ANNUAL REPORT • RAPPORT ANNUEL 2003

ACADEMY OF FINLAND

IN THE BEST INTERESTS OF SCIENCE AND RESEARCH
POUR LE MEILLEUR DE LA SCIENCE

The Academy of Finland is committed to promoting high-level research through long-term funding, reliable evaluation, science-policy expertise and global cooperation.

The Academy strives to advance the diversity of research, support its capacity for renewal and innovation, and to promote the use of its results as widely as possible for the benefit of social welfare, culture, the economy and the environment. The Academy's aim is to encourage closer exchange and interaction between basic and applied research and to develop international funding and research cooperation.

The Academy's highest executive organ is its Board of seven members who are responsible for the Academy's science policy line and the allocation of research appropriations to Research Councils. The Councils decide on research funding within their respective fields.

Contents

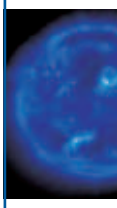
THE LONGER VIEW ON SCIENCE POLICY

When it's time to look back and assess the past, it is usually quite easy to make out the major historical turning-points and the main direction of change, perhaps even to recognise some grander scheme of things. However, it is impossible to know for sure what the future holds, no matter how much you have seen of the past. The human activity of science policy makes no exception in this respect.

Ever since 1950 the Academy's Research Councils have been appointed for fixed terms, currently for three years at a time. This three-year cycle ended at year-end 2003, and the new councils got to work the very next day. This provides a convenient vantage-point from which to look back at the past and ahead to the future. In this Annual Report, the Chairs of the Research Councils offer their own views. A good and comprehensive overview of research and the conditions for doing research in Finland can also be obtained from the Academy's 2003 review of the state and quality of scientific research.

The period since the economic recession of the early 1990s has been one of great success for Finnish science policy, and perhaps for Finnish society in general. Our investment in research has increased in terms of both money and new funding instruments. In 1990, Finland's R&D expenditure stood at 1.9 per cent of GDP. By 2003, the figure was 3.4 per cent. At the same time, total output per capita has reached the same level as in Sweden and Germany. The cake is bigger, and an ever bigger slice of it is being spent on research.

In 1994 the Ministry of Education made its first appointments of 12 centres of excellence in research without tying in any funding decisions. Today we have 42 centres of excellence that are all in a reasonably healthy funding position. The national graduate school system was set up in 1995. The same year saw Finland join the European Union, which opened up a new and important funding channel for our researchers. In 1996 the Finnish government took the decision



to invest substantial additional funds into research, and went on to complete the programme.

Whereas in the early 1990s the Academy had 21 Research Professorships and 95 posts for Senior Research Fellows, we now have 38 Academy Professors and 238 Academy Research Fellows. The Academy's postdoc system accommodates a total of 380 postdoctoral researchers. All these growth statistics have had a very positive impact on university research at the highest level.

It would be easy to continue this list of positive trends and to back it up by referring to various indicators compiled by independent bodies, which also show good results in terms of outcomes. Indeed, these outcomes stand up to any comparison. We in Finland tend to be quite modest about our achievements, so in that sense it is good to have others blow our trumpet for us. We can confirm the facts of their accounts and provide more background not only on the various aspects of growth, but also on our opening up, on the creation of new networks of cooperation, the successes of individual researchers, the growing role of business and industry in R&D and the unprecedented internationalisation of research.

What, then, about the future? Will the growth and success we enjoyed in the last few years of the twentieth century carry over into the new millennium? What do we aim for now that we are in the vanguard ourselves, without any obvious examples in the vicinity to follow?

Basic research is the Academy's home ground and will remain so in the future. It is interesting to see that the European Union is also promoting basic research to the front line of its research policy: witness the Commission's Communication in early 2004 on Europe and basic research as well as the progress that is being made with the current plans to set up a European Research Council. We need to make sure that Finland is closely involved in these processes.

Creating and supporting the highest quality research environments and the challenges related to researcher training and professional careers are now on the agenda of European research policy. In these areas we have gained valuable experiences from which others can draw important lessons. Research policy that cuts across national boundaries gives us the opportunity to give and to take.

It makes sense for us to take advantage of every opportunity to bring into Finland the highest level of international expertise, and it is certainly worth the effort to try and win a bid to host a major international research centre or infrastructure in Finland. In this era of globalisation, small countries like Finland are not doomed to be eternal losers – but winning requires independent initiative and a good cooperative attitude.

As we set about carving out a future for ourselves, we need to have clear understanding of our main challenges, of what we really want and how we can achieve our goals. Then, it's just a matter of nose to the grindstone. This is exactly what we have done up to now. It remains for the historians later on to record the results and identify the most significant common denominator in these developments.

I should like to take this opportunity to extend my warmest and respectful thanks to all Research Councils, experts, staff at the Administrative Office and Finnish researchers who have all done such an extraordinary job in promoting the best interests of science.

Reijo Vihko
President

"Winning requires independent initiative and a good cooperative attitude."

ACADEMY OF FINLAND IN 2003

REVIEW OF THE STATE AND QUALITY OF SCIENTIFIC RESEARCH

In 2003, the Academy published its third review of the state and quality of scientific research in Finland. The main focus of the review was on developments in the early years of the twenty-first century. The review concludes that science and research in Finland are of a high international standard. We invest substantial resources in research and development and have a competent research staff and a highly efficient researcher training system.

Among the key objectives of Finnish science policy are to raise the quality standards of research, to increase its international visibility, and to improve its scientific impact. These objectives have been met reasonably well. International publishing by Finnish scientists increased rapidly in the 1990s and early 2000s, and their work is now being cited more and more often. For example, at the turn of the 1980s and 1990s, Finland's relative citation impact was weaker than the average for the OECD countries, but from 1998 to 2002 the number of citations received by Finnish publications was seven per cent higher than the average for publications in OECD countries.

Along with Sweden, Finland ranks among the most active EU Member States in terms of investment in human resources and funding for R&D relative to GDP. In Finland R&D occupies more than 70,000 people or around two per cent of the active labour force, which is a higher proportion than anywhere else in the OECD. From 1997 to 2001, the number of personnel has increased by one-quarter.

Finland and Sweden also rank among the top EU countries in terms of the number of new graduates with a researcher training per one thousand population aged 25–34. According to OECD comparisons Finland's strengths lie in its high level of education, strong education system, and positive public opinion towards education.

Finnish researchers engage in international co-operation to a much greater extent than before. This trend is well described by the number of publications: in the biosciences and medicine, for instance, Finnish researchers' joint publications with European colleagues increased by 50 per cent and with American colleagues by 25 per cent from 1997 to 2001.

Growing interest in the impacts of science and research

One of the main themes cutting across the state and quality review is the impact of research. With the changes that are sweeping society today, considerations of impact have gained increasing importance in science policy and research funding. Research policy has become an ever more integral part of social policy. Citizens and politicians are increasingly interested in research, and consequently there are ever greater demands on efficiency and impact.

Finland's information society strategy has elevated information and its practical application into a value worth pursuing alongside education. There is perhaps no other human activity that has more diverse impacts than scientific research. Research has both foreseen and unforeseen, both intended and sometimes surprising impacts in the surrounding society as well as globally. The impacts of science materialise in and through the interaction of decision-makers, researchers, R&D funding bodies, business companies, administrative organs and civic organisations.

The Academy of Finland, then, through its own operation, exercises a broad, profound and long-term

impact on society and international relations. This impact is based upon the specific nature of its mission: the Academy provides funding for research in all disciplines as well as for multidisciplinary projects. The Academy's four Research Councils each cover different fields of research.

With the heavy emphasis on innovation in Finnish science and technology policy over the past couple of decades, the onus for producing social impacts through research has largely rested with the natural sciences and engineering. Research in these fields has given us greater control over and allowed us to make better use of the material world. Scientific and technological knowledge has laid the foundation for new innovations and products and their commercialisation.

For the ordinary citizen, the most apparent impacts of science and research come from the line of research that is funded by the Research Council for Health. This is grounded in the broad consensus about the importance of health. Research that promotes health contributes to an improved quality of life: new medicines and health and welfare technologies are perhaps the most prominent examples. Besides the Academy, several other national and international funding bodies are involved in supporting this innovation effort.

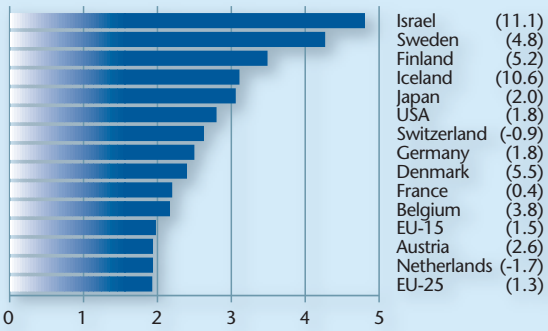
Research funded by the Research Council for Culture and Society is focused on various phenomena within its fields. Studies in history, psychology and politics, for instance, shape the way that people think about themselves and even change established practices in society.

Biosciences and environmental research produces new knowledge and insights into the relationship between humans and the environment. This is crucial not only to understanding the anatomy of environmental hazards and to bringing environmental problems under more effective control, but also to the preservation of species diversity.

Finland continues to invest in science

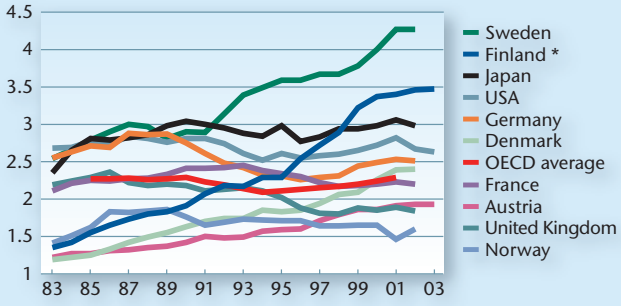
The Academy of Finland is the major funding body of basic research in our country. The development of Academy research funding has followed the policy decisions taken by the Science and Technology Policy Council of Finland.

R&D intensity (GERD as % of GDB), 2001*; in brackets: average annual growth rates of R&D intensity (%), 1997–2001**



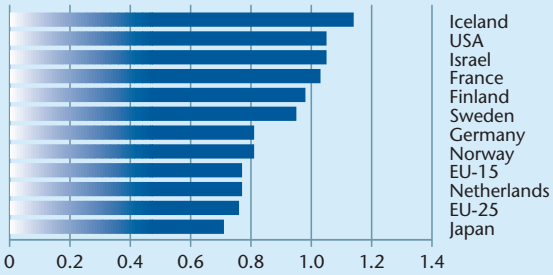
* or latest available year
** or nearest available years
Source: European Commission, Key Figures 2003–2004

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

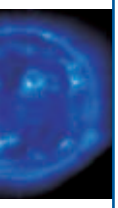


* Figure for 2003 Ministry of Finance estimate
Source: OECD

Government budget allocated to R&D as % of GDP in 2003*



* or latest available year
Source: European Commission, Key Figures 2003–2004



Finland has consistently ranked among the world leaders in terms of its investment in R&D. Ours is a small country so the absolute sums involved are obviously smaller than in many other countries, but when compared with GDP the figures are impressive. In 2003, Finland's research and development spending as a proportion of GDP stood at 3.4 per cent. Finland accounted for 0.7 per cent of the OECD countries' combined R&D investment.

The government allocated 1.4 billion euros to R&D in 2003, an increase of 25 million euros on 2002. Expenditure showed a nominal increase of 1.8 per cent, but decreased 1.2 per cent in real terms. Government research expenditure as a proportion of public spending, excluding central government debt servicing, stood at 4.4 per cent, virtually the same as in 2002.

The funding made available for allocation through the Academy of Finland in 2003, 185.1 million euros, was equivalent to the 2002 funding level. In 2003, the Academy accounted for 13 per cent of government research spending, showing no change on 2002.

Competitive research funding

The Academy's main instruments for supporting Finnish research include research project funding that is open for general application, research programmes, centre of excellence programmes and posts for Academy Professor and Academy Research Fellow. Virtually all research projects involve international cooperation, researcher training and work abroad.

In 2003 the Academy of Finland spent 184.4 million euros on supporting research, 8 million euros more than in 2002 (see page 32).

Academy research funding is competitive. In 2003, it received applications worth 841.6 million euros. The total amount of research funding awarded was 184.4 million euros, or 22 per cent of the total value of all applications. The number of applications received was 5,053, of which 2,501 were successful. Large numbers of high-quality research projects and international standard researchers remained without funding.

Research projects accounted for 42 per cent of all funding granted by the Academy in 2003. The figure for research programmes was 23.5 per cent, for researcher training 14.5 per cent, research posts 11 per cent and international cooperation 8 per cent.

In 2003, 5,337 persons worked a total of 2,778 person-years with Academy research funding. More than four-fifths or 82 per cent of all Academy research funds were awarded to researchers working in universities or university hospitals.

Research and development expenditure by sectors in Finland in 1991–2003

Year	Business enterprise		Public sector*		Higher education sector**		Total	R&D spending as % of GDP***
	€ million	%	€ million	%	€ million	%	€ million	%
1991	975.1	57.0	357.5	20.9	378.0	22.1	1,710.6	2.04
1993	1,048.5	58.4	379.7	21.1	367.5	20.5	1,795.8	2.16
1995	1,373.4	63.2	374.4	17.2	424.6	19.6	2,172.4	2.28
1997	1,916.7	66.0	408.6	14.1	579.5	20.0	2,904.9	2.71
1998	2,252.8	67.2	443.9	13.2	657.8	19.6	3,354.5	2.88
1999	2,643.9	68.2	470.1	12.1	764.8	19.7	3,878.8	3.23
2000	3,135.9	70.9	497.4	11.2	789.3	17.8	4,422.6	3.40
2001	3,284.0	71.1	500.9	10.8	834.1	18.1	4,619.0	3.42
2002	3,375.1	69.9	529.7	11.0	925.6	19.2	4,830.3	3.46
2003****	3,380.3	69.5	518.3	10.7	963.8	19.8	4,862.4	3.43

* Includes private non-profit institutions

** Includes university central hospitals from 1997, polytechnics from 1999

*** Figures based on revised national accounts (base year 2000). GDP for 2003 Ministry of Finance estimate

**** Estimate based on questionnaire responses and other calculations

Source: Statistics Finland

Eighteen research programmes

Grounded in either a scientific or social background or both, research programmes are composed of a number of research projects that are focused on a defined subject area or set of problems and that are scheduled to run for a fixed period of time under a coordinated management. The main motivation for launching research programmes is that they are expected to break new ground and generate added value when compared to individual projects. In 2003, the Academy had 18 ongoing research programmes. The budget authority for 2003 was used to launch a total of seven new programmes, which were prepared and implemented jointly with other funding agencies. At the same time, steps were taken to promote co-operation with international funding agencies and to support networking among international research programmes working in the same field.

