes in the funding of research programmes, targeted calls and cluster programmes. During 2002 the Academy of Finland had 10 ongoing research programmes in which funding was received through the National Technology Agency. The Academy contributed to three Tekes programmes.

The Academy contributed with three research programmes and one targeted call to national cluster programmes in the forest cluster (Wood Wisdom), welfare cluster (Research Programme on Ageing) and environmental cluster (Sustainable Use of Natural Resources).

Five Finnish research projects were selected to take part in the first two EUROCORES research programmes administered by the European Science Foundation. Through these programmes, Finnish research in the humanities and social sciences is getting support worth about EUR 0.7 million.

The centre of excellence programme is one of the Academy's most important forms of research funding for promoting the development of creative research environments. All centres of excellence in research represent the cutting edge of their respective field. The national strategy for centres of excellence in research has been jointly developed with the National Technology Agency, which also contributes to the funding of centre of excellence programmes (see page 39).

In 2002, a total of 42 centres of excellence were fund-



ed through the national centre of excellence programme; 16 of these began work at the start of the year under review. The first three-year term of the 26 centres of excellence and seven core facilities organisations involved in the first centre of excellence programme from 2000–2005, ended in 2002. Following negotiations conducted with both the centres of excellence and the core facilities organisations, the decision was taken to spend EUR 30.341 million on supporting this programme in 2003–2005.

During its first three years the centre of excellence programme has achieved many of the targets that were specified at the outset. Both multidisciplinary research and researcher mobility have increased, and there is more synergy and cohesion between research teams. In many cases funding for centres of excellence has allowed them to engage in basic as well as high-risk research.

The Academy has promoted the international networking of centres of excellence by providing funding for the cooperation of four Finnish centres working in the natural and life sciences with high-quality groups funded by the Chinese National Natural Science Foundation. A total of EUR 0.7 million was allocated to this purpose for a three-year period.

The Joint Committee of the Nordic Natural Science Research Councils (NOS-N), the Nordic Council of Ministers and the Nordic Academy for Advanced Study (NorFA) together launched a Nordic Centres of Excellence Programme that is aimed at raising the quality standards and increasing the visibility of Nordic research and at testing the workability of this kind of arrangement in the context of Nordic research. A pilot study in the field of global change research will be carried out in 2003–2007.



The pilot programme will provide funding for three networks involving research teams from several Nordic countries as well as one research team that will provide the necessary equipment and infrastructure for other Nordic researchers. One of the centres of excellence supported will be coordinated by the director of a Finnish centre of excellence, two other centres that operate on a network basis involve Finnish research teams. Annual funding for the programme amounts to around EUR 1.6 million; the Academy's contribution is 189,000 euros. The programme secretariat is based at the Academy.

## **THE ACADEMY OF FINLAND: AN EXPERT IN SCIENCE AND RESEARCH**

The Academy of Finland owes its expertise to the shared input of its Board, Research Councils, other science experts and the Administrative Office. Its highest executive organ is the Board, which is responsible for the Academy's science policy line and the allocation of research appropriations to Research Councils. In addition, the Board decides on the appointment of Academy Professors, on new research programmes and centres of excellence in research.

2002 marked the second year in office for the Board and Research Councils, which are appointed by the Government for a three-year term. The Academy has four Research Councils: Biosciences and Environment, Culture and Society, Natural Sciences and Engineering, and Health. Each council has a Chair and ten members. The members of the Board and the Research Councils are listed on page 37.

The Research Councils decide on research funding within their respective fields and act as experts in science policy issues. The work of the Research Councils is described in closer detail on pages 17–31.

All funding decisions made by the Academy are based on scientific evaluations of the applicants and their research plans. In this process the Academy consults domestic and foreign experts in their respective fields.

Applications for research posts and appropriations are reviewed by panels of experts. This system has improved the quality of statements received and provides a solid foundation for decision-making by the Research Councils.

In 2002 the Academy consulted a total of 600 experts in the process of reviewing applications received; 236 of them were from outside Finland. Foreign experts accounted for 41 per cent of the panel members who reviewed the applications received in May for general research appropriations.

The Academy also evaluates the state and quality of Finnish scientific research and individual disciplines as well as the research programmes it supports. In 2002 the Academy published 12 evaluation reports on research programmes or other major projects; see the list of publications on page 42.

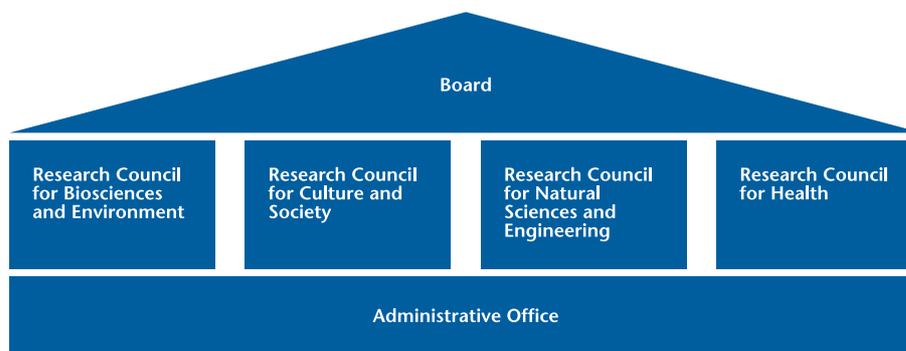
A novel aspect in the final evaluation of research programmes was the inclusion of self-assessments by project researchers. Self-assessments were incorporated in the evaluations of the Process Technology Research Programme and the Wood Wisdom Programme.

Since 1983 the Academy has launched and coordinated more than 20 evaluations of individual disciplines. In January 2002 it published the results of a joint evaluation that covered six different disciplines or fields of research. The overwhelming opinion is that these evaluations are necessary, and in general the scientific community takes a positive attitude to them.

During the autumn of 2002 the Academy's Research Councils exchanged views on how best to take advantage of the results of the discipline assessments as well as on how to select the disciplines for evaluation. The Academy's Administrative Office has begun work to prepare guidelines for the conduct of these evaluations.

During the year under review work was started on the third report on the state and quality of scientific research in Finland. Due for publication in 2003, the science policy report will focus on assessing the impacts of research in society as well as on human resources in research.

## Academy of Finland organisation in 2002



## ADMINISTRATION

The objectives for the Academy's operation and the resources made available to the Academy are decided on an annual basis in talks between the Academy of Finland and the Ministry of Education. The Academy's President makes the corresponding agreements on target outcomes with the Research Councils and the Administrative Office.

The Administrative Office has responsibility for the Academy's administration. It does all the necessary groundwork for official decision-making by the Board and Research Councils, and on the other hand executes and monitors their decisions.

The Administrative Office is headed by the Academy's President. The Executive Vice President (Research) is responsible for the Academy's science policy planning and the development of research funding. Administrative functions are the responsibility of the Executive Vice President (Administration).

The Administrative Office is organised into research units that correspond to the Research Councils and into Office Administration units; see page 40.

At year-end 2002 the Administrative Office had a permanent staff of 140, marking an increase of seven on the previous year. Over half (60%) of the staff had an academic degree. The proportion with a researcher training remained at around one-fifth (21%). Among Administrative Office staff 62 per cent were in expert and supervisory positions.

Women accounted for 74 per cent of Administrative Office personnel. The mean age of personnel was 44 years; for men 41, for women 45 years. This was slightly lower than the figure for 2001.

The Administrative Office's payroll costs (other than wages and salaries for research posts) totalled EUR 5.6 million.

The Academy's science policy library specialises in science studies as well as science and technology policy. At year-end 2002 the library's collections comprised some 26,000 titles. During the year under review, 730 titles were entered into the library's database. The number of electronic and printed magazines and bulletins stood at 270 titles. Subscriptions were taken out on 216 titles, the rest were received as donations. During the year library staff compiled for internal use a total of 15 summaries of magazine and newspaper articles dealing with questions of science policy or the Academy of Finland.

During 2002 the Academy organised the fourth annual science competition for senior secondary school students. The purpose of the competition is to inspire greater interest among schoolchildren in science and research. There were 133 entries from 30 different schools.

### Research post holders under Research Councils 31st December 2002

Research Councils	Academy Professors	Academy Research Fellows	Postdoctoral Researchers	Total
Research Council for Biosciences and Environment	8	51	2	61
Research Council for Culture and Society	11	62	2	75
Research Council for Natural Sciences and Engineering	11	66	3	80
Research Council for Health	8	51	3	62
<b>Total</b>	<b>38</b>	<b>230</b>	<b>10</b>	<b>278</b>



## INTERDISCIPLINARITY CALLS FOR A COMMON LANGUAGE

Biologist Eva Kisdi believes the biggest challenge in interdisciplinarity is to find a common language. In her own work she applies mathematical models to study adaptive dynamics and biological phenomena.

“Communication between biologists and mathematicians is easily distorted or lost. Biology relies often on verbal descriptions, and it may well be harder for readers to understand any mathematical formulas. On the other hand mathematicians working with biological models often have difficulty understanding the complexity of biological systems”, Eva Kisdi explains.

Adaptive dynamics is a new field of study. Its basic principles have been approached in a biological context, but Eva Kisdi and her colleagues are now aiming to establish for it a mathematical foundation. The subject requires close interaction among researchers in different fields.

Mathematics is not only a tool that can help resolve the problems of biology. The mathematical system created in this project can have interest value in and of itself, even without the interpretations that have to do

with biology. On the other hand, mathematical results often raise new questions that are directly related to biology.

The mathematical models developed by Eva Kisdi and the rest of the research team are used for purposes of shedding new light on ecology and evolutionary processes. “Research will produce evidence on why individuals in a certain species move from one population or location to another. Another area of application is the adaptation of individuals to the local environment.”

Based at the University of Turku Department of Mathematical Sciences, the research team is working as part of a consortium that is concerned with the stochastic adaptive dynamics of complex systems. The main focus of work is on the impacts of random phenomena and environmental interactions on the behaviour of complex systems. Several disciplines are represented: mathematics, physics, ecology, biomathematics, economics, scientific computation and computer science theory. The project is part of the Academy-funded Research Programme on Mathematical Methods and Modelling in the Sciences.

## INCREASING TRENDS OF INTERNATIONALISATION

*The Research Council for Biosciences and Environment promotes research into complex problems relating to the biosciences, the environment and natural resources. The bulk of Council funding goes to the biosciences, including ecology. Other fields that benefit from Council support include environmental research, geography, forest and agricultural sciences as well as food sciences.*

*Field of research:*

- *biochemistry*
- *microbiology*
- *genetics*
- *ecology, biosystematics and biophysiology*

- *forest sciences, agricultural sciences*
- *food sciences*
- *research into substances hazardous to the environment*
- *research relating to the state of the environment and to environmental protection*
- *geography and regional studies*
- *research relating to environmental policy, environmental economy and environmental law; and*
- *biotechnology, molecular biology, cell biology, biophysics and bioinformatics and economic and technological research related to environmental research*

During the year under review, the Research Council for Biosciences and Environment continued its efforts to develop research environments and research funding and to support high-quality research. This involves supporting teams composed of researchers at different stages of their careers. The aim is to give them the chance to address special research needs within their respective fields on a broad and long-term basis.

The Council supported the development of creative research environments by taking funding decisions that promote national and international networking and mobility among individual researchers as well as closer collaboration between universities, public administration, and business and industry.

The Council monitored the quality and social impacts of research within its fields by drafting sections for the forthcoming report on the state and quality of scientific research in Finland.

### RESEARCH PROGRAMMES

Multidisciplinary research programmes are the most important tool available to the Research Council for Bio-

sciences and Environment in promoting the goal of internationalisation. The Nordic dimension and Arctic issues are prominently represented in environmental research programmes. Two research programmes were started up during 2002: the Baltic Sea Research Programme (BIREME) and the Research Programme on Wood Material Science.

The Baltic Sea Research Programme involves 21 projects, three of which are funded from sources outside the Academy. Academy funding for the programme amounts to EUR 4.4 million. Funding has also been pledged by the Ministry of the Environment, the Ministry of Agriculture and Forestry and the Ministry of Transport and Communications. Among the issues addressed in these projects are eutrophication, fishes, winter ecology, environmental history and management, biological diversity and the environmental impacts of hazardous substances.

The Council worked on building up its relations of cooperation with research projects under way in other Baltic Rim countries and started preparations for a Baltic Sea ERA-NET application. A coordinator chaired a working group discussing the infrastructure strategy of European marine research. The Baltic Sea Research Programme is coordinated by the Research Unit for Biosciences and Environment.



2002 saw the start-up of a jointly funded Finnish-Swedish Research Programme on Wood Material Science 2003–2006. In Finland the programme is supported by the Academy, the Ministry of Agriculture and Forestry and the National Technology Agency; and in Sweden by the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning and the Swedish Agency for Innovation Systems. Funding has been made available to projects in which cooperation between Finnish and Swedish research teams is expected to generate scientific added value. The main focus of research is on the characteristics of wood raw material and on ways of improving those characteristics. The Academy is spending EUR 1.7 million to support the programme.

The Council has main responsibility for two ongoing Academy research programmes, namely the Research Programme on Biological Functions (Life 2000, 2000–2003) and the Research Programme on the Sustainable Use of Natural Resources (SUNARE, 2001–2004). Two programmes ended in 2002: the Finnish Biodiversity Research Programme (FIBRE) and the Finnish Global Change Research Programme (FIGARE).

The Academy contributed to the National Technology Agency's technology programme FINE Particles – Technology, Environment and Health through a targeted call. Of the Academy funded projects, the Research Council for Biosciences and Environment funded one.

The Council was charged with the responsibility to start preparations for a Research Programme on the Environmental, Societal and Health Effects of Genetically Modified Organisms. In November 2002 the Academy decided to set aside EUR 3.5 million in support of the

four-year programme (2003–2007). The programme will be jointly funded with various ministries, and steps will be taken to promote international networking.

The Council took part in implementing, monitoring and networking the national centre of excellence programme within the disciplines it hosts. The Council underlined the importance of postgraduate training in the best research environments and sought to ensure that its units had access to sufficient funding.

## INTERNATIONAL EXCHANGE AND EVALUATIONS

International contacts and cooperation are an integral part of all the fields of research hosted by the Research Council for Biosciences and Environment. The Council has sought to support international exchange by means of funding cooperation, the scientific review of applications, researcher mobility as well as by actively lobbying for science funding in Europe. All of this has been geared to improving the international visibility and competitiveness of Finnish research.

In the field of science funding and science policy, the Council has worked ever more closely with international science and funding bodies. In practice, cooperation assumes the form of joint funding, joint evaluations and programme networking. International exchange and cooperation has been an important element in the planning and preparation of new research programmes as well.

The tendency towards increasing internationalisation was seen both in the applications review process and in the final evaluations of research programmes. In order to make sure that all applications receive a fair and objective review, the Council relies primarily on foreign experts. Most applications are reviewed by panels of experts. In the biggest single category of applications processed by the Academy, i.e. those for research posts and research appropriations, 98 per cent of the members of Council panels in 2002 were foreign experts. In cases where statements were requested from individual experts, 79 per cent were from other countries. The same trend was seen in reviews of applications for research programmes and targeted calls.

International experts were also consulted in the final evaluation of research programmes administered by the Council. Some of these processes included a new feature of self-assessment.

The Council supported researcher mobility in various different ways. Grants were made available for purposes of researcher training abroad. Cooperation among individual researchers and research teams is crucially important to efforts aimed at strengthening the European Research Area. Other funding instruments were also used to support internationalisation and networking among researchers.

In 2002 the Council was closely involved in work surrounding the European Union's framework programmes for research. Preparations for the Sixth EU Framework Programme and its actions continued. The Research Unit for Biosciences and Environment has had primary responsibility for preparations in the priority theme of Global Change and Ecosystems and secondary responsibility for two thematic areas, viz. Genomics and Biotechnology for Health and Food Quality and Security. A prime concern has been to increase the prospects of Finnish researchers being able to take part in the framework programme.

The Council has worked to keep the research community informed about new funding opportunities made available through the framework programme and provided support for the filing of applications. Cooperation between national research programmes has been developed by taking advantage of the ERA-NET initiative. The Council supported the ESF by providing funding for 12 à la carte programmes and two standing committees (Polar Board and Marine Board).

One of the Council's new openings was to provide funding for two ESF EUROCORES programmes, in which European research cooperation is supported through joint funding arrangements, while in the case of à la carte programmes funding is provided solely for purposes of maintaining contact among national research teams. The two programmes concerned are EUROCLIMATE and the Science of Protein Production; preparations for the latter have been conducted closely with the Research Council for Health.

Through its participation in these programmes and its involvement in the Standing Committee for Life and Environmental Sciences, the Council hopes to be able to strengthen European research cooperation as well as the European Research Area.

The Council also contributed to Nordic cooperation, primarily through the Joint Committee of the Nordic Natural Science Research Councils (NOS-N). NOS-N prepared and launched the first Nordic Centre of Excellence Programme. The Council's secretary-general was involved in

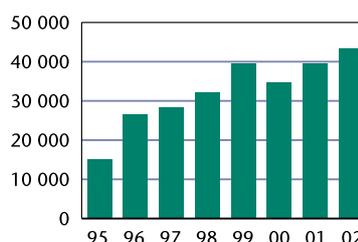
the work of the European Molecular Biology Laboratory (EMBL) and the European Molecular Biology Conference (EMBC).

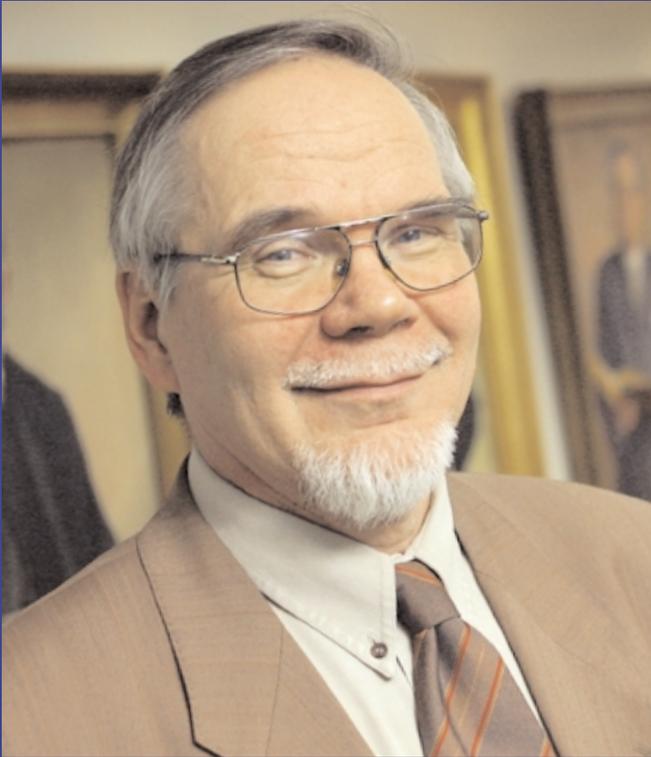
Cooperation was started with the National Science Foundation (NSF) surrounding Baltic Sea research and the Long Term Ecological Research Programme. Various events were arranged during a visit by NSF representatives, with researchers also taking part.

### Funding decisions in 2002

Type of funding	EUR	%
Research posts	4 336 620	10
Programme funding	14 620 160	34
Research project funding	17 169 498	39
Researcher training	5 657 540	13
International researcher exchange	366 605	1
Funding to foreign organisations	957 970	2
Other support	411 689	1
Funding decisions, total	43 520 082	100

### Funding decisions in 1995–2002 (1 000 euros)





## RESEARCHERS IN THE HUMANITIES WELL ACCUSTOMED TO MULTIDISCIPLINARY COOPERATION

The Centre of Excellence that works in the Department of Biblical Studies at the University of Helsinki and the Department of Exegetics at the Åbo Akademi University, is a genuinely multidisciplinary organisation. In their explorations of the history of Christianity, its growth as a Jewish movement and emergence as a separate religion, researchers draw upon the methods and perspectives of linguistics, history, literature, archaeology and the social sciences.

In charge of the Centre of Excellence and its research into the development of early Jewish and Christian ideology, Academy Professor Heikki Räisänen points out that researchers in the humanities are in fact well accustomed to this kind of multidisciplinary cooperation. What is new in this field is having no less than some 60 scholars working

together in a single Centre of Excellence. Professor Räisänen is keen to stress that in the humanities, benefits of scale do not follow automatically: within “reasonable limits”, though, larger units are bound to have synergy benefits.

Another indication of multidisciplinary is that all historical sources related to the birth of the Christian way of thinking are now treated in research on an equal basis. The New Testament no longer enjoys special status.

All this has contributed to a more nuanced and less certain image of the birth of Christianity and Judaism in Antiquity. “It has made people realise that things might have turned out very differently”, says Professor Räisänen.

## NEW OPENINGS TOWARDS THE SCIENCE AND RESEARCH COMMUNITY

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*The Research Council for Culture and Society supports research in the fields that fall under its jurisdiction. Research in the engineering sciences, medicine and the natural sciences can all benefit from applying the perspectives of the humanities and social sciences because new products and innovations always have cultural and social implications as well.*

*The key objectives of the Council are to support high-quality research; to promote researcher training and research careers; to advance the practical application of research results; to increase the national and international visibility and impacts of research; and to develop and improve its own operation and activities.*

**Field of research:**

- *philosophy*
- *theology*
- *history and archaeology*
- *cultures research*
- *aesthetic fields research*
- *philology and linguistics*
- *law*
- *psychology*
- *logopedics*
- *education*
- *social sciences*
- *economics*
- *political science*
- *communication and library science*

Most of the work of the Research Council for Culture and Society during the reporting period was taken up by review and evaluation and the preparation of initiatives for new multidisciplinary research programmes.

The Council intensified its contacts and exchange of information with the scientific community. During the reporting period it went to six universities to inform researchers about the Academy's funding instruments, application procedures and evaluation criteria. It also hosted a number of information meetings on international funding opportunities and on the new forms of funding available through the Sixth EU Framework Programme for Research.

Supporting young scholars who are aiming for a career in research has become one of the priority goals of national research policy. However, the ratio of doctorates to first degree qualifications obtained in the humanities and social sciences is on average lower than it is in other disciplines. In 2002 there were 36 Ministry of Education funded graduate schools in disciplines hosted by the Council. Within the humanities and social sciences it is not, however, possible to create a graduate school system

that covers all fields of research. Therefore the Council provides funding not only for graduate schools but also for doctoral training in high-quality research projects as well as for postgraduate studies in foreign countries. In particular, the Council supports Finnish students at the European University Institute in Florence, Italy, which is jointly administered by EU Member States.

Individual research positions have a special significance in the fields of research hosted by the Council. Indeed there is intense competition for the appropriations for Postdoctoral Researcher and the posts for Academy Research Fellow. For instance, in 2002 no more than 10 per cent of all applicants for the vacant posts of Academy Research Fellow were successful. The Council has no quota system for research posts or for research projects in different fields of research, but the breakdown by disciplines depends upon the scientific merits of applications received.

## REVIEWS AND EVALUATIONS

The Council relies increasingly on panels instead of individual experts for purposes of reviewing the applications it receives for research projects and research posts. The share of international experts is increasing, and it is therefore now required that all applications shall be filed in the English language.

Two very interesting and noteworthy discipline assessments were completed during 2002 in fields of research hosted by the Council.

The evaluation of research on foreign and security policy had its background in the changes that swept this field during the 1990s as well as in the special funding allocated by the Ministry of Education to research in the field of security policy. The assessment was carried out by an international panel that based its work upon self-evaluation materials and the results of site visits. In its conclusions the group says that research in this field needs to take a long-term view to developing its international cooperation. It should also invest more effort in examining broader and more theoretical problems instead of local and current issues.

The evaluation of women's studies in Finland was the first of its kind. This assessment was carried out by a panel of international experts who visited all women's studies units in the country, reviewed their research reports and self-evaluations and conducted a comparative analysis with women's studies in other Scandinavian countries. The panel concluded that the standard of research in Finland is very high. Researchers were also commended for their good mutual cooperation and for their active interaction with the society around. Some problems were also identified: not all fields take full advantage of the high-quality input of women researchers, and even experienced, internationally recognised women researchers have difficulty securing permanent university posts. The panel submitted several concrete proposals and recommendations for improvement and development.

The impacts and effectiveness of the Research Programme on the Economic Crisis of the 1990s in Finland (LAMA) was evaluated during the year under review. Concluded in 2001, the programme was concerned with the economic crisis of the past decade as an economic, political, social and cultural phenomenon. The international assessment team observed that the research programme has succeeded in highlighting and analysing key aspects of social development during the recession,

with important implications for economic and social decision-making.

The Council also commissioned an international evaluation of the second stage of the Information Research Programme.

In spring 2002 a seminar on the final evaluation of the targeted call on interactions between research and the arts drew attention to the programme's successes particularly in the field of researcher training.