The proportion of Academy funding allocated to research programmes and targeted programmes was greater in 2003 (23%) than in 2002 (12%). This is because no funding decisions were made on centres of excellence.

The funding term ended for six programmes in 2003: the Research Programme on Biological Functions, Life 2000 (2000–2003); Interaction across the Gulf of Bothnia (2000–2003); the Research Programme on Mathematical Methods and Modelling in the Sciences, MaDaMe (2000–2003); the Research Programme on Marginalisation, Inequality and Ethnic Relations in Finland, SYREENI (2000–2003); the Research Programme for Telecommunication Electronics, TELETRONICS II (2001–2003); and the Research Programme on Future Mechanical Engineering, TUKEVA (2000–2003). These research programmes are described on page 37.

In the context of research programmes the Academy had cooperation with 16 domestic and foreign research funding bodies in both the public and private sector.

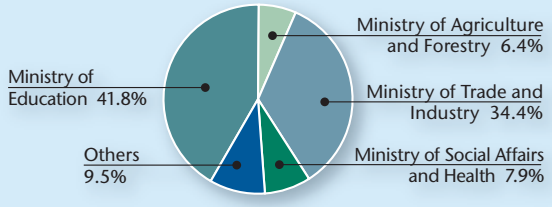
Four ministries were involved in the preparation and funding of Academy research programmes. In addition, funding was made available by one other public sector organisation. Three Finnish foundations and the Work Environment Fund contributed.

Government R&D appropriations by funding organisation in 2002 and 2003

Organisations	€ million		Change 2002-2003		
	2002	2003	€ million	Nom. %	Real. %
Universities	377.7	386.7	9.0	2.4	-0.6
University hospitals	56.7	48.7	-8.0	-14.1	-16.6
Academy of Finland	184.9	185.1	0.2	0.1	-2.8
Tekes	398.5	399.3	0.8	0.2	-2.7
Government research institutes	234.4	234.0	-0.3	-0.1	-3.1
Other funding	140.0	162.9	22.9	16.4	13.0
Total	1,392.1	1,416.7	24.6	1.8	-1.2

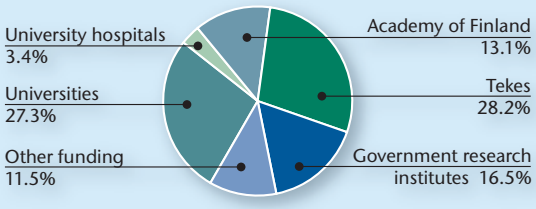
Source: Statistics Finland

Government R&D funding by ministry in 2003



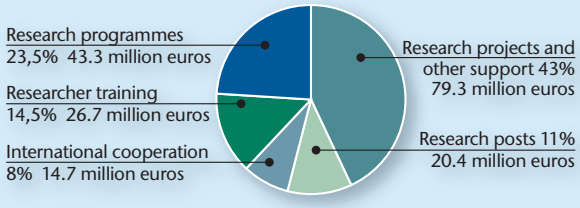
Source: Statistics Finland

Government R&D funding by organisation in 2003



Source: Statistics Finland

Academy of Finland research funding decisions by type of funding in 2003



Total 184.4 million euros

The Academy of Finland worked closely with the National Technology Agency Tekes in the funding of research programmes and cluster programmes. During 2003 the Academy of Finland had eight ongoing research programmes to which the National Technology Agency contributed. The Academy, in turn, contributed to one Tekes programme.

The Academy contributed with one research programme (Wood Material Science) and one targeted programme (Sustainable Use of Natural Resources, SUNARE) to two national cluster programmes in the forest cluster and environmental cluster.

The Councils participated in two EUROCORES collaborative research programmes administered by the European Science Foundation, and prepared their participation in eight programmes.

Centres of excellence have lived up to expectations

The centre of excellence programme is one of the key instruments in which the Academy strives to promote the development of creative research environments. All centres of excellence in research are at the very cutting edge of their respective fields. Centre of excellence programmes are jointly funded with Tekes in line with the national strategy for centres of excellence in research. In addition, the host organisations of these units provide substantial funding and other support.

In 2003, a total of 42 centres of excellence were funded through two centre of excellence programmes. The second 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, started in 2003. Following negotiations conducted with both the centres of excellence and the core facilities organisations, the decision was taken to spend 30.3 million euros on supporting this programme in 2003–2005.

Around 8.5 per cent of the Academy's annual research funding goes towards contractual funding of centre of excellence programmes. Separate funding for centres of excellence is thus at a rather low level by international comparison.

During its first three years the first national centre of excellence programme has achieved many of the targets that were identified at the outset. Both multidisciplinary research and researcher mobility have increased, and there is more synergy and cohesion between research teams. Funding for centres of excellence has also allowed them to engage in basic as well as high-risk research. The centres of excellence are listed on page 36.

Many new challenges lie ahead. In the third centre of excellence programme that is due to start up in 2006, the Academy will be emphasising the importance of new openings, multidisciplinary and interdisciplinary approaches, systematic cooperation among research groups internationally as well as the application and popularisation of research results. Preparations for the new programme got under way in 2003.

A Nordic Centres of Excellence Programme funded by 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) was launched at the beginning of 2003. The programme focuses on global change research. Annual funding for the five-year pilot programme amounts to around 1.6 million euros. The Academy's contribution is 189,000 euros.

An international scientific advisory group was appointed to monitor and support the work of the four

centres of excellence involved in the programme. The group had its first meeting in late 2003. One of the four units is led by an Academy Professor, two other units involve Finnish research teams. The programme secretariat is based at the Academy of Finland. The Nordic centres of excellence are listed on page 36.

The call for the second Nordic Centres of Excellence programme was opened in autumn 2003. This programme in molecular medicine and the related researcher training are funded by the Joint Committee for Medical Research (NOS-M), the Nordic Council of Ministers and the Nordic Academy for Advanced Study (NorFA). Scheduled to run from 2004 to 2009, the programme has annual funding of around 1.2 million euros; the Academy's contribution is around 120,000 euros per year. Research teams from Finland have shown a high level of interest.

The Academy provided funding for the cooperation of four Finnish centres of excellence in the natural sciences and biosciences with groups funded by the National Natural Science Foundation of China (NSFC). Funding for the 2002–2005 period amounts to 0.7 million euros.

PhDs in demand on the job market

Commissioned by the Ministry of Education, the Academy carried out a survey on PhD employment, placement and demand in the Finnish labour market in order to provide a background for education and science policy decision-making. The project was launched in response to broad public concern over the rising number of doctorates awarded and the dwindling employment opportunities for PhDs.

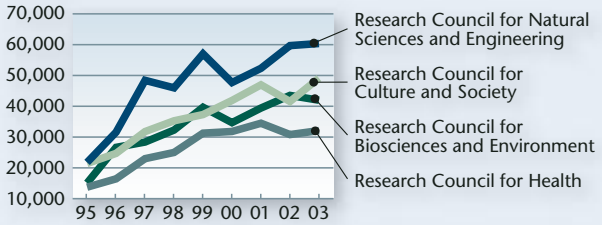
In 1989–2002, a total of 11,577 persons earned a doctorate. At the same time higher academic degrees were completed by 142,119 persons. According to the survey PhDs have so far had little difficulty finding employment. In 2000, the unemployment rate among PhDs was 1.5 per cent, among people with a higher university degree it was 3.6 per cent, and for the whole active labour force around 10 per cent.

PhDs in engineering, medicine and the natural sciences have been the most successful in terms of finding employment. These are also the fields with the highest number of graduating PhDs. PhD graduates have made good use of their training in that most of them are in jobs that are compatible with their qualifications. There are no indications of a future decline in the demand for PhDs.

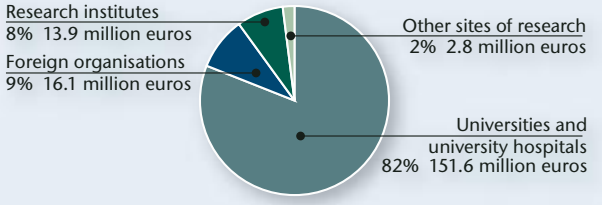
In 2001, the number of research personnel with a PhD was 7,441, representing 11 per cent of total R&D personnel. Within this group over 60 per cent were employed in the university sector and 14 per cent in the private sector.

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 uni-

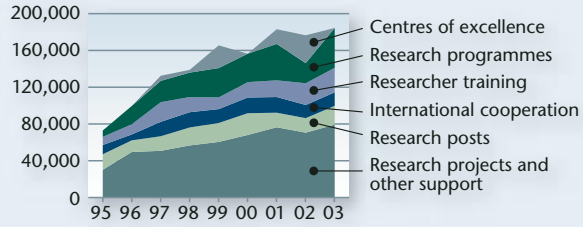
Academy of Finland research funding by Research Councils in 1995–2003 (1,000 euros)



Breakdown of Academy of Finland research funding by site of research in 2003



Academy of Finland research funding decisions by type of funding in 1995–2003 (1,000 euros)



Science03 was primarily targeted at the general public, and specifically at schoolchildren.

versity positions. In 2003, the Academy's Research Councils awarded 190 two-year grants for newly-graduated PhDs starting out on professional careers in research. At year-end 2003 there were 238 posts for Academy Research Fellows and 38 posts for Academy Professors.

At the end of 2003, the Academy appointed a working group to draft a proposal on measures for the promotion of researcher training and basic research that would satisfy the needs of business and industry and for the development of closer cooperation between the Academy and business and industry.

Academy research funding as well as its research posts and positions are important career avenues for both men and women. Women's position in the Academy's system of research posts has improved: in 1997–2003 the number of women appointed to different Academy research posts has exceeded their proportion among the applicants. Among Academy Research Fellows the figure was 33 per cent, and among Academy Professors 29 per cent.

Most of the Academy's support for researcher training is provided in the form of project funding. The Academy's Research Councils award annual grants to support graduate schools that are run by the Ministry of Education. At year-end 2003 there were 114 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 for their doctorate with funding from other sources.

In 2003, the Academy continued to support the international mobility of researchers as part of its general research funding. In addition, a total of 2.4 million euros was awarded in grants to researchers and doctoral students working abroad; a further 1.8 million euros went to the same purposes through bilateral international agreements.

Within the framework of bilateral researcher exchange, 187 Finnish researchers spent a total of 6,186 days working abroad, while 400 foreign researchers spent 12,041 days in Finland.

The Academy contributed to the development of a national mobility centre for EU researchers and a related website. The EU granted 200,000 euros to support this work.

Emphasis on international evaluations

The results of the international evaluation of the Academy of Finland, which started up in 2002 commissioned by the Ministry of Education, will be published in March 2004. The international evaluation panel had access to a wide range of materials. In addition its members conducted a large number of interviews and visited the Academy on two occasions.

All funding decisions made by the Academy are based on scientific evaluations of the applicants and

their research plans. For this purpose the Academy consults domestic as well as foreign experts who are esteemed researchers in their respective fields. In 2003, the Academy consulted 758 experts, 347 of whom were from outside Finland.

Apart from evaluating the overall state and quality of Finnish science, the Academy regularly carries out assessments of individual disciplines as well as the research programmes it supports. Over the past 20 years, the Academy has launched and coordinated 25 assessments of individual fields of research and disciplines. In 2003, international evaluations were carried out on the disciplines of nursing science and the geosciences, and a new evaluation was launched in the area of business know-how.

Final evaluations were carried out for six research programmes in 2003. In addition, the Academy commissioned an assessment by the Research Institute for Social Sciences at the University of Tampere of 12 Academy research programmes and their impacts. The publications are listed on page 37.

Towards a European Research Area

Finland has been actively involved in the ongoing development of a European Research Area (ERA), in which the EU's framework programmes for research are key instruments, as well as in the project to set up a European Research Council (ERC).

The Academy of Finland shares responsibility with the National Technology Agency Tekes for the national coordination of the Sixth EU Framework Programme. Key strategies of the programme include the networks of excellence, integrated projects as well as support for the networking of national research programmes (ERA-NET). The work that was done in preparation of the ERA-NET project required considerable input on the part of the Academy. This careful preparation was rewarded with the decision to appoint the Academy as coordinator of two ERA-NET projects. BONUS actually scored highest among all the proposed projects, and NORFACE was praised as excellent. In addition, the Academy is involved as a partner in five ERA-NET projects.

Other EU projects in which the Academy was involved included the Training Network for National Contact Points (TRAIN-NET), the programme for the Coordination of Genomes Research Across Europe (COGENE), the European-Developing Countries Clinical Trials Programme (EDCTP) and the Internet Press Centre for European Science and Arts (AlphaGalileo).

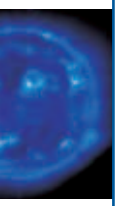
The Academy's President is a member of the European Research Advisory Board (EURAB) and the European Union Research Organisations Heads of Research Councils (EUROHORCs). In 2004–2008, the Academy will be contributing to the ESF-administered European Young Investigators Award (EURYI), which was founded by EUROHORCs.

Outside the EU framework programme, the Academy has several bilateral and multilateral research programmes and cooperation with various countries and regions. In 2003, the Academy had bilateral international agreements with 27 countries and regions and 40 foreign organisations. The most common types of collaboration specified in the agreements were research project cooperation (27 agreements), expert evaluations (21), researcher training courses (27), researcher mobility (13) and information exchange (28).

The Academy provides funding to support the operation of the European Molecular Biology Laboratory (EMBL) and the European Molecular Biology Conference (EMBC), the operation of the ESF and the European Organization for Nuclear Research (CERN), research projects by the European Space Agency (ESA), researcher training at the European University Institute (EUI) and the operation of the International Institute for Applied Systems Analysis (IIASA).