## RESEARCH PROGRAMMES

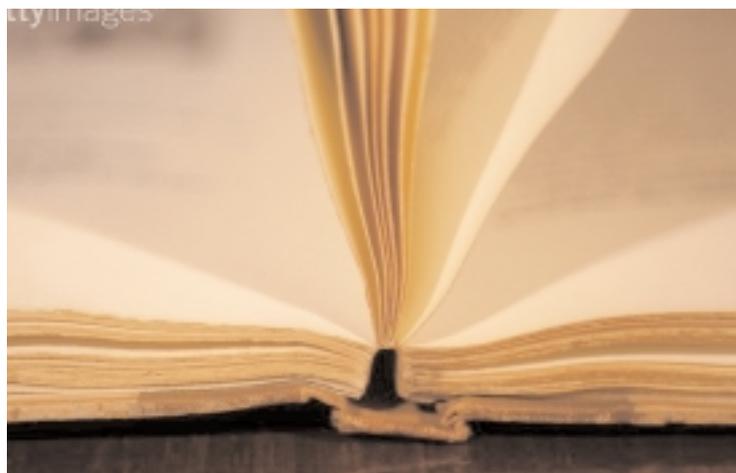
2002 saw the start-up of the Life as Learning Research Programme (LEARN) that the Council has been preparing for some time. LEARN projects are adopting new perspectives on such issues as learning in different kinds of learning environments, future learning models, the changing role of the teacher and learning as a social and cultural skill. The programme is an excellent example of international networking among research programmes. Partners include corresponding programmes in Britain, Holland, Norway, France, Sweden and Canada. Scheduled to run from 2002 to 2006, the programme includes 17 projects. The Academy has earmarked EUR 5.1 million for supporting the programme, which will also benefit from funding from the Finnish Work Environment Fund and the National Technology Agency.

Among the new research programmes set up by other Academy Councils and supported by the Research Council for Culture and Society are the Baltic Sea Research Programme (BIREME), Proactive Computing (PROACT) and Microbes and Man (MICMAN).

During the reporting period the Council worked on three new research programme initiatives: Russia, Social Capital the Network of Trust, and Industrial Design. The emphasis in the preparatory work was on multidisciplinary, extensive domestic cooperation and internationalisation. The Academy Board took the decision to make available the necessary funding in November 2002.

Knowhow and expertise in Russian studies is one of the areas highlighted in the Academy's international strategy. All Academy Research Councils have been closely involved in preparing the Russian programme. In Finland, several ministries and the National Technology Agency have pledged their support. In addition there have been discussions with, for instance, French and British research bodies on the possibility of international cooperation.

Research into social capital has evolved into a multi-disciplinary exercise on the interface between economics, sociology, education, regional studies, communication research and social history. Covering multiple fields, the multidisciplinary Research Programme for Industrial Design will be exploring the interaction between man and technology, cultural influences, trends and semiotics, the use, means, benefits and systematics of industrial design, and new manufacturing techniques. The programme will be linked closely with the Design 2005 Technology Programme launched in 2002 by the National Technology Agency.



## INTERNATIONAL ACTIVITIES

Nordic cooperation figured ever more prominently in the Council's work. In 2002–2003, Finland is chair of all the Nordic joint bodies working in the Council's area (the Joint Committee of the Nordic Social Science Research Councils – NOS-S; the Joint Committee of the Nordic Research Councils for the Humanities – NOS-H; and the Councils for Research in the Humanities and Social Sciences NOP-HS).

The work of both NOS-S and NOS-H was evaluated in 2002, and on the strength of this evaluation it was recommended that the two bodies be merged. The Council sought to intensify cooperation between the Nordic committees and the British Economic and Social Research Council (ESRC) and started preparatory work on the ERA-NET initiative.

The European Science Foundation is an important partner in cooperation in the humanities and social sciences. The Council Chair has been involved in an ESF initiative to develop a citation index for the humanities. The Council Vice-Chair was nominated as member of the Standing Committee for Social Sciences Core Group. The Council decided to start funding three new ESF research programmes. In addition, it is supporting jointly funded EUROCORES programmes in both the humanities and the social sciences.

COST (European Cooperation in the Field of Scientific and Technical Research) networks in social science fields showed positive development. Finnish researchers have been involved in all COST actions. The Council supported the extension of COST cooperation into the humanities. In 2002 the humanities were formally approved in the COST Social Sciences Technical Committee.

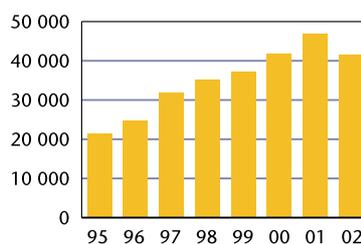
The Sixth EU Framework Programme and the Com-

mission's proposal for a European Research Area present a completely new set of challenges for fields of research hosted by the Council. The Framework Programme emphasises not only social scientific research, but for the first time the significance of the humanities as well. Most of the relevant themes are found under the priority area "Citizens and Governance in the European Knowledge-Based Society", where the accent is upon such issues as European integration and globalisation from the point of view of history and cultural heritage.

### Funding decisions in 2002

Type of funding	EUR	%
Research posts	3 767 930	9
Programme funding	10 657 120	26
Research project funding	17 924 821	43
Researcher training	6 823 400	16
International researcher exchange	450 008	1
Funding to foreign organisations	736 330	2
Other support	1 187 240	3
Funding decisions, total	41 546 849	100

### Funding decisions in 1995–2002 (1 000 euros)





## FROM CIRCLE OF FRIENDS TO CENTRE OF EXCELLENCE

The Nordic Centre of Excellence that is working under Professor Markku Kulmala to study biosphere, aerosol, cloud and climate interactions has quite an unusual history: its roots can be traced back to a close circle of friends who some 15 years ago used to study together at the University of Helsinki Department of Physical Sciences. The nucleus of the team has since dispersed to different institutions and universities, but contacts are still maintained – through the centre of excellence network.

Close on forty research scientists are involved in the Nordic Centre of Excellence headed by Professor Kulmala. Five of the 12 research teams are based in Finland. A solid foundation in basic research combined with multidisciplinary teamwork is the platform on which all of them base their efforts to understand and resolve environmental problems. The researchers involved represent

such varied fields as physics, chemistry, meteorology, geophysics and forest ecology.

Professor Kulmala says the dilemma for environmental research is that results are expected “here and now”, even though it would in fact require a systematic and long-term approach. “When we started our aerosol studies, there were some civil servants who thought they were completely unnecessary. In the early stages the Academy’s support was crucial. Without that support our only option would have been to follow in the wake of foreign trends.”

In his capacity as climate researcher Professor Kulmala feels it is particularly important that decision-makers are kept informed. “We should need to have a direct link from basic research through applied research to decision-makers. Basic research provides the solidity you need for persuasive argumentation, especially in climate research.”

## IDENTIFYING AND SUPPORTING NEW AND EMERGING GROWTH FIELDS

*The Research Council for Natural Sciences and Engineering has responsibility for the exact natural sciences as well as the technical disciplines upon which Finnish industry is based. As from the beginning of 2003 the Council will also be responsible for statistics, which previously was under the Research Council for Culture and Society. High-quality basic research and the effective application of research results in these fields provide a sound basis for strong economic development in society.*

*The Council has set itself the goals of improving the quality of scientific research and researcher training in the fields it represents; promoting multidisciplinary and international research; and identifying and supporting new and emerging growth fields in collaboration with other research councils, stakeholder groups and particularly with the National Technology Agency Tekes.*

*Field of research:*

- *geosciences*
- *space research and astronomy, mathematics*
- *information processing sciences*
- *telecommunications technology*
- *electronics and electrical engineering*
- *medical engineering*
- *physics and technical physics*
- *chemistry and chemical engineering*
- *materials and process technology*
- *mechanical engineering and automation and manufacturing technology*
- *production economics*
- *construction and municipal engineering*
- *architecture and industrial design*
- *biotechnology relating to the above fields of research*

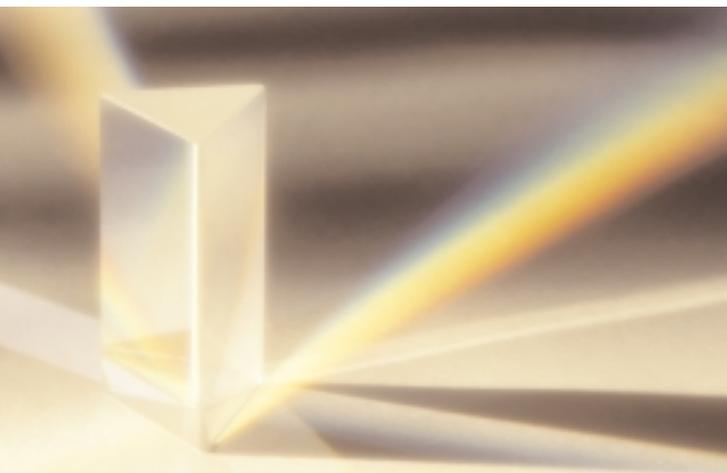
Most of the Council's research funding was awarded in the form of research appropriations open for general application, with a total of EUR 13.7 million granted to 101 projects. Funding was made available to less than one-third of all applicants. In money terms the grants and appropriations awarded represented 14 per cent of the sum total of all applications. In addition, the Council took part in the National Technology Agency's technology programme FINE Particles – Technology, Environment and Health by supporting fine particle research, particularly work concerned with the environmental and health effects of fine particles. The call was jointly organised with the Research Council for Biosciences and Environment and the Research Council for Health. In 2003–2005, the Academy will be spending a total of around one million euros to support five FINE projects.

In its funding decisions the Council stressed the criteria of scientific quality and the importance of researcher training. It also gave special consideration to the goal of supporting young people and women pursuing a research career.

The Academy's second centre of excellence programme

started up in 2002. Six of the 16 centres of excellence funded by the Academy come under the jurisdiction of the Council. Decisions on extending Academy funding for the units involved in the first centre of excellence programme for the remaining period from 2003 to 2005, were made in December. During this period the Academy will be spending EUR 10.4 million to fund centres of excellence and to core facilities organisations working under the Council's auspices. One of the four centres of excellence selected to take part in the Nordic centres of excellence programme in 2003–2007 is coordinated by the director of a national centre of excellence that is under the Council's jurisdiction.

The Council has improved its review and evaluation procedures and sought to increase the share of women researchers and foreign scientists on its panels of experts. In 2002, 95 per cent of all applications received for research appropriations were reviewed in panels of whose members 41 per cent were foreign experts. Panels were also used for the first time to review applications for vacant posts of Academy Research Fellow and appropriations for Postdoctoral Researchers.



During the reporting period the Council continued to intensify its collaboration with stakeholder groups and hosted several national and international seminars and meetings. In January, researchers in the construction and real estate sector and other stakeholder groups met to discuss the needs for basic research and the challenges facing this line of work at a seminar hosted by the Council. In March, the Council joined forces with the Ministry of Education to organise a seminar aimed at charting the future directions of Finnish Antarctic research. In April the Council invited all domestic experts who had reviewed applications in this field to attend a seminar where they were informed about the Academy's current review and evaluation practices.

In 2002 Finland started negotiations on the country's membership of the European Southern Observatory (ESO). Headed by the ESO's Director General, an Observatory delegation visited the Academy in May. Here, Finnish researchers, business and industry representatives, science policy experts and education people were given an introduction to ESO's work. In October, space researchers, astronomers and representatives of funding bodies met at the Academy to discuss funding needs in the near future. The Nordic Optical Telescope (NOT) Council held its autumn meeting at the Academy in November. NOT is a prime example of Nordic cooperation that has been going strong since the late 1980s.

The Nordic Neuroinformatics Meeting was held in December, with experts and representatives of research funding bodies getting together to discuss their plans for future Nordic cooperation in the field of neuroinformatics and to look into the possibility of setting up a joint Nordic research programme in this field.

## RESEARCH PROGRAMMES

The Research Programme on Proactive Information Technology (PROACT) was started up in autumn 2002 in collaboration with the Research Council for Culture and Society, the Research Council for Health, the National Technology Agency Tekes and the French Ministry for Youth, National Education and Research. Academy funding for Finnish research teams in 13 different projects amounts to EUR 5.7 million, while the French Ministry has earmarked EUR 1.4 million to support three Franco-Finnish consortia. In addition, the National Technology Agency will be contributing to the funding of one Franco-Finnish consortium.

In response to an initiative by the Research Council for Natural Sciences and Engineering, the Academy's Board decided to launch a Research Programme for Future Electronics (TULE) in 2003. The programme is designed to promote long-term and high-quality basic research in support of research and development in the Finnish electronics industry as well as innovative new applications. A total of EUR 6.75 million was earmarked to support the programme, which will be jointly implemented with the National Technology Agency in 2003–2006. In addition, the Council took part in the preparation of three research programmes that will be starting up in 2003: Systems Biology and Bioinformatics, Russia and Industrial Design.

## ASSESSMENTS AND EVALUATIONS

Working closely with the Research Council for Biosciences and Environment, the Ministry of Trade and Industry and the Ministry of Education, the Council launched a discipline assessment in the field of geosciences. The team of international experts will be doing the actual fieldwork in 2003. Among their goals will be to assess the scientific quality of research in geology, geophysics and geomatics as well as the structure of education.

During 2002 international evaluation reports were published on five completed research programmes in disciplines hosted by the Research Council for Natural Sciences and Engineering. The Research Programme for Ecological Construction (EKORA, 1995–1999) was evaluated in 2001 and the evaluation report published in January.

The Materials Research and Structures Research Programme (MATRA, 1994–2000) was the first multidisciplinary

nary programme jointly sponsored by all the Academy's Research Councils and also the first programme jointly funded with the National Technology Agency. Published in February, the evaluation report said one of the key strengths of the programme was that it involved both basic and applied research projects.

The international evaluation of the Telectronics programme (1998–2001) was published together with the evaluations of the National Technology Agency's ETX and TLX technology programmes in March 2002.

The final evaluation of the Research Programme for Process Technology (PROTEK, 1999–2002) was carried out in the autumn. This involved both assessments by foreign experts and self-evaluations by researchers in charge of the projects.

The evaluation report on the Electronic Materials and Microsystems Research Programme (EMMA, 1999–2002) was published in November. The scientific evaluation was conducted by three foreign experts on the basis of the projects' self-evaluation reports. Both the scientific standards of the research work and the researcher training provided through the projects received excellent marks, both for quality and quantity.

## INTERNATIONAL ACTIVITIES

The Research Council for Natural Sciences and Engineering recognises the importance of international contacts and exchange. Its aim is to ensure that Finnish research within the fields it represents has access to adequate resources and is internationally both visible and competitive. To this end the Council is committed to promoting international cooperation within these fields of research and in researcher training.

In December the Academy published the national CERN strategy drafted by a working group it had appointed. The strategy emphasises the responsibilities of the Helsinki Institute of Physics in coordinating and administering CERN's basic and applied research projects. It particularly highlighted the importance of technology development and industrial application. The working group's strategy proposal also drew attention to the need to activate researcher training in particle physics and to increase public awareness of CERN's operations.

In March the European Science Foundation's (ESF) Standing Committee for Natural Sciences and Technology PECS launched the first EUROCORES collaborative

research programme under the title Self-organized Nanostructures (SONS). A total of 146 plans of intent were received. Nine Finnish teams submitted their plans, with four of them going through to the second round among 58 shortlisted projects. All the projects in the programme will be funded from national sources. The Council earmarked a total of EUR 125,000 for this purpose.

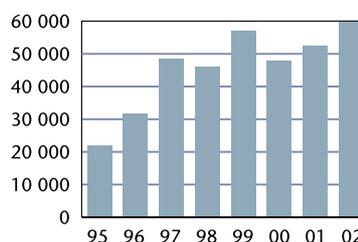
The Council decided to take part in the international research programme "Chemistry in Support of Sustainability" launched by CERC3 (Chairpersons and Directors of European Research Councils' Chemistry Committees). Projects funded through the programme shall include participants from 2-4 countries involved in the programme. Applications are reviewed by international experts, but the projects are funded from national sources. The Council decided to allocate a maximum of EUR 100,000 for this purpose.

Operated under the ESO, the Swedish SEST radiotelescope has been a significant research resource for Finnish astronomers ever since 1994 when the Academy of Finland and the Swedish Research Council signed an agreement to this effect. In 2002 the agreement was extended, without modification, to mid-2003, when the telescope will be closed down and ESO will begin preparations for a new ALMA project.

### Funding decisions in 2002

Type of funding	EUR	%
Research posts	5 456 730	9
Programme funding	16 197 720	27
Research project funding	20 480 660	34
Researcher training	5 991 110	10
International researcher exchange	712 172	1
Funding to foreign organisations	10 188 330	17
Other support	665 260	1
Funding decisions, total	59 691 982	100

### Funding decisions in 1995–2002 (1 000 euros)





## MULTIDISCIPLINARITY BRINGS OUT THE BEST IN PEOPLE

Academy Research Fellow Pekka Martikainen is used to working in multidisciplinary research projects. He is currently studying mortality and morbidity differences between population groups and small communities and regions – this in the context of projects that involve not only sociologists and demographers, but also statisticians, public health experts, medical scientists and nutritionists.

Given the preference of many research teams to co-author their reports, Pekka Martikainen feels it makes sense for individual team members to concentrate on the areas where they are most competent. This makes everyone's job easier and also contributes to a better quality of writing.

Although he has previously been engaged in various Academy projects, this is the first appointment for Pekka Martikainen as an Academy Research Fellow. Based at the University of Helsinki Department of Sociology, he is now working in a project under

the Health Promotion Research Programme to study the associations of the social environment with health and mortality. Whereas traditional health research focuses on the individual level, Pekka Martikainen is interested in regional factors that increase exposure to illnesses and affect mortality irrespective of individual traits. His main concern is with health differentials between different parts of Helsinki and between different regions across the country.

“Mortality rates in different parts of Helsinki vary widely, but we believe this is largely due to the fact that different areas are inhabited by different kinds of people. However, sub-regional differences in alcohol mortality, for instance, are quite marked, and that cannot be explained by individual traits. This suggests that political decision-making, access to services and cultural differences between regions may have significant health implications.”

Research Council for Health in 2002:

## INTENSIFYING NATIONAL AND INTERNATIONAL COOPERATION

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*The Research Council for Health has responsibility for implementing the Academy's strategy in the field of health research. Health research is primarily aimed at increasing our knowledge and understanding about human health, the human body and how it functions, and the prevention and treatment of diseases. Research provides a solid foundation for the promotion of health and the development of health care. Health research has numerous points of contact most particularly with basic research in life sciences and with research that has a social science and behavioural science orientation.*

*Field of research:*

- *biomedicine*
  - *veterinary medicine*
  - *pharmacy, dental science*
  - *nursing science, public health science*
  - *clinical medicine, sport sciences*
  - *nutrition*
  - *occupation and environmental medicine*
  - *biochemistry, genetics, microbiology, biotechnology, molecular biology, cell biology, biophysics and bioinformatics relating to the above fields of research*
- 

During the reporting period the Council held a number of hearings with researchers and representatives of other stakeholder groups. The Council had close contact and exchange with the Ministry of Education, especially in the areas of biotechnology research and researcher training. It also had discussions with the Ministry of Social Affairs and Health on occupational medicine and substance abuse research, particularly drug-related research, and looked into the prospects for partnerships within the Programme for Health Services Research.

The Council worked closely with the Ministry of Agriculture and Forestry to improve the coordination of EU programmes. It also had close collaboration with the National Technology Agency's Bio- and Chemical Technology Unit both in ongoing research programmes and in the preparation of new ones, including the Systems Biology and Bioinformatics Research Programme. The Council shared responsibility with the National Technology Agency for the national coordination of the Fifth and Sixth EU Framework Programmes. Mutual visits served to strengthen contacts with the Finnish National Fund for Research and Development SITRA. In a joint effort with the National Technology Agency, SITRA and the National Agency for Medicines, the Council held information meetings for researchers as well as start-up businesses in life sciences and health research about legislation governing research and product development.

The Council made use of the expertise of sectoral research institutes in various projects, evaluations and in the preparation of new research programmes. Together with the Finnish Medical Association Duodecim, it continued preparations for a consensus meeting on the concentration of specialised health care services and for the Health, Science and Future seminar, both of which will be held in 2003. With the Swedish Embassy, the Council organised a Finnish-Swedish seminar focused on stem cell research and on the challenges presented by the commercialisation of biotechnology.

Jointly funded research programmes cemented their status as essential tools of collaboration. The Microbes and Man Research Programme (MICMAN) was prepared and launched together with the Swedish Foundation for Strategic Research. Aimed at producing information on microbe-host interactions, the programme is expected to yield significant new insights that will contribute to the maintenance of human health and the prevention and treatment of illnesses. Among the themes addressed are allergies, intestinal immune defence mechanisms, antibiotic resistance, the role of microbes in cardiovascular diseases and the impacts of probiotics in humans.

The Academy's share of the total programme budget of EUR 5.4 million is EUR 4.1 million. The Swedish Foundation for Strategic Research earmarked EUR 1.3 million to support the programme. The programme is coordinat-



ed by the National Public Health Institute.

The Council took part in the National Technology Agency's FINE particles research programme together with the Research Council for Biosciences and Environment and the Research Council for Natural Sciences and Engineering.

In 2001 the Council received from the Finnish Society of Epidemiology and the Finnish Society of Social Medicine an initiative regarding the start-up of a registry research unit with Academy support. The Council appointed a working group to make the necessary preparations. In spring 2002 the working group organised a hearing on the matter and drafted a proposal for the mission and organisation of the new unit.

Work was also continued to facilitate discussions among biocentres. The Council attended the regular meetings of biocentre directors.

## RESEARCH PROGRAMMES AND EVALUATIONS

Academy research programmes in biotechnology and molecular biology have been geared to strengthening and facilitating research in these fields, to promoting networking and supporting researcher training in Finland. The research programmes in genome research, cell biology, molecular epidemiology and molecular evolution, structural biology and biological functions together constitute a coherent whole that will be well complemented by the new, internationally networked Systems Biology and Bioinformatics Research Programme that will be starting up in 2003.

High-quality research into the health care system is essential to addressing the challenges that now face public health care services. The Board of the Academy approved the Programme for Health Services Research, which is due to start up in 2003.

The Academy has for some time had in place a system for the international evaluation of research programmes. The panel system has now been extended from these evaluation of scientific quality to assessments of the value added generated by research programmes. The international evaluation of the Research Programme on Environment and Health (SYTTY) was carried out in 2002. A separate national panel was set up to review the social impacts of the programme.

The Council took part in evaluating the impacts of the public funding programmes for biotechnology research implemented by the Ministry of Education and coordinated by the Academy. During the reporting period the Council also launched a discipline assessment of nursing science.

All applications received by the Council for research appropriations are reviewed by panels of outside experts. During the year under review the same procedures were applied, for the first time, to the review of applications for research appropriations open to general application.

As far as their research funding is concerned, the situation of Academy Professors and Academy Research Fellows remains sound. New Academy Research Fellows working under the Council's auspices have been exceptionally well represented among those receiving incentive money for young researchers.

The Council's own strategies of promoting professional careers in research have included development projects in veterinary and psychiatric research as well as supporting clinical research careers.

Launched on the Council's initiative, the founding of a nationwide clinical graduate school specialising in molecular medicine marked an important reform in the graduate school system in the field of health research. The Council has also supported Academy Research Fellows who have wanted to work in clinical patient settings in so far as this has supported their research.

Appropriations were allocated to graduate schools for purposes of organising national training courses, covering doctoral students' congress travel costs and supporting coordination. The Council arranged a hearing with representatives of graduate schools at a seminar it hosted in autumn 2002.

## INTERNATIONAL ACTIVITIES

The Council's Secretary General has served as a member on the programme committee for the framework programme's thematic area Life sciences, genomics and health biotechnology. The Council Chair is a member of the advisory expert group for the same thematic area. Joint research programmes between the Academy and the National Technology Agency have provided a sound foundation for work within this programme area.

The Council Chair has also been in charge of the EU Genome Research Managers Forum and coordinator of the EU-funded COGENE project. Based at the Academy, the Forum coordinator was hired with framework programme funding. This project is aimed at increasing awareness of national genome programmes in other Member States and at promoting cooperation between research programmes and their funding bodies. The Academy is responsible for the implementation of the project, which will offer great opportunities for cooperation among national research programmes during the Sixth Framework Programme.

The Chair of the Research Council also chaired the EU Cancer Research Managers Forum (COGENE). The Council was particularly active in the preparation of the European-Developing Countries Clinical Trials Programme (EDCTP) that is aimed at combatting poverty-linked diseases.

Together with the Research Council for Biosciences and Environment, the Research Council for Health shares responsibility for the Finnish contribution to the administration of the European Molecular Biology Laboratory (EMBL) and the European Molecular Biology Conference (EMBC). In 2002 the Council organised a Nordic seminar where views were exchanged on the idea of starting up a new molecular medicine research centre in the Nordic countries. The Council has provided funding to support the collaboration of Finnish graduate schools and the laboratory's doctoral training programme. One of the Council members has been responsible for this collaboration as Graduate School Director. The Council Chair, Professor Eero Vuori was appointed as Chair of the EMBL Council for 2003.

The Research Council for Health chaired the Joint Committee for Medical Research (NOS-M), and the Health Research Unit served as its secretariat in 2002. It is the Council's strategy to invest in the development of NOS-M as a joint forum for funding organisations. The

Council decided to submit to NOS-M a proposal for the establishment of a centre of excellence programme in the field of molecular medicine.