In addition, the Academy is involved in promoting European research cooperation through the COST forum (European Cooperation in the Field of Scientific and Technical Research) and the INTAS association which is dedicated to promoting scientific cooperation between CIS and EU countries.

The Academy is involved in UNESCO's science programmes and is an active member of the joint Nordic science committees (NOS). Academy representatives lent their assistance to Gustav Björkstrand who was appointed by the Nordic Council of Ministers to work out a blueprint for a Nordic Research and Innovation Area (NORIA). The plans were published in a white book in 2003.



Finland and Russia deepened their cooperation in Baltic research. One of the outcomes was the signing of an agreement between the Academy of Finland and the Russian Foundation for Basic Research (RFBR) to provide funding for Finno-Russian research projects in 2004–2006. The projects sponsored are involved in the Academy's Baltic Sea Research Programme (BIREME). The Academy has responsibility for the funding of the Finnish researchers, the RFBR for funding the Russian researchers.

The Academy also has centre of excellence cooperation with China. Ultimately the aim is for the Academy to set up an office in China. In 2003 the Academy opened an office in New York with a view to promoting research in the area of business know-how between Finnish and US universities.

New strategy in place

During the reporting period the Academy's strategy was updated by the Academy Board. The strategy emphasises the importance of international cooperation and the tendency in science and research towards ever fiercer competition. For this reason it is important to make sure that Finnish research remains firmly at the cutting edge of modern science and that Finnish research environments are globally cooperative as well as competitive.

The Academy's aim, according to the new strategy, is to increase public understanding of science and research as well as their social esteem. The strategy is geared to the creation of a society and economy based on innovation and know-how. Special attention is paid to maintaining the research system's capacity for renewal and regeneration, making sure that a professional career in research is an attractive option, and to promoting closer collaboration between the public and private sector.

According to the strategy, the Academy's operation is characterised by expertise, reliability, impartiality, interactivity and gender equality. Good cooperation among international funding bodies requires openness, diversity as well as a readiness to take on the challenges of global interaction. Furthermore, the Academy considers it important that different disciplines receive fair and equitable treatment as they compete for funding.

The Academy carried out a community image survey among its key interest groups and received high scores throughout. Researchers in particular were pleased with the Academy's performance.

2003 marked the final year in office for the Academy's Board and Research Councils, which are appointed by the Government for a three-year term. The Board met on eight occasions during 2003. 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 Research Councils decide on research funding within their respective fields and act as experts in science policy issues. The members of the Board and the Research Councils are listed on page 34. The work of the Research Councils is described in closer detail on pages 16–31.

The Administrative Office has responsibility for the Academy's administration. It does all the necessary groundwork for official decision-making by the Board, Research Councils and subcommittees, and on the other hand executes and monitors their decisions. The Administrative Office is headed by the Academy's President. The Administrative Office is divided into research units and support units: see page 33.

At year-end 2003 the Administrative Office had a permanent staff of 148, marking an increase of eight on the previous year. Over half (61%) of the staff had an academic degree. The proportion with a researcher training remained at around one-fifth (21%). Among Administrative Office staff 60.8 per cent were in expert and supervisory positions. Women accounted for 74 per cent of Administrative Office personnel.

The Administrative Office's payroll costs totalled 5.7 million euros.

In February 2003, on the initiative of the Board of the Academy of Finland, the President of the Republic conferred the honorary title of Academician upon Research Professor Emerita Pirjo Mäkelä. Professor Mäkelä is the first Finnish woman to receive this title. All Finnish and foreign holders of the title are listed on page 34.

During the year the Academy announced its first awards for promising researchers who are at a dynamic stage of their career. The Academy's Recognition Award went to Docent Jari Ehrnrooth from the

University of Helsinki. The panel of judges were particularly appreciative of his ability fluently to combine in his work both sociology, the history of ideas and culture, literary studies, and philosophy. The Academy's Incentive Award was bestowed on Academy Research Fellow Johanna Mappes from the University of Jyväskylä. Together with her colleagues, she has developed a new approach to studying warning signals. The method has received widespread international recognition in evolution research and has helped to resolve important long-standing problems in this field. The prize, presented to Ms Mappes and Mr Ehrnrooth at the Academy's science gala, was a piece in bronze called "Path" by Mika Natri, who won the Academy's art competition in 2003.

The 2003 Finnish Science Award was bestowed, on the Academy's proposal, on Professor Markku Kulmala. Based at the University of Helsinki Department of Physical Sciences, Professor Kulmala is in charge of a unit that is involved in the national centre of excellence programme.

The Academy organised its third national series of science events in 2003. At Science03, the Academy and 64 partners joined forces to inspire wider public interest in research in the natural sciences and technology. The events involved universities, research institutes, centres of excellence, business companies, scientific societies, museums and organisations from all around Finland. The science events were primarily targeted at the general public, more specifically at schoolchildren and their teachers.

The Academy took part in the Man and Cosmos event in Kuhmo as well as in the Space 2003 exhibition in Helsinki. The winner of last year's science competition for senior secondary school students was Kaisa Matomäki. In all there were 130 entries.

Research post holders under Research Councils 31st December 2003

Research Councils	Academy Professors	Academy Research Fellows	Total		
			Women	Men	Total
Research Council for Biosciences and Environment	8	51	19	40	59
Research Council for Culture and Society	11	65	26	50	76
Research Council for Natural Sciences and Engineering	11	70	18	63	81
Research Council for Health	8	50	27	31	58
Total	38	236	90	184	274

Academy of Finland research funding decision by type of funding in 2003

Type of funding	Research Council for Biosciences and Environment		Research Council for Culture and Society		Research Council for Natural Sciences and Engineering		Research Council for Health		Total	
	€	%	€	%	€	%	€	%	€	%
Research posts	4,805,710	12	5,822,120	11	6,172,250	10	3,616,440	11	20,416,520	11
Programme funding	9,963,970	24	12,836,780	25	11,597,100	19	8,930,630	27	43,328,480	24
Research project funding	18,967,440	45	20,899,776	43	23,236,240	39	13,134,320	41	76,237,776	42
Researcher training	6,180,490	14	7,171,920	15	7,693,110	13	5,643,980	18	26,689,500	13
International researcher exchange	363,610	1	421,620	1	783,457	1	238,860	1	1,807,547	1
Funding to international organisations	1,134,580	3	747,850	2	10,330,190	17	22,110	0	12,234,730	7
Other support to research	543,080	1	1,216,670	3	562,080	1	505,370	2	2,827,200	2
Total	41,958,880	100	49,116,736	100	60,374,427	100	32,091,710	100	183,541,753	100

TERTTU VARTIAINEN:

WE NEED A RIGOROUS SYSTEM OF EVALUATION

"The single most important step for us over the past three years has been to upgrade the applications review process. It is crucially important that we have in place a rigorous system of scientific evaluation. The evaluations are now carried out by panels that consist mainly of foreign experts," says Professor Terttu Vartiainen.

Vartiainen chaired the Research Council for Biosciences and Environment and was a member of the Academy Board for two terms (1998–2000 and 2001–2003). Throughout this time, she says, international contacts have been a priority concern. In the future, international cooperation will be promoted not only in research but in funding as well.

"The best way to promote international cooperation is through joint research projects that involve not only researchers but funding bodies from different countries. A good example is provided by the Baltic Sea Research Programme," she continues.

In biosciences and environmental research, Professor Vartiainen has been particularly pleased to see new fields of research open up.

"This is essential for the development of new innovations. At the same time, though, we have to accept that these new fields involve more uncertainties than older, well-established fields of research. It is noteworthy that most of the new openings have been born out of multidisciplinary and interdisciplinary ventures."

"The projects we selected were successful and we were able to show that to the Board."

"This is not to say, however, that we have ignored these older fields of research."

"Our basic strategies were constantly developed over the past three years for greater clarity and consistency. Steps were also taken to improve the cooperation between the Research Councils and to develop the Board's operations. Transparency improved with the adoption of a set of general principles that we also posted on the website," Vartiainen points out.

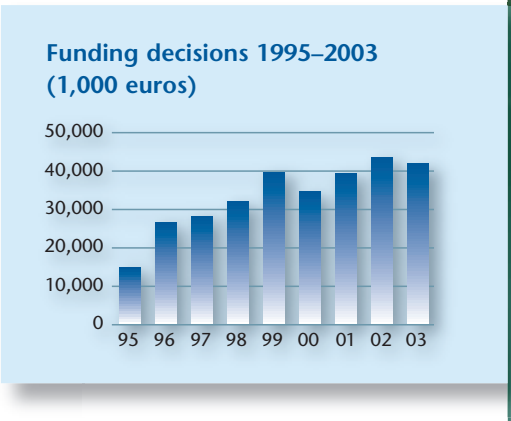
"Science is advancing all the time. This is also reflected in the applications received by the Research Council. Over the past year the share of biosciences has increased, while the number of applications in ecology has remained unchanged. On the other hand, traditional environmental research has been slightly falling behind."

"The Research Council is certainly in a position to steer the direction of research to some extent, but it cannot determine what kind of applications we get. Its steering role is mainly confined to research programmes. The criteria for project selection and for awarding research funding are available for public scrutiny. The money goes to the best applications," Vartiainen stresses.

RESEARCH COUNCIL FOR BIOSCIENCES AND ENVIRONMENT IN 2003:

KNOWLEDGE AND INTERACTION

The Research Council for Biosciences and Environment continued to promote Finnish research at the highest level. Most of the projects funded by the Council were basic research, which rarely generates immediate social impacts and returns on investment. In some fields, though, such as ecology and the management of environmental risks, the impacts have materialised quite soon.



Committed to promoting the impacts of science and research, the Research Council for Biosciences and Environment based its funding decisions on international scientific reviews. The large bulk of Council funding went to universities (85%), some of the monies were allocated to research institutes (8%).

The Council used the various funding instruments at its disposal to promote internationalisation, develop researcher training and support growth areas. It compiled a report on the state-of-the-art of research in its disciplines, which concluded that they continue to enjoy high international visibility. The international standard of agricultural research had improved. Other disciplines held on to their positions. Overall the standard of work in biosciences and environmental research is high, even though development may have plateaued somewhat.

A survey carried out among researchers who had received Academy funding provided a useful overview of the impacts of biosciences and environmental research. In addition to generating technical innovations, supporting economic development and providing training for experts, research in this field promotes environmental protection and the management of environmental risks and has an impact on politics and administration.

Researchers funded from Council sources take an active part in public discussion and debate on issues that touch upon their area of expertise as well as in committee work and development projects. Some projects in environmental protection have involved direct development cooperation with Third World countries.

During 2003 the Council carried out assessments of three of its targeted programmes: microbe ecology and physiology, material flows and materials recycling and agricultural research. The main focus of these evaluations was on the impacts and added value produced by this form of funding. For the main part the programmes reached the targets that were set and produced substantial added value when compared to general project funding. Work will continue to develop targeting of funding on the basis of the recommendations made in these evaluations.

Research programmes: platforms for cooperation

The Research Council for Biosciences and Environment is committed to setting up multidisciplinary or interdisciplinary and international research programmes. These kinds of programmes provide the most effective tools for the development of creative research and education environments.

The Council took an active role in the international networking of ongoing and planned research programmes. The main emphasis in the planning, coordination and evaluation of research programmes was on the integration and application of results. The Nordic dimension and Arctic issues had a prominent presence in environmental research programmes.

In 2003 the Council took the decision to provide funding for one new research programme and invited applications for complementary funding in two ongoing programmes. Two new research programmes started up.

The Research Programme on Environmental, Societal and Health Effects of Genetically Modified Organisms (ESGEMO) involves 11 projects. Academy funding for the programme during 2004–2007 will

amount to 2.9 million euros. Funding will also be made available by the Ministry of Agriculture and Forestry and the Ministry of the Environment. Non-governmental organisations (NGOs) were consulted in the blueprint phase to get their views on the aims and contents of the programme.

The Baltic Sea Research Programme (BIREME 2003–2005) and the Russian Foundation for Basic Research (RFBR) invited funding applications for studies in the ecology of coastal regions and environmental research. BIREME is also funded by the Ministry of the Environment, the Ministry of Agriculture and Forestry, the Ministry of Transport and Communications and the Nessling Foundation. The programme coordination is based at the Biosciences and Environment Research Unit. The programme manager chaired a working group discussing the infrastructure strategy of European marine research. The working group reported on its findings in the Academy's publication series.

Jointly funded from Finnish and Swedish sources, the Research Programme on Wood Material Science (2003–2006) kicked off in 2003 with a round of applications organised by the National Technology Agency Tekes and the Swedish Agency for Innovation Systems Vinnova. Funding was made available to eight Finnish-Swedish research projects concerned with the properties and processing of wood materials and expected to generate scientific added value. The programme is supported not only from Academy and Tekes sources, but also by the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning, and the Finnish Ministry of Agriculture and Forestry.

The Council has main responsibility for one ongoing Academy research programme, namely the Research Programme on the Sustainable Use of Natural Resources (SUNARE 2001–2004). Research in disciplines hosted by the Council is also being funded in many other Academy-funded research programmes, including Microbes and Man (2002–2006) and Russia in Flux (2004–2007). The Research Programme on Biological Functions (Life 2000, 2000–2003), which ended in 2003, organised thematic seminars for researchers. The results of the programme were presented at a final seminar on a DVD programme, which also looked into ethical questions involved in biosciences research.

Scientific evaluations were published for two programmes that ended in 2002, i.e. the Finnish Biodiversity Research Programme (FIBRE) and the Finnish Global Change Research Programme (FIGARE). Both were considered to have achieved high scientific standards and to have shown strong social relevance.

The Council began its long-term preparations for the Neuroscience Research Programme, which will be geared towards international research cooperation.

The Council was involved in implementing, monitoring and in the international networking of national centre of excellence programmes. The four research networks engaged in the first Nordic centres of excellence programme began their work in basic natural scientific research on global change.

A force in international science policy

In the European science policy the Council creates new links of cooperation through ERA-NET projects under the EU's Sixth Framework Programme for Research. It was involved in three ERA-NET applications that were submitted in early summer. All were awarded funding through the framework programme.

Designed to support and promote networking among Baltic researchers, the BONUS ERA-NET project involves ten funding organisations from eight different countries and one international science organisation. The project is coordinated by the Biosciences and Environment Research Unit. The unit was also involved in two other ERA-NET projects. WOODWISDOM-NET is a natural extension to the joint Finnish-Swedish Research Programme on Wood Material Science, in which Norway, Denmark and Germany are now involved as well. In the field of plant genomics, ERA-PG involves cooperation among research funding bodies from 11 European countries. All leading Finnish researchers are involved in this network through the plant genomics project programme set up by the Academy.

The new instruments of the framework programme, integrated projects and networks of excellence all require long-term planning and preparation that is organised on a professional basis. The Council supported the participation of Finnish researchers in these projects by awarding grants worth 200,000

euros for the preparation of 15 projects. The projects that received these grants had excellent success in the framework programme, in spite of increasingly intense competition.

European research cooperation was deepened through the opportunities offered by the European Science Foundation. The Council is involved in preparing three EUROCORES programmes – EuroCLIMATE, BIODIVERSITY and the Science of Protein Production programme (EuroSCOPE) – in which it has had an influence on both programme contents and orientation. Preparation for the EuroSCOPE programme is a joint effort with the Research Council for Health.

The Council lobbied for the foundation of a high-level international research centre in molecular medicine in Finland. The initiative suggests that the research centre be set up as an EMBL Affiliated Centre that operates as a national research unit and works closely with the European Molecular Biology Laboratory, the leading institute in Europe.

The Council has charge of the work of the Finnish Global Change Research Support Group (FIGSU) appointed by the Academy Board. The support group's job is to maintain contact with international science programmes in the field of global change research: the World Climate Research Programme (WCRP), the International Geosphere-Biosphere Programme (IGBP), and the International Human Dimensions Programme on Global Environmental Change (IHDP). In addition, the group serves as the national SCOPE committee (Scientific Committee on Problems of the Environment) and the national committee for two UNESCO science programmes, the International Hydrological Programme (IHP) and Man and the Biosphere Programme (MAB).

Fields of research hosted by the Research Council for Biosciences and Environment:

- 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, bioinformatics and economic and technological research related to the above fields

ARTO MUSTAJOKI:

AWAKENING TO REALITY IS A GOOD THING

"An enlightened society should also support research that does not have immediate use-value."

Professor Arto Mustajoki, Chair of the Research Council for Culture and Society and member of the Academy Board (2001–2003 and 2004–2006), says he has witnessed an increase in research subjects with immediate social relevance.

"This awakening to reality, if you like, is unquestionably a good thing, but in the same breath it has to be stressed that an enlightened society should also support research that does not necessarily have immediate use-value," Professor Mustajoki points out.

Among the changes introduced during the first term of his chairmanship were the steps taken to develop expert procedures. Currently serving as Professor of Russian Language, Mustajoki says his Council has been making increasing use of the services of international experts and evaluation panels, as well as trying to learn from the experiences accumulated.

"The general trend has been towards internationalisation. Research is itself traditionally an international undertaking, but now there is international cooperation among funding bodies as well. The European Science Foundation has offered one window on European science policy and funding."

"This has been a healthy experience. Often we are only aware of the problems and shortcomings in our own operation, but a closer examination of European science funding helps to make you realise that technically speaking, our processes are in fact of a very high standard."

As more and more research is organised in multi- and interdisciplinary projects, this presents a major challenge for funding mechanisms and the channelling of support to interesting research at the interfaces of different disciplines.

Professor Mustajoki is concerned about how researchers from universities with less research experience can cope with the task of putting together a good, credible application. The Research Council recently organised a roadshow that visited various universities to meet researchers, to tell them about the applications process and to get feedback.

According to Professor Mustajoki, the recent debate on the role of the humanities and social sciences as national sciences has helped to clarify the situation.

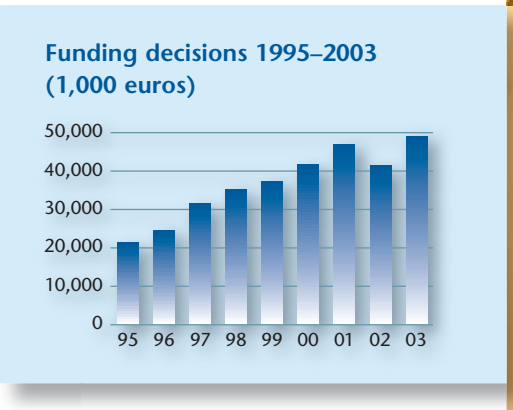
"Any Finnish researcher who wants to have an impact on the international development of scientific research, has to get published on a forum that is followed by the international science community. To have an impact on Finnish society, you have to publish on a domestic forum."

"In this regard we have been rather inclined to hide behind the bushes. The fact that we are studying national issues is no justification for withdrawing from the development of world science. Comparative research, for example, often yields interesting new information. We could be doing more of that."

RESEARCH COUNCIL FOR CULTURE AND SOCIETY IN 2003:

A DIVERSE, FRAGMENTED AND CHALLENGING FIELD

The disciplines, scientific traditions and branches of education that come under the Research Council for Culture and Society constitute a diverse and fragmented field. Within this operating environment, the planning of research funding policy and the development of evaluation presented a demanding challenge for the Council.



The Council invested much effort in the set-up and internationalisation of new multidisciplinary research programmes. In connection with compiling its report on the state and quality of scientific research in Finland, the Council explored and assessed the impacts of research in its fields.

The Research Council for Culture and Society promoted research in the humanities and social sciences and took an active part in discussion and debate on issues of research policy. The Council paid special attention to the role and contribution of research in its own fields to the development of the welfare society and a national strategy based on knowledge and know-how. Drawing on feedback received and critical self-assessment, it also continued efforts to develop its own operations.

Research grants that are open for application by research groups, remain the Council's single most important type of funding. In 2003, almost 60 per cent of total Council funding was awarded to research projects. In most disciplines hosted by the Council, the Academy is the only significant source of external funding. The number of applications and their sums have increased all the time, which inevitably has meant that the proportion of projects getting Academy funding has declined.

Individual research posts are of key significance in promoting professional careers in research. However, the competition for Academy research fellowships has continued to intensify. The Council has given special attention to women's research careers. Indeed, during the three-year term from 2001 to 2003, the proportion of women appointed was greater than their proportion among applicants.

There were 40 Ministry of Education funded graduate schools in disciplines hosted by the Council. Within the humanities and social sciences it is not, however, possible to have a graduate school system that covers all fields of research. The remaining gaps have been filled by providing funding not only for graduate schools, but also for doctoral training in high-level research projects as well as for postgraduate studies in foreign countries. In particular, the Council supports Finnish students researching their doctorate at the European University Institute in Florence, Italy, which is jointly administered by EU Member States.

Multidisciplinarity a key element in research programmes

Multidisciplinarity is a key element in the Council's research programmes from the planning stage onwards. Another major consideration is the aim of producing research results and knowledge that have social significance. The Council launched three new research programmes during the year: Industrial Design, Social Capital and Networks of Trust, and Russia in Flux. More than 300 applications were received to these programmes.

The eight projects that were selected for participation in the Research Programme for Industrial Design are concerned among other things with the development of the design profession, the practical ethics of auxiliary device and patient clothing design, methods of analysing product characteristics, and the modelling of future brand thinking. All projects share the goal of developing design research and finding new methods of design. The programme is organised jointly in connection with the National Technology Agency's Design 2005 Technology Programme.

The Research Programme on Social Capital and Networks of Trust draws extensively upon expertise in the fields of social and cultural research. The aim is to set up research groups formed around individual disciplines and to encourage the development of interdisciplinary groups. The projects involved in the programme represent a broad cross-section of research into social capital and networks of trust in different disciplines, including the social sciences, history, business administration and health research.

The Research Programme on Russia in Flux is aimed at gaining a deeper understanding of Russia as a state, society, natural environment and economic and cultural region. The programme will help to produce a clearer picture of the conditions prevailing in the country and shed light on ongoing changes as well as the causes and effects of those changes. The knowledge produced in the programme can be used in strategic decision-making in different sectors of society. The projects selected for participation in the programme deal with the Russian natural environment, public health and the national economy as well as with social and political changes. Several ministries and the National Technology Agency Tekes are involved in implementing the programme.

In addition to the new programmes started up during the year, the Council had four other ongoing research programmes and three targeted programmes. Furthermore, the Council was involved in programmes administered by other research councils.

Trend towards international panels of experts

In the process of reviewing proposed research projects the Council relies increasingly on panels and international experts. This trend is most clearly seen in the case of research programmes, but applications for research projects and posts are also being reviewed more and more often by panels of experts rather than individual experts. However, given the wide spread of disciplines hosted by the Council and the different fields of research involved, it does not always make sense to convene a panel, but the decision has to be made on a case-by-case basis.

The impacts and effectiveness of the Media Culture Research Programme (1999–2002) were evaluated. The main concern in this programme was with the changes taking place in media culture and with the impacts of media culture on people's every-

day life, particularly from a cultural point of view. The aim was to produce new information about the media and to illuminate the Finnish media landscape around the turn of the millennium. The international panel evaluating the programme pointed out that the relatively loose definition of the themes and subjects of research at the application stage allowed for the inclusion of a wide range of research areas. On the other hand, this also made it harder to define a clear set of objectives for the programme.

Nordic cooperation figured ever more prominently in the Council's work: Finland chaired all the Nordic joint bodies working in the Council's area (the Councils for Research in the Humanities and Social Sciences NOS-HS and the Nordic Board for Periodicals in the Humanities and Social Sciences NOP-HS). The Joint Committee of the Nordic Research Councils for the Humanities NOS-H and the Joint Committee of the Nordic Social Science Research Councils NOS-S were merged to form the NOS-HS, which decided to start preparations for a Nordic centres of excellence programme.

The European Science Foundation (ESF) is an important partner in cooperation in the humanities and social sciences. The Council was involved in several ESF projects and programmes. In response to an initiative by the ESF Standing Committee for the Humanities, work has now got under way to create a European Citation Index for the Humanities. The Research Council for Culture and Society was responsible for compilation in Finland.

The EU's Sixth Framework Programme provides for the first time an opportunity for researchers in the humanities to apply for EU funding. 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.

The Council offered several information meetings on new European funding opportunities. However the coordination of EU projects requires substantial resources and expertise that are not yet readily available in Finland in the fields of social and cultural research.

Drawing upon the cooperation between the Nordic research councils and their British counterparts, the Council launched an ERA-NET project in the social sciences that was among the first applicants to receive Commission funding. NORFACE (New Opportunities for Research Funding in Europe – A Strategy for Social Sciences) brings together the leading funding bodies for social sciences research from seven different countries: Finland, Sweden, Norway, Denmark, Iceland, Great Britain and Ireland. The Commission regarded this is a highly necessary, significant and challenging project. Among its main objectives are to open up new channels of communication between both researchers and funding authorities in different countries, to identify and analyse obstacles to the implementation of joint research programmes, and to intensify cooperation between national programmes.

Fields of research hosted by the Research Council for Culture and Society:

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

RIITTA KEISKI:

MULTIDISCIPLINARITY HELPS TO BREAK DOWN BARRIERS

"Researchers are investing more attention in subjects that have a future."

Professor Riitta Keiski, Chair of the Research Council for Natural Sciences and Engineering and member of the Academy Board (2001–2003 and 2004–2006), says that one of the most significant trends over the past three-year term has been the steady growth in the number of multidisciplinary research projects.

"It has been good to see that researchers are investing more attention in subjects that have a future. Especially in the fields of bio-, neuro-, geo- and environmental informatics, these projects also cut across the boundaries of different Research Councils," Professor Keiski points out.

The most recent graduate school applications received from research groups in the natural sciences and engineering had a prominent representation of information and biotechnology. Information technology was also well represented among the funding decisions made during the past year. Much of the research that is done in this field is of a multidisciplinary nature. Its results have practical application and they can also benefit business and industry.

Keiski believes the Research Council managed to establish a solid and consistent policy line in its decision-making over the past three years. "We were able to support basic research that is so crucial for the information industry. In mechanical engineering we saw significant advances in the standard of domestic research, although both the information industry and engineering sciences would have needed more support. Applications often have immediate use in business and industry, but we still need to have basic research as well. Basic and applied research must go hand in hand."

Keiski says it was unfortunate that the Council received such a small number of applications from civil engineering, industrial engineering and management, and automation technology, since the commitment was there to support basic research in these fields as well.

The biggest changes in the Academy's operation over the past three years, in Professor Keiski's view, have been related to internationalisation and researcher training.

"Graduate schools and centres of excellence have got off to a great start. Finland has emerged as a model country of basic research: benchmarking groups from other countries are now visiting our shores more and more often."

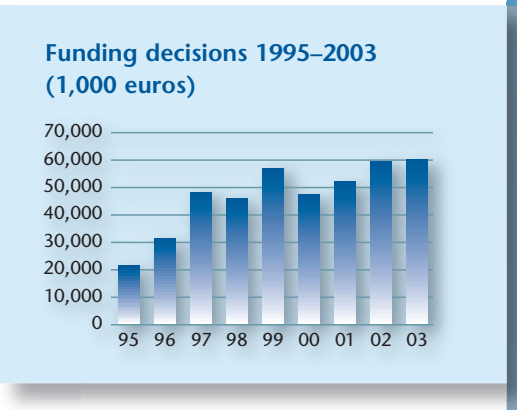
"International networking among researchers and funding bodies is also well under way. The Academy has shown strong initiative and invested considerable effort in this area over the past three years. It has been great to see how centres of excellence have facilitated closer interaction among different disciplines."

"There has been much improvement in the international visibility and networking of centres of excellence. The results of their basic research can be used in practical applications. The money invested in these kinds of things is now beginning to pay off."

RESEARCH COUNCIL FOR NATURAL SCIENCES AND ENGINEERING IN 2003:

SUPPORT FOR HIGH-RISK RESEARCH

The Research Council for Natural Sciences and Engineering continued its efforts to identify and support new promising lines of research, to plan and prepare ahead for future research programmes, and to assess the impacts of its research funding. The Council works closely with various interest groups, most particularly business and industry.



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. 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 takes the view that the availability and adequacy of open research grants are crucial to the development of new innovations.