The European Medical Research Councils (EMRC) represents one of the channels in the effort to steer EU research policy. The Council Chair has been a member of the EMCR Executive Group since 2001.

The Council is supporting two ESF programmes: Social Variations in Health Expectancy in Europe (1999–2003) and Integrated Approaches for Functional Genomics (2000–2005). The Council took part in two EUROCORES programmes: Science of Protein Production (SCOPE) and Clinical Trials.

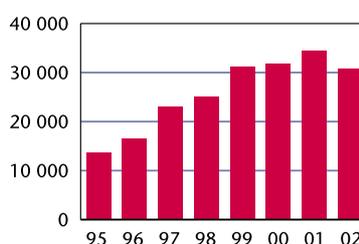
Council cooperation with the National Genome Research Institute (NHGRI) under the US National Institutes of Health (NIH) has meant that each year, a few newly graduated Finnish PhDs have been able to join top research teams in the United States.

Cooperation between the Research Council for Health and the Netherlands Organization for Scientific Research (NWO) has been particularly valuable in promoting researcher mobility.

### Funding decisions in 2002

Type of funding	EUR	%
Research posts	2 239 280	7
Programme funding	10 642 130	35
Research project funding	11 890 050	39
Researcher training	5 198 793	17
International researcher exchange	226 682	1
Funding to foreign organisations	19 390	0
Other support	593 210	2
Funding decisions, total	30 809 535	100

### Funding decisions in 1995–2002 (1 000 euros)



## RÉSUMÉ FRANÇAIS

# L'ACADÉMIE DE FINLANDE EN 2002

La part de la Finlande sur l'ensemble des dépenses de recherche et de développement des pays de l'OCDE représentait 0,7 pour cent en 2001. La Finlande a investi 3,4 pour cent (4,6 milliards d'euros) de son produit intérieur brut dans la recherche et le développement, ce qui la place au second rang des pays de l'OCDE. Les évaluations indiquent que, par rapport au PIB, le chiffre a atteint les 3,5 pour cent pour 2002.

L'État a alloué 1,4 milliard d'euros en 2002 pour la recherche et le développement, soit une croissance d'environ 48 millions d'euros par rapport à l'année précédente. La part des dépenses de l'État pour la recherche par rapport aux dépenses globales de l'État, à l'exclusion des frais de gestion de la dette publique, se montait à 4,5 pour cent. Les dépenses de recherche ont théoriquement connu une croissance de 3,5 pour cent depuis 2001. En fait, il n'y a pas eu de croissance réelle. Ce qui fait que l'augmentation, permanente depuis le début des années 1990, s'est arrêtée.

Dans le budget de l'État 2002, ce sont les dépenses des secteurs dépendant du ministère de l'Éducation qui ont connu la plus importante croissance avec 27,5 millions d'euros. Cependant, le financement obtenu par l'Académie de Finlande, dépendant du ministère de l'Éducation, a connu une légère baisse, passant de 187,1 millions d'euros à 184,9 millions d'euros.

En 2002, le financement budgétaire destiné aux universités et aux instituts de recherche a augmenté, alors que le montant des fonds destinés à l'Académie de Finlande et l'Agence nationale pour le développement technologique (Tekes), qui les redistribuent ensuite en fonction de mérites et des candidatures, a diminué. Le changement n'est pas très important, mais c'est une rupture par rapport à la tendance des années précédentes.

En 2002, la part de l'Académie de Finlande sur les financements publics pour la recherche était de 13 pour cent contre environ 14 pour cent pour l'année précédente.

## DIMENSION INTERNATIONALE

Le conseil d'administration de l'Académie de Finlande a approuvé en 2002 une stratégie pour la politique internationale. Conformément à celle-ci, l'Académie souhaite, avec ses particularités nationales dynamiques, être un acteur important sur la scène scientifique internationale. Le débat sur la politique de la recherche, aussi bien nationale qu'internationale a été dominé en 2002 par la question du développement de l'Europe en une économie de la connaissance la plus compétitive et la plus dynamique du monde – un espace européen de la recherche EER - d'ici l'an 2010.

Durant l'année écoulée, l'Académie a participé activement sur différents forums entre autres, au débat sur l'internationalisation des structures de recherche nationales, sur la coopération internationale en matière de financement de la recherche et du développement et sur les nouveaux défis.

Outre la Suède, la Finlande est le seul pays d'Europe à avoir dépassé l'objectif, fixé lors de la réunion du Conseil européen de Barcelone en mars 2002, selon lequel le financement destiné à la recherche, au développement et à l'innovation devrait atteindre les 3 pour cent du PIB d'ici l'an 2010. L'Académie, pour sa part, s'est efforcée de trouver avant tout des pratiques concrètes et des modes de coopération permettant de promouvoir la politique scientifique européenne et celle de l'EER tout en renforçant la recherche nationale.

Le sixième programme-cadre de l'UE est l'un des principaux instruments de la mise en place de l'EER. Le programme-cadre a pour ambition de soutenir non seulement les projets de recherche sur les domaines prioritaires, mais également un autre type de coopération entre les acteurs nationaux qui apportent un soutien à la recherche et lui sont bénéfiques. Dans le sixième programme-cadre, la plus grande part des responsabilités en Finlande ont été réparties entre l'Académie et Tekes.

La tâche de l'organisme responsable consiste à apporter un soutien à la proposition des projets, à se charger de la communication et du conseil et à promouvoir la mise en réseau internationale. Sur les 17 parts du programme, 8 sont principalement sous la responsabilité de l'Académie.

mie. De plus, la fonction de coordination de la recherche est sous la responsabilité conjointe des deux organismes, Tekes et l'Académie de Finlande.

L'Académie participe activement à plusieurs projets de l'UE, par exemple: le réseau de formation pour les points de contact nationaux TRAINNET; un projet (COGENE Coordination de la recherche génomique en l'Europe) destiné à promouvoir la notoriété des programmes de recherche nationaux sur la génomique des pays de l'UE ainsi que la collaboration entre les participants au programmes et les financeurs; la collaboration à la recherche clinique des pays européens et des pays en développement (EDCTP); et le centre de presse sur Internet pour l'actualité des sciences, de l'ingénierie et des technologies en Europe, AlphaGalileo.

Les organismes de financement européens ont également développé des méthodes de fonctionnement communes. Le Directeur général représente l'Académie au sein de l'organe commun des chefs de conseil de recherche des organismes de recherche de l'Union européenne (EUROHORCS).

La collaboration des groupes liés de l'Académie avec les différents pays et les différents secteurs s'est démultipliée. En 2002, l'Académie disposait d'accords internationaux bilatéraux avec 25 pays et 37 organisations étrangères.

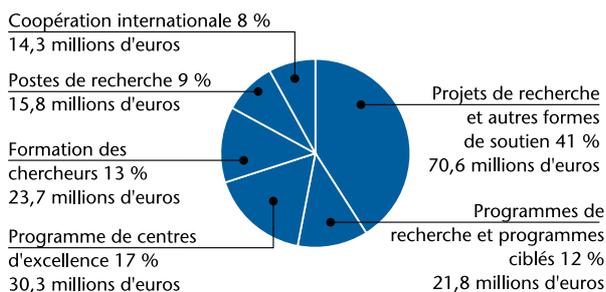
L'Académie s'efforce de mettre ses programmes de recherche en réseau avec les programmes de recherche des autres pays et d'avoir une coopération souple avec les financeurs des différents pays. Une collaboration financière internationale est engagée dans tous les programmes de recherche ayant débuté en 2002.

L'Académie est un membre dans les organisations de recherche des pays nordiques, dans la Fondation européenne de la science, dans l'Organisation européenne pour la recherche nucléaire CERN et dans le Laboratoire européen de biologie moléculaire, EMBL. Par ce biais, elle promeut la participation des chercheurs à la construction d'une collaboration internationale.

## LE FINANCEMENT DE LA RECHERCHE EST SOUMIS À LA CONCURRENCE

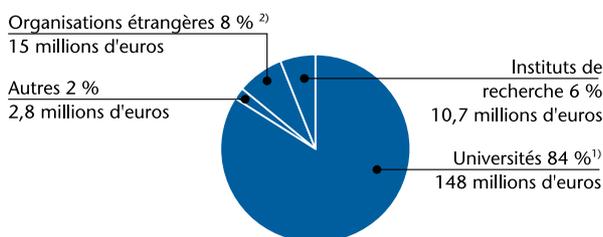
L'Académie finance des projets de recherche sous différentes formes: le financement général des projets de recherche, les programmes de recherche, les programmes de centres d'excellence de la recherche ainsi que les postes de

### Décisions sur le financement de la recherche de l'Académie de Finlande par mode de financement en 2002, total 176,5 millions d'euros <sup>1)</sup>



<sup>1)</sup> inclut les cotisations aux organismes de recherche internationaux

### Décisions sur le financement de la recherche de l'Académie de Finlande par sites de recherche en 2002, total 176,5 millions d'euros



<sup>1)</sup> incl. hôpitaux universitaires

<sup>2)</sup> incl. cotisations aux organismes internationaux

professeur à l'Académie et de chercheur d'Académie. Presque tout projet implique la formation des chercheurs, la recherche à l'étranger et la coopération internationale.

En 2002, l'Académie a financé la recherche de haut niveau à hauteur de 176,5 millions d'euros. Soit un montant inférieur de 6,8 millions par rapport à l'année 2001. L'Académie a reçu des demandes pour une valeur de 829,8 millions d'euros et a accordé des financements pour 176,5 millions d'euros, ce qui représente 21 pour cent des demandes de financement. Elle a reçu en tout 4 916 demandes dont 2 541 ont reçu une réponse positive.

En 2002, la part des projets de recherche s'est montée à 39 pour cent du financement accordé par l'Académie. La distribution des fonds a été répartie de la manière suivante: 12 pour cent pour les programmes de recherche et

les programmes ciblés, 17 pour cent pour les programmes de centres d'excellence, 13 pour cent pour la formation des chercheurs, 9 pour cent pour les postes de recherche et 8 pour cent pour la collaboration internationale.

En 2002, 5 300 personnes ont pu travailler grâce aux fonds de recherche de l'Académie, ce qui représente 2 830 années-hommes. 84 pour cent des fonds de recherche de l'Académie ont été accordés aux chercheurs travaillant dans des universités ou des hôpitaux universitaires.

À long terme, l'objectif de la politique scientifique de l'Académie de Finlande consiste à développer les possibilités de carrière des chercheurs professionnels. L'Académie accorde une importance particulière à la promotion de la carrière des femmes et des hommes, à la mise en place et au soutien des conditions nécessaires pour des environnements de recherche de haut niveau ainsi qu'à l'exploitation des possibilités de collaboration globales dans la recherche, le financement de la recherche et la politique scientifique.

L'Académie de Finlande finance la formation des chercheurs en leur allouant des fonds, les plus importants concernant le financement de projets. Les comités scientifiques de l'Académie soutiennent également les écoles doctorales financées par le ministère de l'Éducation en allouant chaque année une partie des fonds vers leurs activités. Fin 2002, il existait en Finlande 108 écoles doctorales où étudiaient 1 426 étudiants-chercheurs subventionnés par le ministère de l'Éducation. Outre les places financées par le ministère de l'Éducation, il est estimé qu'environ 2 500 étudiants-chercheurs préparant leur thèse de doctorat avec un autre mode de financement.

L'objectif de l'Académie est qu'un cinquième des étudiants ayant soutenu leur thèse aient la possibilité de se qualifier pour devenir chercheur professionnel par le biais du système de postes à l'Académie ou à l'université. La mise en place de la rénovation structurelle de la formation doctorale a mis l'accent des actions de développement des activités de l'Académie vers la carrière de chercheur post-doctoral. Cela a été renforcé aussi bien par l'augmentation des postes de recherche que par les crédits pour la recherche. En 2002, les comités scientifiques de l'Académie ont déjà accordé 190 crédits sur deux ans à des chercheurs post-doctoraux débutant dans la carrière de chercheurs professionnels. Fin 2002, il existait 230 postes de chercheurs d'Académie et 38 postes de professeurs d'Académie.

## LES PROGRAMMES DE RECHERCHE S'INTERNATIONALISENT

Le conseil d'administration de l'Académie de Finlande a adopté fin 2002 une stratégie pour son programme de recherche pour les années 2003–2007. Cette stratégie prend en considération les défis posés par un environnement en phase d'internationalisation et les besoins de développer une collaboration sur le plan de la recherche et de la technologie au niveau national et international. Les programmes de recherche vont permettre de renforcer de nouveaux domaines de recherche en émergence, d'améliorer la qualité de la recherche et d'accéder à un niveau international.