Most of the Council's research funding was awarded in the form of research grants open for general application, with a total of 15.2 million euros granted to 116 projects. Funding was made available to around one-quarter of all applicants, which in money terms represented just over 10 per cent of the sum total of all applications. Almost half of the applications that scored at least four out of five points in the review process, failed to secure funding. In spite of the efforts of both the Academy and the Research Council, much high-quality research remains without funding, closing the door on many potential innovations.

Academy research funding has great impact

More and more of the research that is funded by the Council consists of interdisciplinary or multidisciplinary work that is often close to practical applications. The Council's long-term research funding for strategically important areas has provided crucial support for the development of innovation chains.

Surveys conducted by the Research Unit for Natural Sciences and Engineering have shown that Academy funding to the natural sciences and engineering has boosted business at many levels. Strategic basic research has produced not only qualified and highly trained professionals and new methods, but also new processes and improvements to existing production and manufacturing technologies. The methods produced in basic research are crucially important to the development of science and research. Their application in other disciplines and industry means that problems can be tackled more effectively than before.

In the natural sciences and engineering the posts of Academy Research Fellow play an important role in ensuring the renewal of professors in universities and research institutes. In these fields some two-thirds of those who had been appointed to a post of Academy Research Fellow in 1990–1997 (66 in all) had been awarded a professorship by the end of July 2003. Among those appointed as Academy Research Fellows in 1991 and 1994, everyone had been awarded a professorship.

Research programmes network high-level basic research

The Research Programme for Future Electronics (TULE 2003–2006) started up in summer 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. All in all it involves 13 projects, 12 of which are consortium projects. Programme funding amounts to 6.8 million euros.

The Council was involved in four research programmes funded from the 2003 authority: Systems Biology and Bioinformatics (SYSBIO), Russia in Flux, Industrial Design and the Environmental, Societal and Health Effects of Genetically Modified Organisms (ESGEMO). The projects included in the SYSBIO

research programme within the Council's scope of expertise are from fields of bioinformatics and computational engineering. Two projects in the Russia Research Programme are in fields of research represented by the Research Council for Natural Sciences and Engineering. These projects are concerned with exchanges between boreal forests and the atmospheric aerosol system and the treatment of industrial emissions. The three projects in the Research Programme for Industrial Design that come under the Council's purview, are concerned with design methods, end user driven product concept design, and the observer's view path as an aid for the designer and end user.

The Academy's Board decided in December 2003 to grant the Council authority to go ahead with its preparations for the launch in early 2005 of a research programme on the application of information technology in mechanical and construction engineering and automation technology. The Confederation of Finnish Construction Industries RT, the Finnish Association of Building Owners and Construction Clients, the National Technology Agency Tekes and the Ministry of the Environment will also be supporting projects in this research programme.

The Academy's Board also granted the Council authority to conduct negotiations on the start-up of two research programmes in 2006: one is a research programme on chemical, physical and biological nanosciences, the other a multidisciplinary programme related to chemical technology and to processes and production engineering (sustainable production). This process is going on in close cooperation with other research councils, funding organisations, researchers as well as business and industry.

The Council was also involved in preparations for the Environment and Law Research Programme that will be starting up in 2004 and for the Neurosciences Research Programme that is due to begin in 2005.

Evaluation of science disciplines and research programmes

Joining forces with the Research Council for Biosciences and Environment, the Ministry of Trade and Industry and the Ministry of Education, the Council commissioned a discipline assessment of geosciences in Finland. The international evaluation group concluded that research in geosciences earns a grade between good and excellent.

However, given the current high level of investment in applied research there is a real risk that the resources made available to basic research will decrease too much. According to the evaluation report further steps are needed to promote interdisciplinary expertise and research.

International evaluation reports were published on three research programmes completed in the field of natural sciences and engineering. The final seminar for the programme on wireless datacommunications technologies (EXSITE 2001–2003), which was organised with joint international funding, was held in November in Riga, Latvia. The programme evaluation was carried out together with the National Technology Agency Tekes and the Swedish Agency for Innovation Systems VINNOVA. The report concludes that the international funding cooperation worked very well and that it deserves to be continued.

According to the international evaluation of the Research Programme on Mathematical Methods and Modelling in the Sciences (MaDaMe 2000–2003), most projects succeeded in achieving one of the main programme objectives, that is to increase cooperation among mathematical and statistical disciplines as well as their interaction and exchange with application areas.

The projects involved in the MaDaMe programme continued to make headway in terms of international networking, but on a national level very little new cooperation was created among the projects. It is expected that the long-term economic impacts of the research programme will be seen in health care, medicine, forestry, paper production, the fishing industry, the biochemical industry and education.

In its assessment of the Research Programme on Future Mechanical Engineering (TUKEVA 2000–2003), the international evaluation panel concluded that the programme has contributed significantly to the development of researcher training in mechanical engineering and reinforced the foundations of scientific research in this field. Roughly half of its projects have produced results that will have practical application within the next few years.

Involvement in international projects

Finland has been actively involved in the international Ocean Drilling Program (ODP) together with the other Nordic countries and through its participation in an ESF consortium. Technological advances and emerging scientific challenges led to the start-up in 2003 of a new Integrated Ocean Drilling Programme (IODP), which takes a stronger multidisciplinary approach and covers a broader range of themes. The Academy has decided to go with the Council's proposal and will be participating in the programme in 2003–2007.

The agreement among the seven EISCAT Associates which together fund and manage an ionosphere radar facility in the Nordic countries, is due to expire at year-end 2006. Plans are already under way to create a new EISCAT organisation. Since EISCAT has without question been a great success for Finnish near space research, the Council has supported Finland's continued involvement in the new organisation.

Negotiations on Finland's ESO membership were concluded in 2003: it is expected that Finland will be joining the organisation in July 2004. Since this decision will require some reallocation of research funds in astronomy, the Council decided not to commit itself to new projects in this field (such as the APEX radiotelescope). The Council is involved in the ESF EUROCORES programme Self-Organized Nanostructures (SONS 2003–2007). It took its first funding decisions related to the SONS programme in spring 2003.

The Council decided to participate in the preparation of two new EUROCORES programme initiatives: European Solar Terrestrial and Atmospheric Research (E-STAR) and Smart Structural Systems Technologies (S3T). It joined four new ESF à la carte programmes, which promote networking among researchers and research teams. These new programmes are Arrays of Quantum Dots and Josephson Junctions (AQDJJ 2004–2008), European Polymer Optical Technology Network (EPONET 2004–2007), Global and Geometric Aspects of Nonlinear Partial Differential Equations (2004–2008) and Quantum Degenerate Dilute Systems (QUDEDIS 2004–2007).

In the first round of ERA-NET applications under the EU's Sixth Framework Programme, funding was awarded to the ERA-CHEMISTRY project that was launched under CERC3 (Chairmen and Directors of European Research Councils' Chemistry Committees). On the Council's recommendation the Academy is involved in ERA-CHEMISTRY, which is concerned to develop new funding instruments and joint European research programmes in the field of chemistry. A total of ten funding organisations from nine countries are involved in the project, which is coordinated by the Deutsche Forschungsgemeinschaft (DFG).

For the next two-year period that started in November 2003, the Joint Committee of the Nordic Natural Science Research Councils (NOS-N) will be chaired by the Chair of the Research Council for Natural Sciences and Engineering. A two-year Data Grid project was launched in 2003 on a NOS-N initiative with a view to laying the foundations for a Nordic Grid centre.

Fields of research hosted by the Research Council for Natural Sciences and Engineering:

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

EERO VUORIO:

LOTS OF WORK BUT HUGELY REWARDING

Eero Vuorio, currently serving as Chancellor of the University of Turku, believes that the main challenges for research funding bodies today lie in developing the infrastructure of science and in promoting multidisciplinary and holistic approaches. After six years as Chair of the Research Council for Health and member of the Academy Board, Vuorio says he is relieved but sad to be leaving.

According to Vuorio, Finnish science has gained greatly in international credibility. "The international evaluation of the Academy of Finland has now been completed and the results will be published in March. Earlier evaluations have led to some major shake-ups, and I wouldn't be surprised to see the same again," Vuorio predicts.

"One possible future scenario is a science organisation where we no longer have any boundary lines between Research Councils. This has to do with the growth of multidisciplinarity, which is clearly seen in the funding applications we receive. The Academy has tried different ways of reviewing multidisciplinary projects, but the problems have not been entirely solved."

"Even though we have stepped up our research funding and improved the applications review process, some of the disappointed applicants feel they have not been understood by the Academy. And you have to admit that it's a pretty cruel system, as no more than around one-fifth of the applicants get the go-ahead," Vuorio adds.

"Research evidence is accumulating in ever larger clusters."

2003 was a busy year for the Academy's Board and Research Councils. "The additional funding made available to the Academy through the supplementary budget was allocated to new growth areas, such as stem cell research and nanosciences and to supporting the internationalisation of graduate schools."

"We had 20 million euros to spend on improving the infrastructure of universities and research institutes. This was an interesting task that we took on in a special programme group which included the Chairs of all four Research Councils. The outcome was announced in February."

In the field of health research, Vuorio says he has noticed a tendency towards integration. Research evidence is accumulating in ever larger clusters.

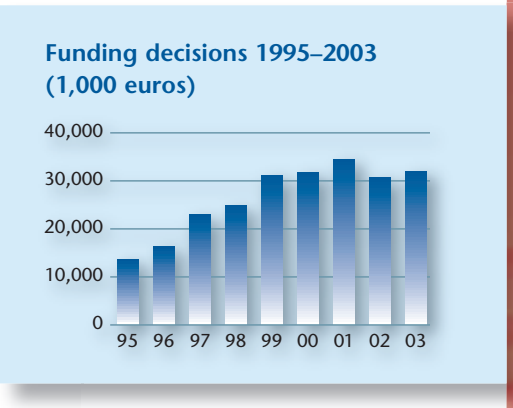
"Computers have made possible the development of new disciplines such as bioinformatics," Vuorio points out. "With bioinformatics, health researchers are coming out of the laboratory and starting to work with computers and large statistical datasets, which are helping them to understand human disease as part of the interplay between genes, environment and lifestyles."

"This holistic view on health is excellently suited to Finland, the land of registers and egalitarian health care. In the future these registers will prove an invaluable source of information on public health – without infringing on people's privacy," he says.

RESEARCH COUNCIL FOR HEALTH IN 2003:

NEW FORMS OF NATIONAL AND INTERNATIONAL COOPERATION

The Research Council for Health devoted considerable resources to strengthening the international position of Finnish health research. Special attention was given to networking research programmes and to increasing the international component in the applications review process.



In 2003 the Research Council for Health commissioned an international evaluation of nursing research in Finland. The purpose was to gain a broad picture of the quality of research and postgraduate training, the discipline's international contacts and cooperation, and its significance to society at large. The evaluation covered the five university units that engage in nursing research and that provide education in this field. The experts' recommendations will be used among other things for the development of research careers in the field of nursing science.

In October, the Council joined forces with the Finnish Medical Association Duodecim and the University of Helsinki to host a seminar under the heading Health, Science and the Future. The main focus of the multidisciplinary seminar was upon factors that are expected to impact human health over the next few decades and upon the impacts of people's values on health and the choices made in health care.

The Council launched the Systems Biology and Bioinformatics Research Programme (SYSBIO) together with the other research councils and the National Technology Agency Tekes. In the preparation of this programme close attention was paid to the recommendations issued in the 2002 evaluation of the impacts of public funding for biotechnology research. Indeed SYSBIOS follows closely in the footsteps of earlier research programmes in the fields of biotechnology and molecular biology.

The Academy will be spending 9 million euros in 2004–2007 to support 17 research consortia in the SYSBIO programme. Designed to promote the systems biological approach in research, the programme is very much an interdisciplinary exercise, with bioinformatics playing a key integrative role. The programme has international network contacts through the European Union's EUSYSBIO project.

The year under review also saw the launch of the Health Services Research programme (TERTTU), which was prepared jointly with the Research Council for Culture and Society. The only way successfully to tackle the challenges facing health care today is by means of high-quality research. The programme marked an important opening in terms of funding cooperation with university hospital health care districts. Other funding partners in this programme include the Ministry of Social Affairs and Health, the National Pension Institution, the Finnish National Fund for Research and Development Sitra, the Association of Finnish Local and Regional Authorities and the Work Environment Fund.

Academy funding in the Health Services Research programme amounts to 6 million euros and goes to 24 different projects.

The Council carried out the final evaluation of the Research Programme on Ageing (ITU, 2000–2002). The Academy granted a total of 3.2 million euros to 21 ITU projects from 12 universities and research institutes. The international evaluation group was particularly appreciative of the programme's aim to get different disciplines working together in a joint effort to study the problems associated with ageing.

The Council is continuing to support research on ageing. It is currently preparing for participation in a major EU-funded network of funding bodies for ageing research (ERA-AGE)

Jointly administered by the Research Council for Health and the Research Council for Biosciences and

Environment, the Research Programme on Biological Functions Life 2000 ended in 2003. This was an exceptionally large-scale project that involved all Academy research councils.

The Council had responsibility for two research programmes, i.e. the Health Promotion Research Programme, which started up in 2001, and the Microbes and Man programme, launched in 2002. The latter programme is jointly administered with the Research Council for Biosciences and Environment and the Swedish Foundation for Strategic Research. The Council also took part in the National Technology Agency's Drug 2000 technology programme and in the targeted programme related to fine particles research.

Aiming at the international cutting edge

The Council has provided funding for research at the highest international level and promoted the development of new centres of excellence in research. One of its strategies in doing this has been to provide adequate research funding for Academy Professors.

The Council is keenly aware of the need to develop professional careers in research. During the year under review it supported the career development of young talented researchers by providing grants of up to three years for postdoctoral researchers hoping to continue their studies abroad. Some posts of Academy Research Fellow were allocated to young talented researchers who are making good progress in their careers and who are looking to set up their own research teams.

Also committed to promoting clinical research careers, the Council gave Academy Research Fellows the opportunity to allocate 20 per cent of their working time to clinical work and where necessary to take short leaves of absence for spells of work in hospital. The Council supported cooperation between the clinical graduate school and the graduate schools in biosciences and public health. The aim was to establish a solid foundation for researcher training at all medical faculties.

The graduate school system has helped to increase the number of new doctorates awarded each year and bring it closer to the Ministry of Education targets. A survey commissioned by the Academy found that almost 24 per cent of all doctorates were completed in the field of medicine.

One of the Council's priority concerns has been to support medical graduate schools and to get them to work more effectively. The Council granted funding to graduate schools particularly for purposes of organising national training courses. This has helped to reduce unnecessary overlap, to increase the number of training courses available and to raise the quality standards of these courses. Furthermore, the Council facilitated the mobility of doctoral students by granting awards to cover their travel and course costs, especially in foreign countries. On the strength of the additional authority granted by the Academy Board, one of the priorities for the Council during the year under review was to support the international networking of graduate schools.

Finnish researchers have a strong presence in the framework programme

In the field of health research the emphasis in the EU's Sixth Framework Programme is on biosciences, genome research and health-related biotechnology as well as on the impacts of nutrition on health and diseases. The Chair of the Research Council for Health has been in a position to influence the content of the framework programme through the Advisory Expert Group on Biosciences, Genome Research and Health Biotechnology. The Director of the Unit for Health Research has been involved in the work of the programme committee.

The Council promoted the participation of Finnish researchers in the framework programme by providing funding for the drafting of project proposals. Two of the Council's research programmes, Systems Biology and Bioinformatics and the Research Programme on Ageing, are networking with ERA-NET projects.

Finnish researchers have enjoyed good success in the early stages of the framework programme. In the field of health biotechnology, Finnish applicants in the first round were awarded responsibility for the coordination of two major integrated projects. In all the Commission received more than 500 project proposals, with Finnish researchers involved in one-fifth of them. Over one-quarter or 26 per cent of Finnish applications got the go-ahead.

The Council established contacts with a view to exploring opportunities for international funding cooperation in the field of stem cell research, for example. The Council is involved in the British Medical Research Council's stem cell forum, which is aimed at the development of funding cooperation and the creation of a register on stem cell use. There have also been preliminary talks on the possibility of funding cooperation with the US-based Juvenile Diabetes Research Foundation (JDRF).

The Council took part in the preparation of the ESF Eurocores research programme for the development of a stem cell tool box.

The Council promoted research programme cooperation through the EU-funded COGENE project, which under the chairmanship of the Council Chair is aimed at improving the coordination of genome research across Europe. Furthermore, together with the other Nordic countries, the Nordic Council of Ministers and the Nordic Academy for Advanced Study (NorFA), the Council was involved in setting up the Nordic centres of excellence programme in the field of molecular medicine. It also contributed to drafting an initiative for the establishment in Finland of an international research centre in molecular medicine.

The Council promoted the internationalisation of Finnish researchers by supporting their work abroad as well as their repatriation by providing information on EU, EMBO and EMBL programmes of researcher mobility and by signing bilateral agreements. The Council contributed both to the EMBO Young Investigatory programme (YIP) and to the EURYI programme.

The Council was responsible for the cooperation between the Academy and JDRF, which together with Jusélius Foundation Finland organised a joint targeted programme. Two major projects are being funded through this programme, one of which will have separate JDRF funding to create an international biobank and data archive that will be accessible to other researchers as well.

Fields of research hosted by the Research Council for Health:

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

FUNDING DECISIONS OF THE ACADEMY OF FINLAND IN 2001–2003 BY FIELD OF RESEARCH*

Field of research	2003	%	2002	%	2001	%
Natural sciences	**78,637,267**	**44**	**81,882,412**	**46**	**77,257,346**	**43**
Space research and astronomy	2,493,090		1,356,958		2,340,915	
Biology, environmental sciences	31,698,010		34,387,839		27,811,007	
Physics**	22,867,477		22,647,537		21,355,226	
Geosciences, meteorology	1,899,490		1,762,652		3,569,534	
Chemistry	5,493,540		6,453,859		7,586,457	
Geography	1,455,540		1,458,315		622,238	
Mathematics	5,077,990		4,135,290		5,006,117	
Information processing science	7,652,130		9,679,962		8,965,852	
Engineering	**15,444,120**	**8**	**15,822,755**	**9**	**18,640,168**	**10**
Architecture	107,440		132,390		860,352	
Biotechnology and food engineering	682,980		862,512		838,068	
Energy technology	26,430		252,660		28,961	
Mechanical engineering	1,247,790		1,582,350		889,936	
Metallurgy and extractive engineering	121,810		436,958		400,083	
Other engineering	636,850		379,860		1,151,206	
Process and materials technology	2,055,470		1,805,726		3,655,877	
Wood processing technology	21,220		21,000		126,941	
Construction engineering, community planning and municipal engineering	549,580		308,790		741,869	
Electronical engineering	8,290,000		9,623,489		9,242,510	
Chemical engineering and chemical process technology	1,704,550		417,020		704,365	
Medicine and health sciences	**32,158,470**	**17**	**29,830,019**	**17**	**32,719,549**	**18**
Biomedicine	14,849,300		14,361,385		13,265,179	
Veterinary medicine	176,720		461,700		509,791	
Pharmacy	693,920		751,672		1,494,580	
Dental science	1,017,320		57,862		416,423	
Nursing science	299,760		34,840		14,296	
Public health science	7,950,750		2,873,646		7,940,706	
Clinical medicine	6,541,650		10,305,574		8,842,330	
Sports sciences	169,410		94,790		67,262	
Nutrition science	459,640		888,550		168,982	
Agriculture and forestry	**7,823,540**	**4**	**6,463,860**	**4**	**5,800,679**	**3**
Agricultural sciences, food sciences	3,822,990		2,443,002		440,065	
Forest sciences	4,000,550		4,020,858		5,360,614	
Social sciences	**29,637,516**	**16**	**24,045,670**	**14**	**29,440,125**	**16**
Economics	2,526,610		1,516,002		2,131,549	
Education	2,709,050		6,008,272		2,163,452	
Business economics, economic geography	3,336,190		2,403,900		6,257,771	
Law	3,170,860		1,966,811		3,646,590	
Psychology	3,205,610		4,187,147		3,920,460	
Social science	9,667,392		5,141,504		6,869,661	
Statistics	147,934		118,990		142,120	
Political science and administration	3,750,580		2,139,414		3,405,628	
Communication, library science and information science	1,123,290		563,630		902,894	
Humanities	**20,736,480**	**11**	**18,414,223**	**10**	**19,120,118**	**10**
Philosophy	3,103,920		2,322,805		2,149,325	
History and archaeology	4,331,460		4,330,371		5,525,442	
Philology and linguistics	4,463,200		4,569,727		5,247,832	
Cultures research	2,200,440		2,601,613		1,539,905	
Aesthetic fields research and literature	4,608,990		2,655,189		2,572,722	
Theology	2,028,470		1,934,518		2,084,892	
Others					**65,920**	**0**
Total	184,437,393	100	176,458,939	100	183,043,939	100

* The figures also include the costs of research posts, converted into euros.
** The figure includes the CERN membership dues.

FUNDING DECISIONS OF THE ACADEMY OF FINLAND IN 2001–2003 BY SITE OF RESEARCH*

Site of research	2003	%	2002	%	2001	%
Universities	**150,526,083**	**81.6**	**147,260,155**	**83.5**	**148,489,814**	**81.1**
Helsinki School of Economics and Business Administration	911,780	0.5	1,899,096	1.1	1,935,261	1.1
University of Helsinki	51,102,989	27.7	52,086,806	29.5	50,753,806	27.7
University of Joensuu	6,911,030	3.7	5,239,820	3.0	5,315,521	2.9
University of Jyväskylä	13,618,520	7.4	14,810,429	8.4	10,516,765	5.7
University of Kuopio	5,926,040	3.2	4,519,188	2.6	5,919,736	3.2
University of Lapland	1,692,210	0.9	1,516,147	0.9	942,487	0.5
Lappeenranta University of Technology	1,623,720	0.9	1,135,320	0.6	953,363	0.5
National Defence College	750	0.0				
University of Oulu	9,567,920	5.2	13,211,766	7.5	13,514,625	7.4
Sibelius Academy	267,920	0.1	31,560	0.0	16,422	0.0
Swedish School of Economics and Business Administration	1,013,990	0.5	18,580	0.0	1,934,932	1.1
University of Art and Design Helsinki	1,124,300	0.6	385,597	0.2	61,949	0.0
Tampere University of Technology	5,914,040	3.2	6,261,761	3.5	5,374,010	2.9
University of Tampere	10,853,924	5.9	8,046,025	4.6	11,119,019	6.1
Theatre Academy		0.0		0.0	291,148	0.2
Helsinki University of Technology	14,645,940	7.9	16,678,303	9.5	13,633,396	7.4
Turku School of Economics and Business Administration	832,260	0.5	517,780	0.3	1,654,752	0.9
University of Turku	19,133,260	10.4	14,096,576	8.0	18,108,779	9.9
University of Vaasa	192,990	0.1	146,574	0.1	279,258	0.2
Åbo Akademi University	5,192,500	2.8	6,658,827	3.8	6,164,585	3.4
University hospitals	**1,088,310**	**0.6**	**750,809**	**0.4**	**1,942,820**	**1.1**
Research institutes	**13,910,530**	**7.5**	**10,663,087**	**6.0**	**15,230,253**	**8.3**
Foreign organisations	**16,068,940**	**8.7**	**14,960,697**	**8.5**	**14,146,933**	**7.7**
Scientific associations	**1,374,970**	**0.7**	**1,565,639**	**0.9**	**2,809,682**	**1.5**
Polytechnics	**10,900**	**0.0**	**11,660**	**0.0**	**55,540**	**0.0**
Business companies	**346,730**	**0.2**	**520,510**	**0.3**	**216,325**	**0.1**
Other site of research	**994,020**	**0.5**	**520,918**	**0.3**	**133,542**	**0.1**
Individual researchers	**116,910**	**0.1**	**205,464**	**0.1**	**19,030**	**0.0**
Total	184,437,393	100	176,458,939	100	183,043,939	100

ACADEMY OF FINLAND ADMINISTRATION OFFICE: MANAGEMENT, DIRECTORS AND SECRETARIES OF THE UNITS IN 2003

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Vihko Reijo, President
Laine Jarmo,
Senior Science Counsel
(Senior Adviser to President)
Ryynänen-Karjalainen Lea,
Senior Science Counsel
(Senior Adviser to President)
Rautiainen Irmeli,
Assistant to Management

Sarkio Juha, Vice President,
Administration
Kulo Päivi,
Assistant to Management

Pauli Anneli, Vice President,
Research
Heinänen Anne,
Senior Science Counsel (Senior
Adviser to Vice President)
Raatikainen Anja,
Assistant to Management

Biosciences and Environment Research Unit
Kallio Arja, Director
Järvinen Riitta, Secretary

Culture and Society Research Unit
Savunen Liisa, Director
Ryhänen Maija, Secretary

Natural Sciences and Engineering Research Unit
Linko Susan, Director
Hagelin Aila, Secretary

Health Research Unit
Mustonen Riitta, Director
Rajala Anneli, Secretary

Information Management Unit
Raejärvi Seppo, Director
Kauranen Anneli, IT Support

International Relations Unit
Hattula Raija, Director
Bqain Arja, Secretary

Finance Unit
Virtanen Pirkko, Director
Hyttinen Merja, Finance Officer

Communications Unit
Tanner Maj-Lis,
Communications Director
Aaltomaa Marjo,
Communications Assistant

Administration Unit
Mikkolanniemi Hedvig, Director
Tyynelä Inkeri, Department
Secretary

BOARD AND RESEARCH COUNCIL MEMBERS OF THE ACADEMY OF FINLAND IN 2003

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President of the Academy of Finland

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National Research and Development Centre for Welfare and Health, Stakes

Markku Karlsson
Senior Vice President
Metso Corporation

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National Public Health Institute

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Research Council for Biosciences and Environment

Chair
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National Public Health Institute

Annele Hatakka, Professor
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Jyrki Heino, Professor
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Lea Kauppi, Director General
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Markku Löytönen, Professor
University of Helsinki

Pasi Puttonen, Professor
University of Helsinki

Maija Rautamäki, Professor
Helsinki University of Technology

Eevi Rintamäki, Professor
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University of Joensuu

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Arto Mustajoki, Professor
University of Helsinki

Kaija Heikkinen, Docent
University of Joensuu

Liisa Huhtala, Professor
University of Oulu

Marja Järvelä, Professor
University of Jyväskylä

Aila Lauha, Professor
University of Helsinki

Erno Lehtinen, Professor
University of Turku

Paavo Okko, Professor
Turku School of Economics and Business Administration

Juha Sihvola, Professor
University of Jyväskylä

Lauri Suurpää, Professor
Sibelius Academy

Terttu Utriainen, Professor
University of Lapland

Krista Varantola, Professor
University of Tampere

Research Council for Natural Sciences and Engineering

Chair
Riitta Keiski, Professor
University of Oulu

Mats Gyllenberg, Professor
University of Turku

Iiro Hartimo, Professor
Helsinki University of Technology

Pekka Hautojärvi, Professor
Helsinki University of Technology

Jorma Kangas, Professor
University of Oulu

Markku Kivikoski, Professor
Tampere University of Technology

Kaisa Nyberg, Docent
Nokia Research Center

Marja-Liisa Riekkola, Professor
University of Helsinki

Ulla Ruotsalainen, Docent
Tampere University of Technology

Kari-Jouko Räihä, Professor
University of Tampere

Markku Tuominen, Professor
Lappeenranta University of Technology

Research Council for Health

Chair
Eero Vuorio, Professor
University of Turku

Markku Alén, Medical Director
Peuranka Medical Rehabilitation and Physical Exercise Centre

Esa Heinonen,
Senior Vice President
Orion Pharma, Orion Corporation

Elina Hemminki, Professor
National Research and Development Centre for Welfare and Health, Stakes

Helena Leino-Kilpi, Professor
University of Turku

Lars-Axel Lindberg, Professor
University of Helsinki

Marja Makarow, Professor
University of Helsinki

Pirjo Pietinen, Professor
WHO/National Public Health Institute

Taina Pihlajaniemi, Professor
University of Oulu

Hilkka Soininen, Professor
University of Kuopio

Timo Vesikari, Professor
University of Tampere

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
Jorma K. Miettinen
Pirjo Mäkelä
Arto Salomaa