Les quatre programmes fixés en 2001 et le programme ciblé Science des matériaux du bois (Wood Wisdom II) ont démarré en 2002. Ils représentent 21 millions d'euros. En novembre 2002, l'Académie a approuvé sept nouveaux programmes de recherche pour lesquels une réserve de 41,3 millions d'euros a été prévue.

En 2002, 21 programmes de recherche au total étaient en cours. Réciproquement, sept programmes de recherches se sont achevés.

L'Académie a élargi sa collaboration avec les autres financeurs. Dans les programmes de recherche et les programmes ciblés, l'Académie a collaboré avec 26 financeurs nationaux et étrangers, publics et privés.

Sept ministères ont participé à la préparation et au financement des programmes de recherche de l'Académie, trois autres financeurs publics, cinq fondations nationales à titre privé ainsi que trois autres financeurs également à titre privé.

Trois financeurs étrangers y ont aussi participé. Six programmes de recherche de l'Académie sont financés grâce à la collaboration financière internationale. En 2002, l'Académie avait en cours six programmes de recherche communs à deux pays, subventionnés par des financeurs publics ou privés.

L'Académie et Tekes ont collaboré sous différentes formes pour le financement des programmes de recherche, des programmes ciblés et des programmes grappes. En 2002, l'Académie avait en cours 10 programmes de recherche co-financés par Tekes, et elle participe à trois programmes de Tekes.

L'Académie a participé à deux programmes grappes nationaux avec trois programmes de recherche et un programme ciblé: aux programmes de foresterie (Wood Wisdom) et au programme grappe du bien-être (Programme de recherche sur le vieillissement) ainsi qu'au programme

grappe de l'environnement (Utilisation durable des ressources naturelles, SUNARE).

Cinq projets de recherche finlandais ont été choisis l'année dernière pour participer aux deux premiers programmes de recherche EUROCORES (Programmes de recherche en coopération) de la Fondation européenne de la science. La recherche en sciences humaines et sociales dans les programmes reçoit environ 0,7 million d'euros en Finlande.

## LES CENTRES D'EXCELLENCE SE METTENT EN RÉSEAU

En 2002, 42 centres d'excellence en tout ont été financés dans le cadre de deux programmes nationaux de centres d'excellence, 16 ayant commencé leurs activités au début de l'année écoulée. Le premier mandat, d'une durée de trois ans, de 26 centres d'excellence et de sept organisations de soutien financés par le premier programme de centres d'excellence 2000–2005 s'est achevé en 2002. Sur la base des négociations sur les accords conclus avec les centres d'excellence et les organisations de soutien, le projet sera financé à hauteur de 30,341 millions d'euros sur les années 2003–2005.

L'Académie a contribué à promouvoir la mise en réseau international des centres d'excellence en finançant la collaboration de quatre centres d'excellence finlandais travaillant sur les sciences naturelles et les biosciences avec des groupes de haut niveau financés par la Fondation nationale des sciences naturelles chinoise. Un budget de 0,7 million d'euros sur trois ans a été alloué pour ce projet.

Les comités des pays nordiques des sciences naturelles, des sciences de l'environnement et de la recherche technique (Nordiska samarbetsnämnden för naturvetenskaplig forskning, NOS-N), le Conseil des ministres des pays nordiques et l'Académie de formation des chercheurs des pays nordiques (Nordisk Forskerutdanningsakademi, NorFA) ont mis en route un programme de centres d'excellence dont l'objectif est d'élever le niveau de la recherche nordique et de rehausser sa visibilité internationale, mais également de vérifier dans la pratique ce mode de coopération en matière de recherche dans les pays nordiques. Ils sont en train de mettre en route un programme pilote portant sur la recherche fondamentale en matière de sciences naturelles au sujet du changement global. Ce programme sera réalisé au cours des années 2003–2007.

Dans le cadre du programme pilote, le financement sera accordé à trois réseaux formés par plusieurs groupes de recherche nordiques ainsi qu'à un groupe de recherche qui fournira les équipements et l'infrastructure aux autres chercheurs des pays nordiques. L'un des centres d'excellence à financer est coordonné par le directeur d'un centre d'excellence finlandais national, des groupes de recherche finlandais font partie de deux autres centres d'excellence structurés en réseau. Le financement annuel du programme est d'environ 1,57 million d'euros, la part de l'Académie est d'environ 189 000 euros. Le secrétariat du programme est assuré au sein de l'Académie.

## L'ACADÉMIE ASSURE LES FONCTIONS D'EXPERT SCIENTIFIQUE

Les décisions sur le financement prises par l'Académie sont basées sur l'évaluation du plan et du niveau scientifique du candidat. Les évaluations sont effectuées par des experts nationaux et non nationaux externes à l'Académie, tous sont des chercheurs reconnus dans leur domaine.

Le fait que le panel chargé de l'évaluation des crédits alloués pour la recherche et des demandes d'accès aux postes soit composé d'experts permet de mieux tirer profit des rapports d'experts et permet aux comités de prendre leurs décisions sur des bases solides.

En 2002, 600 experts, dont 236 non nationaux ont participé aux évaluations de l'Académie. 41 pour cent des experts consultés au mois de mai lors de l'examen habituel des demandes de crédits alloués pour la recherche étaient non nationaux.

L'Académie a pour tâche d'évaluer l'état et le niveau de la science en Finlande, des domaines de science et de recherche et scientifiques particuliers ainsi que les programmes de recherche qu'elle finance. En 2002, l'Académie a publié l'évaluation de 12 programmes de recherche ou autres projets de grande envergure.

Une nouveauté dans l'évaluation finale des programmes de recherche a été l'intégration de l'auto-évaluation au processus d'évaluation.

Depuis début 1983, l'Académie a mis en route et coordonné l'évaluation de plus de 20 domaines de science et de recherche différents. L'Académie a publié en janvier 2002 une évaluation générale portant sur l'évaluation de six différents domaines scientifiques ou de recherche.



## NEW KNOWLEDGE IS GENERATED AT THE INTERFACES OF DISCIPLINES

Academy of Finland Research Director, Dr. Anneli Pauli says that the promotion of multidisciplinary, interdisciplinarity and transdisciplinarity is built into the Academy's funding mechanisms. "This is one of the biggest challenges for us at the Academy of Finland. Funding research programmes is one good way to reach this goal", she says.

Research programmes are not usually grounded in any one discipline, but geared to addressing a specific problem. A lasting solution to that problem can only be achieved if it draws upon several different disciplines and fields of research.

According to Dr. Pauli multidisciplinary, interdisciplinarity and transdisciplinarity have always been important values to the Academy, but they are set to gain even greater significance in the future. "New knowledge is generated at interfaces", Dr. Pauli points out. "Some fields of research are inherently multidisciplinary. Environmental research, for instance, draws upon the natural sciences, social sciences as well as the humanities."

Academician Pekka Jauho says that a broadly-based approach is no novel phenomenon in scientific research. Throughout his

active career from the 1950s to the 1990s, cooperation across disciplinary boundaries was essential: "In nuclear physics, for example, you need the contribution of several fields of technical and scientific research. A multidisciplinary approach was key to the safe introduction of nuclear energy", he emphasises.

The roots of multidisciplinary, Academician Jauho says, can be traced all the way back to ancient Greece. "Greek philosophers were not just theoreticians, but they took an all-round interest in physical, medical and technical matters."

From this, however, there was still a long way to go to true transdisciplinarity. "The great geniuses of the past few centuries were still embroiled in a competition over the discovery of 'final' truths. There was no real teamwork as we know it today", he adds.

"The atmosphere today encourages teamwork and interaction between different disciplines. Globalisation and the climate of international cooperation, today's fast and cheap communications media and the development of project-based funding structures all favour and strengthen interdisciplinarity."

## Board and Research Council members of the Academy of Finland in 2002

<b>Board</b>	<b>Research Council for Culture and Society</b>	Ulla Ruotsalainen, Docent Tampere University of Technology
Chair Reijo Vihko, Professor President of the Academy of Finland	Chair Arto Mustajoki, Professor University of Helsinki	Kari-Jouko Rähä, Professor University of Tampere
Vice-Chair Vappu Taipale, Director General National Research and Development Centre for Welfare and Health, Stakes	Kaija Heikkinen, Docent University of Joensuu	Markku Tuominen, Professor Lappeenranta University of Technology
Markku Karlsson Senior Vice President Metso Corporation	Liisa Huhtala, Professor University of Oulu	<b>Research Council for Health</b>
Riitta Keiski, Professor University of Oulu	Marja Järvelä, Professor University of Jyväskylä	Chair Eero Vuorio, Professor University of Turku
Arto Mustajoki, Professor University of Helsinki	Aila Lauha, Professor University of Helsinki	Markku Alén, Medical Director Peuranka Medical Rehabilitation and Physical Exercise Centre
Terttu Vartiainen, Professor National Public Health Institute	Erno Lehtinen, Professor University of Turku	Esa Heinonen, Senior Vice President Orion Pharma, Orion Corporation
Eero Vuorio, Professor University of Turku	Paavo Okko, Professor Turku School of Economics and Business Administration	Elina Hemminki, Professor National Research and Development Centre for Welfare and Health, Stakes
<b>Research Council for Biosciences and Environment</b>	Juha Sihvola, Professor University of Jyväskylä	Helena Leino-Kilpi, Professor University of Turku
Chair Terttu Vartiainen, Professor National Public Health Institute	Lauri Suurpää, Professor Sibelius Academy	Lars-Axel Lindberg, Professor University of Helsinki
Annele Hatakka, Professor University of Helsinki	Terttu Utriainen, Professor University of Lapland	Marja Makarow, Professor University of Helsinki
Jyrki Heino, Professor University of Jyväskylä	Krista Varantola, Professor University of Tampere	Pirjo Pietinen, Professor WHO/National Public Health Institute
Lea Kauppi, Director General Finnish Environment Institute	<b>Research Council for Natural Sciences and Engineering</b>	Taina Pihlajaniemi, Professor University of Oulu
Markku Löytönen, Professor University of Helsinki	Chair Riitta Keiski, Professor University of Oulu	Hilkka Soininen, Professor University of Kuopio
Pasi Puttonen, Professor University of Helsinki	Mats Gyllenberg, Professor University of Turku	Timo Vesikari, Professor University of Tampere
Maija Rautamäki, Professor Helsinki University of Technology	Iiro Hartimo, Professor Helsinki University of Technology	
Eevi Rintamäki, Professor University of Turku	Pekka Hautojärvi, Professor Helsinki University of Technology	
J. Peter Slotte, Professor Åbo Akademi University	Jorma Kangas, Professor Sodankylä Geophysical Observatory	
Juha Tuomi, Professor University of Oulu	Markku Kivikoski, Professor Tampere University of Technology	
Matti Vornanen, Professor University of Joensuu	Kaisa Nyberg, Docent Nokia Research Center	
	Marja-Liisa Riekkola, Professor University of Helsinki	

## Honorary title of Academician

### The highest recognition to scientists and scholars

On the proposal of the Academy of Finland, the President of the Republic of Finland may grant the honorary title of Academician to a highly distinguished Finnish or foreign scientist or scholar. The title of Academician may be held simultaneously by no more than twelve Finnish scientists or scholars. The number of foreign holders of the title of Academician is not limited.