Foreign holders of the honorary title of Academician

Sir Arnold Burgen, Great Britain
Alfred W. Crosby, USA
Ludvig Dmitrievish Faddeyev, Russia
Hans Fromm, Germany
Bengt Hultqvist, Sweden
Torsten Hägerstrand, Sweden
Ancel 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 2003

Lauri Aaltonen
1 Aug 2002–31 Jul 2007
Molecular Background of Hereditary Cancer
University of Helsinki

Helena Aksela
1 Aug 2001–31 Jul 2006
Electron Spectroscopy and Structure of Atoms and Molecules Using Sychrotron
University of Oulu

Kari Alitalo
as from 1 Aug 1993
with tenure
Molecular Biology of Cancer
University of Helsinki

Eva-Mari Aro
1 Aug 1998–31 Jul 2008
Dynamics and Signaling in Photosystem II
University of Turku

Jaakko Astola
1 Aug 2001–31 Jul 2006
Signal Processing Algorithm Group
Tampere University of Technology

Ralph-Johan Back
1 Aug 2002–31 Jul 2007
Formal Methods in Software Construction
Åbo Akademi University

Dennis Bamford
1 Aug 2002–31 Jul 2007
Structures of Macromolecular Assemblies and Functions of Molecular
University of Helsinki

Auli Hakulinen
1 Aug 2001–31 Jul 2004
Finnish Descriptive Grammar
University of Helsinki

Ilkka Hanski
1 Aug 1996–31 Jul 2006
Metapopulation Biology
University of Helsinki

Riitta Hari
1 Aug 1999–31 Jul 2004
Human Cortical Functions: Neuromagnetic Approach
Helsinki University of Technology

Erkki Haukioja
1 Aug 2000–31 Jul 2005
Evolutionary-ecological Effects of Atmospheric Pollution
University of Turku

Marjatta Hietala
1 Aug 2002 –31 Jul 2007
Scholars, Science, Universities and Networks as Making Cities Attractive
University of Tampere

Bjarne Holmblom
1 Aug 1998–31 Jul 2003
Towards Molecular-level Understanding of Papermaking
Åbo Akademi University

Seppo Honkapohja
1 Aug 2000–31 Jul 2005
Learning Behaviour and Other Topics in Macroeconomics
University of Helsinki

Sirpa Jalkanen
1 Aug 1996–31 Jul 2006
Mechanism Controlling Cell Traffic in Malignancies and Inflammations
University of Turku

Kai Kaila
1 Aug 1996–31 Jul 2006
GABA Ergic Transmission: Mechanisms Underlying Neuronal Communication, Development and Pathophysiology
University of Helsinki

Kimmo Kaski
1 Aug 1996–31 Jul 2006
Computational Science and Engineering
Helsinki University of Technology

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

Simo Knuuttila
1 Aug 1994–31 Jul 2004
Studies in Philosophy of Religion
University of Helsinki

Matti Krusius
1 Aug 1999–31 Jul 2004
Topological Objects in Quantum Fluids
Helsinki University of Technology

Antti Kupiainen
1 Aug 1999–31 Jul 2004
Extended Dynamical Systems
University of Helsinki

Risto Nieminen
1 Aug 2003–31 Jul 2008
Computational and Theoretical Materials Physics
Helsinki University of Technology

Hannu Nurmi
1 Aug 2003–31 Jun 2008
Studies on Models of Political Institutions
University of Turku

Risto Näätänen
as from 1 Aug 1983
with tenure
Cognitive Function and its Neural Basis
University of Helsinki

Erkki Oja
1 Aug 2000–31 Jul 2005
New Information Processing Principles
Helsinki University of Technology

Kari Palonen
1 Aug 1998–31 Jul 2003
Polity, Contingency and Conceptual Change
University of Jyväskylä

Tapio Palva
1 Aug 1999–31 Jul 2004
Molecular Analysis of Adaptive Responses on Plants
University of Helsinki

Jukka Pekola
1 Aug 2000–31 Jul 2005
Fabrication and Sensor Applications of Nanostructures
Helsinki University of Technology

Leena Peltonen-Palotie
1 Aug 2003–31 Jul 2008
Genomwide Analyses of the Background of Common Diseases
University of Helsinki and National Public Health Institute

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

Mikko Sams
1 Aug 2002–31 Jul 2007
Neurocognitive mechanisms of multisensory peraption
Helsinki University of Technology

Yrjö Sepänmaa
1 Aug 2000–31 Jul 2005
The Theory and Practice of Applied Environmental Aesthetics
University of Joensuu

Anna-Leena Siikala
1 Aug 1999–31 Jul 2004
Myths, History, Society: National Traditions in Global World
University of Helsinki

Kaarina Sivonen
1 Aug 2000–31 Jul 2005
Cyanobacteria and Their Bioactive Compounds
University of Helsinki

Irma Thesleff
1 Aug 1998–31 Jul 2003
Molecular Regulation of Tooth Development
University of Helsinki

Jaakko Tuomilehto
1 Aug 2000–31 Jul 2005
Epidemiology and Genetics of Diabetes and Rheumatoid Arthritis in Finland
National Public Health Institute

Pertti Törmälä
1 Aug 1995–31 Jul 2005
Studies of Biodegradable Polymer Materials and Composites
Tampere University of Technology

Esko Ukkonen
1 Aug 1999–31 Jul 2004
Pattern Matching and Machine Learning – Algorithms and Biocomputing Applications
University of Helsinki

Ulla Vuorela
1 Aug 1999–31 Jul 2004
Minna Canth Academy Professorship (Women Studies and Gender Equality)
The Rich, the Poor and the Resourceful. Gender and Development in Postcolonialist Context
University of Tampere

Mårten Wikström
1 Aug 1996–31 Jul 2006
The Catalysts of Cell Respiration – Molecular Dynamics, Structure and Pathophysiology
University of Helsinki

Hannele Yki-Järvinen
1 Aug 1995–31 Jul 2005
Mechanisms of Glucose Toxicity
University of Helsinki

CENTRES OF EXCELLENCE IN RESEARCH IN 2003

The centres of excellence in research nominated by the Academy of Finland 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
University of Helsinki, National Public Health Institute, Folkhälsan, Academy Professor Leena Peltonen-Palotie

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

Evolutionary Ecology
University of Jyväskylä,
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 Juha Äystö

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, Academy 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,
Åbo Akademi University
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, University of Helsinki, Helsinki 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 centres of excellence in research nominated by the Academy of Finland 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-Herttuala

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

Developmental Biology Research Programme
University of Helsinki,
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,
Academy 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 Knuuttila

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 Centre 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

ACADEMY OF FINLAND RESEARCH PROGRAMMES IN 2003

Baltic Sea,
BIREME (2003–2005)

Biological Functions,
Life 2000 (2000–2003)

Environmental, Societal and Health Effects of Genetically Modified Organisms,
ESGEMO (2004–2007)

Finnish Companies and the Challenge of Globalisation,
LIIKE (2001–2004)

Future Electronics,
TULE (2004–2007)

Future Mechanical Engineering,
TUKEVA (2000–2003)

Health Promotion,
TERVE (2001–2004)

Health Services Research,
TERTTU (2004–2007)

Industrial Design *
(2004–2007)

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)

Microbes and Man,
MICMAN (2002–2006)

Proactive Computing,
PROACT (2002–2005)

Russia in Flux (2004–2007) *

Social Capital and Networks of Trust, SOCA (2004–2007)

Space Research,
ANTARES (2001–2004)

Sustainable Use of Natural Resources,
SUNARE (2001–2004)

Systems Biology and Bioinformatics,
SYSBIO (2004–2007) *

Telecommunication Electronics,
TELECTRONICS II (2001–2003)

* Financing from 1st January 2004

ACADEMY OF FINLAND PUBLICATIONS SERIES IN 2003

1/03 Tutkimusohjelmien anatomia. Suomen Akatemian tutkimusohjelmat hanke-johtajien ja koordinaattorien silmin. Johanna Hakala, Leena Ahrio, Erkki Kaukonen & Mika Nieminen

2/03 Suomen Akatemian tutkimusohjelmastrategia. Academy of Finland, Research Programme Strategy

3/03 Finnish Biodiversity Research Programme FIBRE 1997-2002. Evaluation Report

4/03 Tohtoreiden työllistyminen, sijoittuminen ja tarve

5/03 PhDs in Finland: Employment, Placement and Demand

6/03 European Strategy on Marine Research Infrastructure

7/03 Finnish Global Change Research Programme (FIGARE). Evaluation Report

8/03 Media Culture Research Programme. Evaluation Report

9/03 Suomen tieteen tila ja taso. Katsaus tutkimus-toimintaan ja tutkimuksen vaikutuksiin 2000-luvun alussa
- Yleisosan tiivistelmä
- Summary of the General Section of the 2003 Review

10/03 Scientific Research in Finland. A Review of Its Quality and Impact in the Early 2000s

11/03 Finnish Research Programme on Ageing 2000–2002. Evaluation Report

12/03 Nursing and Caring Sciences. Evaluation Report

13/03 Research Programme on Future Mechanical Engineering 2000–2003. Evaluation Report

14/03 Finnish Geosciences. Evaluation Report

15/03 Research Programme on Mathematical Methods and Modelling in the Sciences 2000–2003. Evaluation Report

OTHER PUBLICATIONS IN 2003

Printed

Academy of Finland
Annual Report 2002

Academy of Finland
Research Funding.
Guide for Applicants

ProAcademia magazine
(1 issue)

Academy of Finland in Brief.
Brochure in Finnish, Swedish and English

Academy of Finland
Research Programmes

Internet

Academy of Finland web pages in Finnish, Swedish and English (www.aka.fi, www.aka.fi/svenska, www.aka.fi/eng)

Academy of Finland
presentation transparencies in Finnish, Swedish and English

POLITIQUE SCIENTIFIQUE SUR LE LONG TERME

La période suivant la récession économique du début des années 1990 a été une période exceptionnellement prolifique dans l'histoire de la politique scientifique finlandaise, peut-être même dans l'histoire de toute la société finlandaise. Nos investissements dans la recherche se sont accrus, aussi bien en termes financiers que sous forme de nouvelles structures. En 1990, 1,9 pour cent du produit intérieur brut a été dirigé vers la recherche et le développement. Par équivalence, ce chiffre se montait à 3,4 pour cent en 2003. Ce qui nous a amenés au niveau de la Suède et de l'Allemagne. On dispose donc maintenant pour la recherche d'une part plus importante d'une globalité, qui est elle aussi, plus importante.

C'est en 1994 que le ministère de l'Éducation a nommé les premiers 12 centres d'excellence pour la recherche sans toutefois leur attribuer de financement direct. À l'heure actuelle, il existe 42 centres d'excellence, chacun disposant d'un financement raisonnable. Le système national de formation des chercheurs a démarré en 1995. Cette même année, nous avons rejoint l'Union européenne, au sein de laquelle nos chercheurs ont eu du succès dans les compétitions pour le financement de la recherche. En 1996, le gouvernement finlandais a décidé d'investir considérablement dans la recherche.

Alors qu'au début des années 1990 l'Académie comptait 21 postes de professeur de recherche et 95 postes de chercheur senior, à l'heure actuelle on dénombre 38 professeurs d'Académie et 238 chercheurs d'Académie. Il existe actuellement 380 postes dans le système pour les chercheurs post-doctoraux de l'Académie fondé en 1997. Tous ces chiffres, indiquant une croissance, ont eu une signification bénéfique importante pour la recherche de haut niveau à l'intérieur des universités.

Il serait aisé de continuer à énumérer les aspects positifs, aspects pouvant être confirmés par différents indicateurs donnés par des organismes indépendants et démontrant que nous avons également obtenu des résultats : une croissance à tous les niveaux, une ouverture polyvalente, la naissance de réseaux de coopération, les réussites des chercheurs, la croissance de l'importance du monde de l'entreprise dans le travail de recherche et de développement ainsi que l'internationalisation à un niveau jamais constaté auparavant du travail de recherche.

Et les années à venir ? Le domaine de l'Académie de Finlande est la recherche de base. Il est intéressant de voir que même l'Union européenne est en train d'élever la recherche de base aux premiers rangs de sa politique de recherche. C'est ce qu'indique en tout cas l'avis de la Commission publié au tout début 2004 ainsi que le projet de création d'un Conseil européen de la recherche, projet qui avance à grands pas. Il est bon pour nous autres Finlandais d'être étroitement associés à ce développement.

À l'heure actuelle, les points au programme de la politique européenne de la recherche sont la création et le soutien d'environnements de recherche de la meilleure qualité possible ainsi que les défis liés à la formation des chercheurs et à la carrière professionnelle. Dans ces domaines, nous disposons d'une expérience qui semble convenir également aux autres. Une politique de la recherche allant au-delà des frontières est pour nous une possibilité de donner et de recevoir.

À l'heure de la mondialisation, un petit pays n'est pas condamné uniquement à être un perdant, mais pour obtenir des profits, il faut faire preuve d'esprit d'initiative et de coopération.

Reijo Vihko
Directeur général

L'ACADÉMIE DE FINLANDE EN 2003

RAPPORT SUR L'ÉTAT DE LA SCIENCE

En 2003, l'Académie de Finlande a publié son troisième "Aperçu de l'état et du niveau de la science". La réflexion de ce rapport porte sur le développement scientifique, particulièrement dans les premières années du XXIe siècle. Selon ce rapport, sur le plan international, la Finlande se situe à un bon niveau. Notre pays investit dans la recherche et le développement, le personnel de recherche est qualifié et nous disposons d'un système de formation des chercheurs de qualité.

Renforcer la qualité de la recherche, sa représentation sur le plan international ainsi que son influence à l'intérieur de la sphère scientifique, tels sont les principaux objectifs de la politique scientifique finlandaise. Ces buts ont été relativement bien atteints. Les publications scientifiques des chercheurs finlandais se sont rapidement internationalisées dans les années 1990 et au début des années 2000. Les publications faites par des Finlandais servent de plus en plus souvent de références. Par exemple, l'index de références proportionnel au tournant des années 1980 et 1990 était inférieur à celui de la moyenne des pays de l'OCDE, mais sur la période 1998 à 2002, les publications finlandaises ont servi de référence 7 pour cent de fois plus que la moyenne des publications éditées dans les pays de l'OCDE.