### Finnish holders of the honorary title of Academician

Erik Allardt  
Albert de la Chapelle  
Nils Erik Enkvist  
Olavi Granö  
Pekka Jauho  
Eino Jutikkala  
Teuvo Kohonen  
Olli Lehto  
Olli V. Lounasmaa  
(d. 27 Dec 2002)  
Jorma K. Miettinen  
Arto Salomaa  
Nils Westermark  
(d. 17 March 2002)

### Retired from the post of Academician

Georg Henrik von Wright

### Foreign holders of the honorary title of Academician

Johannes Andenaes, Norway  
Sir Arnold Burgen, Great Britain  
Alfred W. Crosby, USA  
Ludvig Dmitrievich Faddeyev, Russia  
Hans Fromm, Germany  
Péter Hajdú, Hungary  
(d. 19 Sept 2002)  
Bengt Hultqvist, Sweden  
Torsten Hägerstrand, Sweden  
Ansel Keys, USA  
Leon Lederman, USA  
Yuri Ivanovish Marchuk, Russia  
Sanjit K. Mitra, USA  
Martha Nussbaum, USA  
Birgitta Odén, Sweden  
Richard Peto, Great Britain  
Lennart Philipson, USA  
Darwin J. Prockop, USA  
Stig Strömholm, Sweden  
Richard Villems, Estonia

## Academy Professors in 2002

Lauri Aaltonen 1 Aug 2002-31 Jul 2007 Molecular Background of Hereditary Cancer University of Helsinki	Erkki Haukioja 1 Aug 2000-31 Jul 2005 Evolutionary-ecological Effects of Atmospheric Pollution University of Turku	Antti Kupiainen 1 Aug 1999-31 Jul 2004 Extended Dynamical Systems University of Helsinki	Anna-Leena Siikala 1 Aug 1999-31 Jul 2004 Myths, History, Society: National Traditions in Global World University of Helsinki
Helena Aksela 1 Aug 2001-31 Jul 2006 Electron Spectroscopy and Structure of Atoms and Molecules Using Synchrotron University of Oulu	Marjatta Hietala 1 Aug 2002-31 Jul 2007 Scholars, Science, Universities and Networks as Making Cities Attractive University of Tampere	Risto Nieminen 1 Aug 1997-31 Jul 2002 Computational and Theoretical Materials Physics Helsinki University of Technology	Kaarina Sivonen 1 Aug 2000-31 Jul 2005 Cyanobacteria and Their Bioactive Compounds University of Helsinki
Rauno Alatalo 1 Aug 1997-31 Jul 2002 Evolutionary Ecology University of Jyväskylä	Bjarne Holmblom 1 Aug 1998-31 Jul 2003 Towards Molecular-level Understanding of Papermaking Åbo Akademi University	Risto Näätänen as from 1 Aug 1983 with tenure Cognitive Function and its Neural Basis University of Helsinki	Irma Thesleff 1 Aug 1998-31 Jul 2003 Molecular Regulation of Tooth Development University of Helsinki
Kari Alitalo as from 1 Aug 1993 with tenure Molecular Biology of Cancer University of Helsinki	Seppo Honkapohja 1 Aug 2000-31 Jul 2005 Learning Behaviour and Other Topics in Macroeconomics University of Helsinki	Erkki Oja 1 Aug 2000-31 Jul 2005 New Information Processing Principles Helsinki University of Technology	Jaakko Tuomilehto 1 Aug 2000-31 Jul 2005 Epidemiology and Genetics of Diabetes and Rheumatoid Arthritis in Finland National Public Health Institute
Eva-Mari Aro 1 Aug 1998-31 Jul 2008 Dynamics and Signaling in Photosystem II University of Turku	Sirpa Jalkanen 1 Aug 1996-31 Jul 2006 Mechanism Controlling Cell Traffic in Malignancies and Inflammations University of Turku	Kari Palonen 1 Aug 1998-31 Jul 2003 Polity, Contingency and Conceptual Change University of Jyväskylä	Pertti Törmälä 1 Aug 1995-31 Jul 2005 Studies of Biodegradable Polymer Materials and Composites Tampere University of Technology
Jaakko Astola 1 Aug 2001-31 Jul 2006 Signal Processing Algorithm Group Tampere University of Technology	Kai Kaila 1 Aug 1996-31 Jul 2006 GABA Ergic Transmission: Mechanisms Underlying Neuronal Communication, Development and Pathophysiology University of Helsinki	Tapio Palva 1 Aug 1999-31 Jul 2004 Molecular Analysis of Adaptive Responses on Plants University of Helsinki	Esko Ukkonen 1 Aug 1999-31 Jul 2004 Pattern Matching and Machine Learning – Algorithms and Biocomputing Applications University of Helsinki
Ralph-Johan Back 1 Aug 2002-31 Jul 2007 Formal Methods in Software Construction Åbo Akademi University	Kimmo Kaski 1 Aug 1996-31 Jul 2006 Computational Science and Engineering Helsinki University of Technology	Jukka Pekola 1 Aug 2000-31 Jul 2005 Fabrication and Sensor Applica- tions of Nanostructures University of Jyväskylä	Ulla Vuorela 1 Aug 1999-31 Jul 2004 Minna Canth Academy Professorship (Women Studies and Gender Research) The Rich, the Poor and the Resourceful. Gender and Development in Postcolonialist Context University of Tampere
Dennis Bamford 1 Aug 2002-31 Jul 2007 Structures of Macromolecular Assemblies and Functions of Molecular University of Helsinki	Seppo Kellomäki 1 Aug 2001-31 Jul 2006 Dynamics and Modelling of the Functioning and Structure of Forest Ecosystem with Implications for the Sustainability of the Forest Production and Climate Change Impacts University of Joensuu	Elianne Riska 1 Aug 1997-31 Jul 2002 Sociology of Health and Profession Sociology Åbo Akademi University	Mårten Wikström 1 Aug 1996-31 Jul 2006 The Catalysts of Cell Respiration – Molecular Dynamics, Structure and Pathophysiology University of Helsinki
Auli Hakulinen 1 Aug 2001-31 Jul 2004 Finnish Descriptive Grammar University of Helsinki	Simo Knuutila 1 Aug 1994-31 Jul 2004 Studies in Philosophy of Religion University of Helsinki	Heikki Räisänen 1 Aug 2001-31 Jul 2006 Christianity in Making: An Alternative to 'New Testament Theology' from the Perspective of Religious Studies University of Helsinki	Hannele Yki-Järvinen 1 Aug 1995-31 Jul 2005 Mechanisms of Glucose Toxicity University of Helsinki
Ilkka Hanski 1 Aug 1996-31 Jul 2006 Metapopulation Biology University of Helsinki	Matti Krusius 1 Aug 1999-31 Jul 2004 Topological Objects in Quantum Fluids Helsinki University of Technology	Mikko Sams 1 Aug 2002-31 Jul 2007 Neurocognitive mechanisms of multisensory perception Helsinki University of Technology	
Riitta Hari 1 Aug 1999-31 Jul 2004 Human Cortical Functions: Neuromagnetic Approach Helsinki University of Technology		Yrjö Sepänmaa 1 Aug 2000-31 Jul 2005 The Theory and Practice of Applied Environmental Aesthetics University of Joensuu	

## Centres of excellence in research in 2002

### The centre of excellence programme for 2000-2005.

Ancient and Medieval Greek  
Documents, Archives and Libraries  
University of Helsinki,  
Professor Jaakko Frösén

Cell Surface Receptors in  
Inflammation and Malignancies  
University of Turku,  
Academy Professor Sirpa Jalkanen

Center for Activity Theory and  
Developmental Work Research  
University of Helsinki,  
Professor Yrjö Engeström

Centre of Excellence in Disease  
Genetics  
National Public Health Institute,  
Professor Leena Peltonen-Palotie

Computational Condensed-  
matter and Complex Materials  
Research Unit  
Helsinki University of Technology,  
Professor Risto Nieminen

Evolutionary Ecology  
University of Jyväskylä,  
Academy Professor Rauno Alatalo

Helsinki Bioenergetics Group  
University of Helsinki,  
Academy Professor  
Mårten Wikström

Institute of Hydraulics and  
Automation  
Tampere University of Technology,  
Professor Matti Vilenius

Low Temperature Laboratory:  
Physics and Brain Research Units  
Helsinki University of Technology,  
Professor Mikko Paalanen

Molecular Biology and Pathology  
of Collagens and Enzymes of  
Collagen Biosynthesis  
University of Oulu,  
Professor Taina Pihlajaniemi

New Information  
Processing Principles  
Helsinki University of Technology,  
Academy Professor Erkki Oja

Nuclear and Condensed Matter  
Physics Programme at JYFL  
University of Jyväskylä,  
Professor Matti Manninen

Plant Molecular Biology  
and Forest Biotechnology  
Research Unit  
University of Helsinki,  
Academy Professor Tapio Palva

Program in Cancer Biology,  
Growth Control and  
Angiogenesis  
University of Helsinki,  
Academy Professor Kari Alitalo

Programme of Molecular  
Neurobiology  
University of Helsinki,  
Professor Heikki Rauvala

Programme on Structural  
Virology  
University of Helsinki,  
Professor Dennis Bamford

Research Centre for  
Computational Science  
and Engineering  
Helsinki University of  
Technology, Academy  
Professor Kimmo Kaski

Research Unit for Forest  
Ecology and Management  
University of Joensuu, Academy  
Professor Seppo Kellomäki

Research Unit for Variation  
and Change in English  
University of Helsinki,  
Professor Terttu Nevalainen

Research Unit on the  
Formation of Early Jewish  
and Christian Ideology  
University of Helsinki, Academy  
Professor Heikki Räisänen

Signal Processing  
Algorithm Group  
Tampere University of  
Technology,  
Academy Professor Jaakko Astola

The Human Development and  
Its Risk Factors Programme  
University of Jyväskylä,  
Professor Lea Pulkkinen

The Metapopulation  
Research Group  
University of Helsinki,  
Academy Professor Ilkka Hanski

Tissue Engineering and  
Medical, Dental and Veterinary  
Biomaterial Research Group  
Tampere University of  
Technology,  
Academy Professor Pertti Törmälä

VTT Industrial Biotechnology  
Technical Research Centre of  
Finland, Research Professor  
Hans Söderlund

Åbo Akademi University  
Process Chemistry Group  
Åbo Akademi University,  
Professor Mikko Hupa

### The new centres of excellence for 2002-2007

Applied Microbiology  
Research Unit  
University of Helsinki, Academy  
Professor Kaarina Sivonen

Bio- and Nanopolymers  
Research Group  
Helsinki University of Technology,  
University of Helsinki and  
University of Turku,  
Professor Jukka Seppälä

Centre for Environmental  
Health Risk Assessment  
National Public Health Institute,  
University of Helsinki and the  
Veterinary Medicine and Food  
Standards Research Institute,  
Research Professor  
Jouko Tuomisto

Centre of Excellence for Research  
in Cardiovascular Diseases and  
Type 2 Diabetes  
University of Kuopio,  
Professor Seppo Ylä-Herttua

Centre of Population  
Genetic Analyses  
University of Oulu and University  
of Helsinki, Professor Pekka Pamilo

Developmental Biology  
Research Programme  
University of Helsinki,  
Academy Professor Irma Thesleff

Finnish Research Unit for  
Mitochondrial Biogenesis  
and Disease (FinMIT)  
University of Tampere and  
University of Helsinki,  
Professor Howy Jacobs

Formal Methods in Programming  
Åbo Akademi University,  
Professor Ralph-Johan Back

From Data to Knowledge  
Research Unit  
University of Helsinki and  
Helsinki University of Technology,  
Academy Professor Esko Ukkonen

Helsinki Brain Research Centre  
University of Helsinki, Helsinki  
University of Technology and  
Helsinki and Uusimaa Hospital  
District, Academy Professor  
Risto Näätänen

History of Mind Research Unit  
University of Helsinki and  
University of Jyväskylä,  
Academy Professor  
Simo Knuutila

Research Unit of Geometric  
Analysis and Mathematical  
Physics  
University of Jyväskylä and  
University of Helsinki,  
Professor Pertti Mattila

Research Programme on Male  
Reproductive Health  
University of Turku,  
Professor Ilpo Huhtaniemi

Research Unit on Economic  
Structures and Growth  
University of Helsinki, Academy  
Professor Seppo Honkapohja

Research Unit on Physics,  
Chemistry and Biology of  
Atmospheric Composition  
and Climate Change  
University of Helsinki, University  
of Kuopio and the Finnish  
Meteorological Institute,  
Professor Markku Kulmala

Smart and Novel Radios  
Research Unit  
Helsinki University of Technology,  
Professor Antti Räisänen

### Nordic Centres of Excellence in Research 2003-2007

Nordic Centre for Studies of  
Ecosystem Carbon Exchange  
and Its Interactions with  
the Climate System  
Responsible leader: Professor  
Anders Lindroth, Lund University

Research Unit on Biosphere -  
Aerosol - Cloud - Climate  
Interactions, Responsible leader:  
Professor Markku Kulmala,  
University of Helsinki

The Dynamics of Ecological  
Systems under the Influence  
of Climatic Variation  
Responsible leader: Professor Nils  
Chr. Stenseth, University of Oslo

The Nordic Centre for  
Luminescence Research:  
Supporting Climate Change  
Research by the Provision of  
Precise and Accurate  
Chronological Control  
Responsible leader: Associate  
Professor Andrew Murray,  
University of Aarhus

## Administrative Office Personnel of the Academy of Finland in 2002

<b>Management</b>	<b>Bioscience and Environment Research Unit</b>	<b>Health Research Unit</b>	<b>Finance Unit</b>
Reijo Vihko, President Jarmo Laine, Senior Adviser Lea Ryyänen-Karjalainen, Senior Adviser Irmeli Rautiainen, Secretary	Arja Kallio, Secretary General Riitta Järvinen, Secretary	Merja Hiltunen, Secretary General Anneli Rajala, Secretary	Pirkko Virtanen, Head of Finance Merja Hyttinen, Office Secretary
Juha Sarkio, Executive Vice President (Administration) Päivi Kulo, Secretary	<b>Cultures and Social Science Research Unit</b>	<b>Administrative Unit</b>	<b>Data Administration Unit</b>
Anneli Pauli, Executive Vice President (Research) Anne Heinänen, Senior Adviser Anja Raatikainen, Secretary	Liisa Savunen, Secretary General Maija Ryhänen, Secretary	Hedvig Mikkolanniemi, Head of Administration Inkeri Tyynelä, Department Secretary	Seppo Raejärvi, ADP Manager Anneli Kauranen, Secretary
	<b>Natural Science and Engineering Research Unit</b>	<b>International Relations</b>	<b>Communications Unit</b>
	Susan Linko, Secretary General Aila Hagelin, Secretary	Raija Hattula, Head of International Relations Arja Bqain, Secretary	Maj-Lis Tanner, Head of Communications Marjo Aaltomaa, Communications Secretary