En étudiant le développement des ressources humaines et du financement de la recherche par rapport au PIB, la Finlande fait partie, à côté de la Suède, des pays de l'UE les plus actifs dans le domaine du développement et la recherche. En Finlande, plus de 70 000 personnes travaillent dans la recherche et le développement, soit environ 2 pour cent de la population active, ce qui est le chiffre le plus important dans les pays de l'OCDE.

La Finlande investit dans la science

L'Académie de Finlande est le principal organisme de financement de la recherche de base dans notre pays. Le développement du financement de la recherche de l'Académie suit les lignes du Conseil national de la science et de la technologie.

Proportionnellement, le financement de la Finlande dans les activités de recherche et de développement a été l'un des meilleurs du monde. Pour 2003, on estime que la part du financement dans la recherche et le développement s'est montée à environ 3,4 pour cent du PIB. La part de la Finlande représentait 0,7 pour cent du total des dépenses pour la recherche et le développement des pays de l'OCDE.

L'État finlandais a financé la recherche et le développement à hauteur de 1,4 milliard d'euros en 2003. En 2002, les dépenses pour la recherche et le développement ont augmenté de 25 millions d'euros. Les dépenses ont augmenté d'une valeur nominale de 1,8 pour cent, mais ont en réalité baissé de 1,2 pour cent. La part des dépenses de recherche et de développement s'est maintenue à 4,4 pour cent des dépenses globales de l'État, à l'exclusion des frais de gestion de la dette publique, comme en 2002.

Le financement obtenu par l'Académie de Finlande, 185,1 million d'euros, était l'équivalent du niveau de l'année 2002. La part de l'Académie dans le financement de la recherche de l'État s'est également maintenue au niveau de l'année 2002, c'est-à-dire à 13 pour cent.

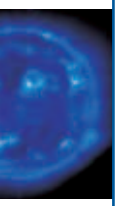
Le financement de la recherche est soumis à la concurrence

En 2003, l'Académie a financé la recherche à hauteur de 184,4 millions d'euros, soit 8 millions de plus que pour l'année 2002.

Le financement de la recherche de l'Académie est soumis à la concurrence. L'Académie a reçu des candidatures pour un total de 841,6 millions d'euros et a accordé des crédits à hauteur de 184,4 millions d'euros, ce qui représente 21 pour cent des demandes de financement. 5 053 dossiers ont été déposés et 2 501 ont été acceptés.

En 2003, 42 pour cent du financement de la recherche par l'Académie a été destiné à des projets de recherche. Le financement par l'Académie a été réparti de la manière suivante ; 23,5 pour cent pour des programmes de recherche, 14,5 pour cent pour la formation des chercheurs, 11 pour cent pour les postes de recherche et 8 pour cent pour la coopération internationale.

Environ 5 337 personnes ont travaillé grâce aux fonds destinés à la recherche de l'Académie, soit approximativement 2 778 années de travail de recher-



che. Les chercheurs travaillant dans les universités ou les centres hospitaliers universitaires ont perçu 82 pour cent des fonds pour la recherche de l'Académie.

Dix-huit programmes de recherche

En 2003, 18 programmes de recherche étaient en cours. Avec le mandat de 2003, sept nouveaux programmes ont été mis en route, qui ont été préparés et mis en place en collaboration avec d'autres financeurs.

Alors qu'en 2002, 12 pour cent du financement était destinée aux programmes de recherche et aux programmes ciblés, en 2003 ce chiffre s'est monté à 23 pour cent. Cela provient du fait qu'aucune décision de financement n'a été prise pour les centres d'excellence.

Le financement de six programmes de recherche s'est achevé en 2003 : le programme de recherche sur les fonctions biologiques, Life 2000 (2000–2003) ; Des deux côtés du golf de Bothnie (2000–2003) ; Développement de modèles et de méthodologies mathématiques pour les différents domaines de la science MaDaMe (2000-2003) ; Exclusion sociale, inégalité et relations ethniques en Finlande, SYREENI (2000-2003) ; Télécommunications-électronique, TELECTRONICS II (2001-2003) et Technologie des machines et de production de l'avenir, TUKEVA (2000-2003).

Dans les programmes de recherche et les programmes ciblés, l'Académie a collaboré avec 16 financeurs nationaux et étrangers ainsi qu'avec une organisation finançant la recherche publique et privée.

L'Académie avait en cours cinq programmes de recherche internationaux communs à deux pays, subventionnés par des financeurs publics et/ou privés. Sept financeurs étrangers y ont également participé.

L'Académie et Tekes (Agence nationale pour le développement technologique), ont collaboré au financement des programmes de recherche et des programmes de type "cluster". En 2003, l'Académie avait en cours huit programmes de recherche co-financés par Tekes. L'Académie a participé à un programme technologique de Tekes.

L'Académie a participé à deux programmes visant au développement de nouveaux pôles nationaux avec un programme de recherche (le pôle forestier) et un programme ciblé (le pôle environnemental).

Les centres d'excellence ont rempli leur mission

En 2003, 42 centres d'excellence ont été financés par deux programmes correspondants. Le second 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 a débuté en 2003. Sur la base des accords conclus avec les centres d'excellence et les organisations de soutien, l'Académie va financer ce projet à hauteur de 30,3 millions d'euros sur les années 2003–2005.

Environ 8,5 pour cent des fonds annuels pour la recherche de l'Académie sont utilisés pour le financement contractuel des programmes des centres d'excellence.

Le premier programme de centres d'excellence de recherche nationale a atteint de nombreux objectifs fixés durant ses trois premières années. Une grande quantité de défis se profilent encore à l'horizon. Dans le troisième programme de centres d'excellence qui va démarrer en 2006, l'Académie met l'accent sur des nouvelles ouvertures, sur une approche multi- et interdisciplinaire, sur une collaboration internationale méthodique et à long terme entre les groupes de recherche ainsi que sur l'exploitation et la vulgarisation des résultats de la recherche. La préparation du nouveau programme a débuté en 2003.

Le programme de centres d'excellence nordique financé par 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) a démarré début 2003. Ce programme est orienté vers la recherche sur le changement mondial. Le financement annuel de ce programme pilote d'une durée de cinq ans se monte à environ 1,6 million d'euros. L'Académie participe à son financement à hauteur de 189 000 euros par an.

Un groupe de soutien scientifique international a été formé pour suivre et soutenir les activités des quatre centres d'excellence participant au programme. Sa première réunion s'est tenue fin 2003. L'un des quatre centres est dirigé par un professeur d'Académie finlan-

dais et deux autres centres accueillent des groupes de recherche finlandais. Le secrétariat du programme est assuré au sein de l'Académie de Finlande.

Le dépôt des candidatures pour le second programme de centres d'excellence commun aux pays nordiques a débuté en automne 2003. Les comités scientifiques de la recherche sur la santé des pays nordiques (Nordiska samarbetsnämnden för medicinsk forskning, NOS-M), le Conseil des ministres des pays nordiques et NorFA financent ce programme de centres d'excellence sur la médecine moléculaire ainsi que la formation correspondante des chercheurs sur les années 2004 à 2009. Le financement annuel de ce programme est d'environ 1,2 million d'euros. L'Académie participe à son financement à hauteur de 120 000 euros par an. Des groupes de recherche finlandais de haut niveau ont participé très activement à la candidature par thème.

L'Académie a financé la collaboration de quatre groupes de chercheurs de centres d'excellence finlandais travaillant sur les sciences naturelles et les biosciences avec des groupes financés par la Fondation des Sciences Naturelles de la Chine NSFC. Le financement pour les années 2002 à 2005 se monte en tout à 0,7 million d'euros.

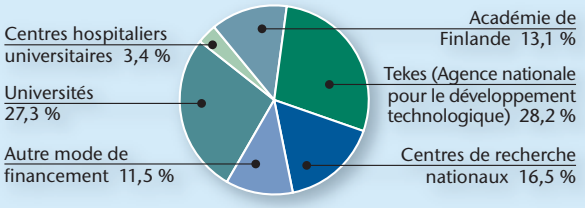
Les titulaires de doctorat sont très demandés sur le marché du travail

L'Académie de Finlande a établi, à la demande du ministère de l'Éducation, un rapport sur l'emploi, le placement et les besoins des titulaires de doctorat. Ce rapport a été établi afin de disposer d'éléments concrets dans la prise de décision concernant la politique de formation et scientifique. Selon ce rapport, les titulaires d'un doctorat sont bien placés sur le marché de l'emploi et il n'y a pas de signes indiquant une baisse de la demande.

En 2003, les comités scientifiques de l'Académie ont accordé 190 bourses sur deux ans à des chercheurs post-doctoraux débutant dans la carrière de chercheur professionnel. Fin 2003, il existait 238 postes de chercheurs d'Académie et 38 postes de professeurs d'Académie.

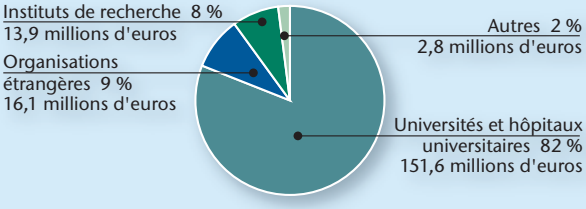
Le financement de la recherche par l'Académie ainsi que les postes et les fonctions de chercheur sont

Financement national de la recherche par organisations en 2003

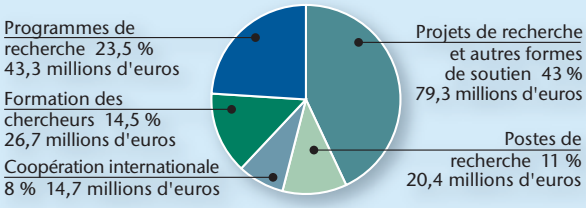


Source : Institut national des études statistiques

Décisions sur le financement de la recherche de l'Académie de Finlande par sites de recherche en 2003



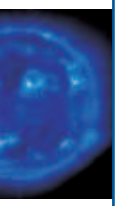
Décisions sur le financement de la recherche de l'Académie de Finlande par mode de financement en 2003



Total 184,4 millions d'euros

des points de passage importants dans la carrière académique, aussi bien pour les hommes que pour les femmes. La situation des femmes dans le système des postes de chercheur d'Académie s'est améliorée, la proportion des femmes nommées entre 1997 et 2003 aux postes de chercheurs de l'Académie a été supérieure à leur part au sein des candidats à ces postes. Fin 2003, 33 pour cent des chercheurs et 29 pour cent des professeurs d'Académie étaient des femmes.

L'Académie de Finlande finance la formation des chercheurs sous différentes formes. La plus importante est le financement de projets. Les comités scientifiques soutiennent les écoles doctorales financées par le mi-



nistère de l'Éducation en leur allouant chaque année une partie des fonds. Fin 2003, il existait en Finlande 114 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 préparent leur thèse de doctorat grâce à un autre mode de financement.

La mobilité internationale des chercheurs fait également partie du financement de la recherche par l'Académie. Le travail à l'étranger des chercheurs et des étudiants-chercheurs a été soutenu également par des bourses, pour un montant total de 2,4 millions d'euros, et par un financement basé sur des contrats internationaux bilatéraux pour un montant total de 1,8 million d'euros.

187 chercheurs finlandais ont travaillé à l'étranger grâce aux échanges de chercheurs bilatéraux, soit au total 6 186 journées. La Finlande a accueilli 400 chercheurs étrangers, soit 12 041 journées.

Accent sur les évaluations internationales

Les résultats de l'évaluation internationale de l'Académie de Finlande, mise en route par le ministère de l'Éducation en 2002, seront publiés en mars 2004. Un panel d'évaluation international a procédé à de nombreux entretiens et s'est déplacé deux fois pour évaluer les activités de l'Académie.

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

L'Académie a pour tâche d'évaluer l'état et le niveau de la science en Finlande, mais aussi des domaines de recherche et scientifiques particuliers ainsi que des programmes de recherche qu'elle finance. En 20 ans, l'Académie a mis en route et coordonné en tout 25 évaluations sur la recherche et la science. En 2003, on a réalisé les évaluations internationales sur les sciences des soins et les sciences de la terre et mis en route l'évaluation sur les compétences en affaires.

En 2003, l'Académie a finalisé le rapport d'évaluation international de six programmes de recherche. De plus, l'Académie a commandé une étude pour l'évaluation des activités et de l'impact de douze programmes de recherche de l'Académie auprès de l'institut de recherche en sciences sociales de l'université de Tampere.

Vers un espace européen de la recherche

Dans le sixième programme-cadre, la responsabilité nationale en Finlande a été répartie entre l'Académie et Tekes. À l'intérieur du programme-cadre, les principaux modes de financement sont la mise en réseau des savoirs de haut niveau, les projets intégrés et le soutien à la mise en réseau des programmes de recherche nationaux (ERA-NET). La préparation aux projets ERA-NET exigé une contribution importante de la part de l'Académie. Le résultat de cette bonne préparation a été l'obtention par l'Académie de la coordination de deux projets ERA-NET. De ceux-ci, BONUS (BONUS pour la science en mer Baltique) a obtenu les meilleurs points de tous les projets présentés et NORFACE (Nouvelles opportunités pour la coopération au financement de la recherche en Europe – une stratégie pour les sciences sociales) a été considéré comme un excellent projet. L'Académie est également partenaire dans cinq projets ERA-NET.

L'Académie a également participé à plusieurs autres projets de l'UE, notamment le réseau de formation pour les points de contact nationaux TRAINNET ; le 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 programme et les financeurs ; le partenariat Europe - pays en développement pour les essais cliniques sur les maladies liées à la pauvreté EDCTP ; et le centre de presse sur Internet pour l'actualité des sciences, de l'ingénierie et des technologies en Europe, AlphaGalileo.

L'Académie participe à de nombreux programmes de recherche entre deux ou plusieurs pays en dehors des programmes-cadres de l'UE et collabore également avec divers pays et régions. En 2003, l'Académie avait des accords bilatéraux avec 27 pays et 40 organisations étrangères.

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