## Funding decisions of the Academy of Finland in 2002 by site of research \*)

Site of research	2002	%	2001	%	2000	%
<b>Universities</b>	<b>147 260 155</b>	<b>83.5</b>	<b>148 489 814</b>	<b>81.1</b>	<b>126 493 458</b>	<b>80.9</b>
Helsinki School of Economics and Business Administration	1 899 096	1.1	1 935 261	1.1	926 609	0.6
University of Helsinki	52 086 806	29.5	50 753 806	27.7	47 596 223	30.4
University of Joensuu	5 239 820	3.0	5 315 521	2.9	4 835 603	3.1
University of Jyväskylä	14 810 429	8.4	10 516 765	5.7	6 748 652	4.3
University of Kuopio	4 519 188	2.6	5 919 736	3.2	6 287 131	4.0
University of Lapland	1 516 147	0.9	942 487	0.5	977 438	0.6
Lappeenranta University of Technology	1 135 320	0.6	953 363	0.5	1 295 544	0.8
University of Oulu	13 211 766	7.5	13 514 625	7.4	11 033 546	7.1
Sibelius Academy	31 560	0.0	16 422	0.0	326 875	0.2
Swedish School of Economics and Business Administration	18 580	0.0	1 934 932	1.1	708 905	0.5
University of Art and Design Helsinki	385 597	0.2	61 949	0.0	218 814	0.1
Tampere University of Technology	6 261 761	3.5	5 374 010	2.9	5 083 251	3.3
University of Tampere	8 046 025	4.6	11 119 019	6.1	8 405 906	5.4
Theatre Academy		0.0	291 148	0.2		0.0
Helsinki University of Technology	16 678 303	9.5	13 633 396	7.4	11 416 100	7.3
Turku School of Economics and Business Administration	517 780	0.3	1 654 752	0.9	11 946	0.0
University of Turku	14 096 576	8.0	18 108 779	9.9	16 522 172	10.6
University of Vaasa	146 574	0.1	279 258	0.2	13 197	0.0
Åbo Akademi University	6 658 827	3.8	6 164 585	3.4	4 085 546	2.6
<b>University hospitals</b>	<b>750 809</b>	<b>0.4</b>	<b>1 942 820</b>	<b>1.1</b>	<b>1 218 753</b>	<b>0.8</b>
<b>Research institutes</b>	<b>10 663 087</b>	<b>6.0</b>	<b>15 230 253</b>	<b>8.3</b>	<b>10 644 729</b>	<b>6.8</b>
<b>Foreign organisations</b>	<b>14 960 697</b>	<b>8.5</b>	<b>14 146 933</b>	<b>7.7</b>	<b>14 497 373</b>	<b>9.3</b>
<b>Scientific associations</b>	<b>1 565 639</b>	<b>0.9</b>	<b>2 809 682</b>	<b>1.5</b>	<b>2 375 537</b>	<b>1.5</b>
<b>Polytechnics</b>	<b>11 660</b>	<b>0.0</b>	<b>55 540</b>	<b>0.0</b>	<b>0</b>	<b>0.0</b>
<b>Business companies</b>	<b>520 510</b>	<b>0.3</b>	<b>216 325</b>	<b>0.1</b>	<b>892 073</b>	<b>0.6</b>
<b>Other site of research</b>	<b>520 918</b>	<b>0.3</b>	<b>133 542</b>	<b>0.1</b>	<b>236 696</b>	<b>0.2</b>
<b>Individual researchers</b>	<b>205 464</b>	<b>0.1</b>	<b>19 030</b>	<b>0.0</b>	<b>36 671</b>	<b>0.0</b>
Total	176 458 939	100.0	183 043 939	100.0	156 395 290	100.0

## Funding decisions of the Academy of Finland in 2002, by field of research \*)

Field of research	2002	%	2001	%	2000	%
<b>Natural sciences</b>	<b>81 882 412</b>	<b>46</b>	<b>77 257 346</b>	<b>42</b>	<b>65 260 045</b>	<b>42</b>
Space research and astronomy	1 356 958	1	2 340 915	1	919 901	1
Biology, environmental sciences	34 387 839	19	27 811 007	15	28 988 735	19
Physics **)	22 647 537	13	21 355 226	12	19 120 538	12
Geosciences, meteorology	1 762 652	1	3 569 534	2	1 416 597	1
Chemistry	6 453 859	4	7 586 457	4	4 414 308	3
Geography	1 458 315	1	622 238	0	645 211	0
Mathematics	4 135 290	2	5 006 117	3	6 281 144	4
Information processing science	9 679 962	5	8 965 852	5	3 473 611	2
<b>Engineering</b>	<b>15 822 755</b>	<b>9</b>	<b>18 640 168</b>	<b>10</b>	<b>15 850 671</b>	<b>10</b>
Architecture	132 390	0	860 352	0	44 805	0
Biotechnology and food engineering	862 512	0	838 068	0	996 833	1
Energy technology	252 660	0	28 961	0	121 013	0
Mechanical engineering	1 582 350	1	889 936	0	3 478 449	2
Metallurgy and extractive engineering	436 958	0	400 083	0	247 466	0
Other engineering	379 860	0	1 151 206	1	670 660	0
Process and materials technology	1 805 726	1	3 655 877	2	828 932	1
Wood processing technology	21 000	0	126 941	0	367 325	0
Construction engineering, community planning and municipal engineering	308 790	0	741 869	0	559 219	0
Electrical engineering	9 623 489	5	9 242 510	5	7 487 011	5
Chemical engineering and chemical process technology	417 020	0	704 365	0	1 048 958	1
<b>Medicine and health sciences</b>	<b>29 830 019</b>	<b>17</b>	<b>32 719 549</b>	<b>18</b>	<b>28 465 806</b>	<b>18</b>
Biomedicine	14 361 385	8	13 265 179	7	13 234 514	8
Veterinary medicine	461 700	0	509 791	0	114 049	0
Pharmacy	751 672	0	1 494 580	1	370 031	0
Dental science	57 862	0	416 423	0	219 053	0
Nursing science	34 840	0	14 296	0	233 450	0
Public health science	2 873 646	2	7 940 706	4	4 430 964	3
Clinical medicine	10 305 574	6	8 842 330	5	9 537 361	6
Sports sciences	94 790	0	67 262	0	153 117	0
Nutrition science	888 550	1	168 982	0	173 267	0
<b>Agriculture and forestry</b>	<b>6 463 860</b>	<b>4</b>	<b>5 800 679</b>	<b>3</b>	<b>3 661 275</b>	<b>2</b>
Agricultural sciences, food sciences	2 443 002	1	440 065	0	230 064	0
Forest sciences	4 020 858	2	5 360 614	3	3 431 211	2
<b>Social sciences</b>	<b>24 045 670</b>	<b>14</b>	<b>29 440 125</b>	<b>16</b>	<b>23 727 941</b>	<b>15</b>
Economics	1 516 002	1	2 131 549	1	1 723 079	1
Education	6 008 272	3	2 163 452	1	2 810 578	2
Business economics, economic geography	2 403 900	1	6 257 771	3	1 472 960	1
Law	1 966 811	1	3 646 590	2	3 015 850	2
Psychology	4 187 147	2	3 920 460	2	3 051 752	2
Social science	5 141 504	3	6 869 661	4	8 177 585	5
Statistics	118 990	0	142 120	0	461 217	0
Political science and administration	2 139 414	1	3 405 628	2	2 185 120	1
Communication, library science and information science	563 630	0	902 894	0	829 800	1
<b>Humanities</b>	<b>18 414 223</b>	<b>10</b>	<b>19 120 118</b>	<b>10</b>	<b>18 606 516</b>	<b>12</b>
Philosophy	2 322 805	1	2 149 325	1	2 222 122	1
History and archaeology	4 330 371	2	5 525 442	3	4 253 117	3
Philology and linguistics	4 569 727	3	5 247 832	3	3 323 637	2
Cultures research	2 601 613	1	1 539 905	1	3 055 218	2
Aesthetic fields research and literature	2 655 189	2	2 572 722	1	3 658 461	2
Theology	1 934 518	1	2 084 892	1	2 093 961	1
<b>Others</b>			<b>65 920</b>	<b>0</b>	<b>823 040</b>	<b>1</b>
<b>Total</b>	<b>176 458 939</b>	<b>100</b>	<b>183 043 939</b>	<b>100</b>	<b>156 395 290</b>	<b>100</b>

\*) The figures also include the costs of research posts, converted into euros.

\*\*) The figure includes the CERN membership dues.

## Academy of Finland research programmes in 2002

Ageing (2000-2002)	<b>Research programmes to be started in 2003</b>
Baltic Sea, BIREME (2002-2005)	Environmental, Societal and Health Effects of Genetically Modified Organisms
Biodiversity, FIBRE (1997-2002)	Future Electronics
Biological Functions, Life 2000 (2000-2003)	Health Services Research
Electronic Materials and Microsystems, EMMA (1999-2002)	Industrial Design
Finnish Companies and the Challenge of Globalisation, LIIKE (2001-2004)	Russia
Future Mechanical Engineering, TUKEVA (2000-2003)	Social Capital and Networks of Trust
Global Change, FIGARE (1999-2002)	Systems Biology and Bioinformatics
Health Promotion, TERVE (2001-2004)	
Interaction across the Gulf of Bothnia (2000-2003)	
Life as Learning, LEARN (2002-2006)	
Marginalisation, Inequality and Ethnic Relations in Finland, SYREENI (2000-2003)	
Mathematical Methods and Modelling in the Sciences, MaDaMe (2000-2003)	
Media Culture, MEDIA (1999-2002)	
Microbes and Man, MICMAN (2002-2006)	
Proactive Computing, PROACT (2002-2005)	
Process Technology, PROTEK (1999-2002)	
Space Research, ANTARES (2001-2004)	
Structural Biology, RAKBIO (2000-2002)	
Sustainable Use of Natural Resources, SUNARE (2001-2004)	
Telecommunication Electronics, TELELECTRONICS II (2001-2003)	

## Academy of Finland publications series in 2002

1/02 Research Programme for Ecological Construction. Evaluation Report	9/02 Information Research Programme 1997-2001. Evaluation Report
2/02 National Programme for Materials and Structure Research 1994-2000. Evaluation Report	10/02 Research Programme for Electronic Materials and Microsystems 1999-2002. Evaluation Report
3/02 Tutkimus- ja kehittämisrahoitus valtion talousarviossa vuonna 2002. Timo Kolu	11/02 Biotechnology in Finland. Impact of Public Research Funding and Strategies for the Future. Evaluation Report
4/02 Finnish Research on Foreign and Security Policy. Evaluation Report	12/02 Research Programme for Process Technology 1999-2002. Evaluation Report
5/02 Research Programme for Urban Studies 1998-2001. Evaluation Report	13/02 Suomen kansallinen CERN-strategia vuosille 2003-2010. Työryhmän ehdotus
6/02 Suomen Akatemian kansainvälisen toiminnan strategia/Academy of Finland International Strategy	14/02 Finnish Research Programme on Environmental Health 1998-2001. Evaluation Report
7/02 Research Programme for the Economic Crisis of the 1990s: Reasons, Events and Consequences 1998-2001. Evaluation Report	15/02 Finnish Forest Cluster Research Programme 1998-2001. Evaluation Report
8/02 Women's Studies and Gender Research in Finland. Evaluation Report	

## Other publications in 2002

<b>Printed:</b>	<b>Internet:</b>
Academy of Finland Annual Report 2001	Academy of Finland web pages in Finnish, Swedish and English
Academy of Finland Research Funding. Guide for Applicants	( <a href="http://www.aka.fi">www.aka.fi</a> , <a href="http://www.aka.fi/eng">www.aka.fi/eng</a> , <a href="http://www.aka.fi/svenska">www.aka.fi/svenska</a> )
Academy in Brief. Brochure in Finnish, Swedish, English, French, German, Spanish, Russian, Chinese, Japanese	
How about a Career in Research	
National Programme for Materials and Structure Research 1994-2000. Second Progress Report	
National Programme on Electronic Materials and Microsystems. Research Reports	

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