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THE ROYAL SWEDISH ACADEMY OF SCIENCES

# THE ROYAL SWEDISH ACADEMY OF SCIENCES



...promotes the sciences and strengthens  
their influence in society



## The North Star

– part of the seal of the Royal Swedish Academy of Sciences since 1742.

### COVER PORTRAITS, Members of the Academy – from the left to the right, top down.

Sir Martin Rees, Carl Linnaeus, Lene Vestergaard Hau (PHOTO: JUSTIN IDE), Gunnar von Heijne, Sara Snogerup Linse (PHOTO: MARKUS MARCETIC), Staffan Normark (PHOTO: MATTIAS PETERSSON), Li Bennich-Björkman (PHOTO: MARTIN CEJIE), Kerstin Fredga (PHOTO: MARKUS MARCETIC), Bo Sundqvist (PHOTO: ERIK HUSS), Svante Pääbo (PHOTO: PUBLIC LIBRARY OF SCIENCE), Ahmed Zewail (PHOTO: LARS FALCK), Jacob Berzelius, Yoshinori Yasuda (PHOTO: TAKESHI TAKEDA), Jan Lindsten (PHOTO: TORBJÖRN ZADIG), Karin Markides (PHOTO: JAN-OLOF YXELL), Nils Nordenskiöld, Stefan Claesson (PHOTO: ERIK HUSS), Gunnar Öquist (PHOTO: MARKUS MARCETIC), Rita Colwell, Svante Lindqvist, Catharina Larsson (PHOTO: TORBJÖRN ZADIG), Alfred Nobel, Marcus Storch (PHOTO: ULLA MONTAN, ©NOBELSTIFTELSEN), Veerabhadran Ramanathan, Mårten Triewald, Juleen Zierath (PHOTO: ULF SIRBÖRN), Sven Kullander, Sheila Kirkwood, Bert Bohlén, Carl Folke (PHOTO: PEDER FOLKE), Reiko Kuroda, PC Jersild.



## ...is a scientific force in society

THE ROYAL ACADEMY OF SCIENCES is an independent, non-governmental organisation with a charter which lays down in its first article that its task is “to promote the sciences and strengthen their influence in society”. The Academy **PROMOTES SCIENCE OF THE HIGHEST QUALITY** by stimulating development and innovation in Swedish research, **STRENGTHENS THE SOCIAL ROLE OF SCIENCE** by focusing on important social issues, appraising them from a scientific perspective and communicating its findings and also **PARTICIPATES IN COOPERATION ON GLOBAL ISSUES**, with the aim of being an international scientific protagonist of sustainable development.

A knowledge-based society that gives priority to education, research and innovation has the best chances of meeting the future challenges.



## Organization

The Academy consists of its members. Today it has about 420 Swedish and 175 foreign **MEMBERS**. They are divided into ten classes: mathematics, astronomy and space science, physics, chemistry, geosciences, biosciences, medical sciences, engineering sciences, social sciences and a class for the humanities and for outstanding services to science.

The Academy's foremost representative is its **PRESIDENT**, who is assisted by three vice presidents – all elected to their offices for a fixed period. Together with the full-time **PERMANENT SECRETARY** they constitute the **PRESIDIUM**.



Responsibility for the development of the Academy's activities and the effective use of available resources lies with the **ACADEMY BOARD**, which consists of the presidium and ten members representing the classes.

The Academy is served by a **SECRETARIAT** with a staff of about 40 headed by the Permanent Secretary. The secretariat's responsibilities include communication, administration, finance and the programme of activities. The Academy also operates through a number of **RESEARCH INSTITUTES**.

The Academy organizes press conferences to announce the Nobel Prize Laureates in its session hall, where the Academy itself meets ten times each year.

PHOTO: MARKUS MARCETIC





'The old man digging', planting a tree for posterity, has been used as an emblem in the Academy's proceedings *Vetenskapsakademiens handlingar* ever since the first issue was published in 1739.

ILLUSTRATION BY LISA BAUER, ENGRAVED BY LARS BÖRNESSON, PHOTO: LARS FALCK



## ...promotes excellence in science

THE WORK OF PROMOTING excellence in science is undertaken primarily within the Academy's classes and comprises, for instance, responding to government proposals, assessments and evaluations, scientific conferences, research at the Academy's institutes and procedures relating to prizes, awards, grants and research appointments.

### Responding to government proposals, assessments and evaluations

The reputation enjoyed by the Academy and its independent, non-governmental status mean that proposals, primarily relating to issues linked with research, are often referred to it by the government. The Academy also undertakes assessments and evaluations, for instance of research foundations such as the Swedish Foundation for Strategic Research and MISTRA, the Swedish Foundation for Strategic Environmental Research.

### Lectures, workshops, conferences and seminars

Initiatives on subjects of current interest involve both members and other invited experts. The initiatives come from individual members, the Academy's classes or committees, and from the national committees. Their common task is to monitor research within their respective fields and maintain contacts with international scientific organisations.

Many members also participate in the publication of the Academy's **SCIENTIFIC JOURNALS**: Acta Mathematica, Arkiv för matematik (Mathematical Archives), Acta Zoologica, Zoologica Scripta, Physica Scripta and Ambio.

## The Academy's research institutes

Over the years a large number of research institutes have been established at the Academy's initiative. Several of these have subsequently been spun off. This is the case, for instance, with the Swedish Museum of Natural History, the Swedish Meteorological and Hydrological Institute (SMHI), the Swedish Institute of Space Physics in Kiruna, Kristineberg Marine Research Station and, most recently Abisko scientific research station.

Today the Academy operates the **BERGIUS FOUNDATION**, a botanical research institute located in the Bergius Botanic Garden in Stockholm, the **BEIJER INSTITUTE FOR ECOLOGICAL ECONOMICS**, which focuses on the interplay of ecological systems with social and economic development, **INSTITUT MITTAG-LEFFLER**, which is an international institute for mathematics, the **INSTITUTE FOR SOLAR PHYSICS OF THE ROYAL SWEDISH ACADEMY OF SCIENCES**, which undertakes research using one of the world's leading solar telescopes on La Palma, and the **CENTER FOR HISTORY OF SCIENCE**, which maintains the Academy's archives, scientific instrument collection and the Nobel archives and also manages the Academy's Observatory Museum.



The Academy's Nordic institute for research in mathematics, Institut Mittag-Leffler.





The Academy's Institute for Solar Physics on La Palma.



The Edvard Anderson greenhouse, the Bergianska foundation.  
PHOTO: ÅSA STJERNA



The Academy's Observatory Museum.  
PHOTO: SUSANNA ASKLÖF

## Prizes, awards and research appointments

ELECTION AS A MEMBER of the Academy is in itself a singular recognition of research success. Outstanding contributions to research are also acknowledged in other ways, for instance through the award of the Academy's many prizes.



The Royal Swedish Academy of Sciences is responsible for awarding the **NOBEL PRIZES IN PHYSICS AND CHEMISTRY**, which reward discoveries, inventions and improvements that have been of the greatest benefit to mankind. The Academy also awards the **SVERIGES RIKSBANK PRIZE IN ECONOMIC SCIENCES IN MEMORY OF ALFRED NOBEL** using the same procedures as for the Nobel Prizes. Each of these prizes has its own prize committee to deal with the nominations and awards. The Academy has established a significant international network of eminent researchers and research institutes for this work. In awarding the Nobel Prizes the Academy defines the highest level of excellence in international science.



Elinor Ostrom has just received the Prize in Economic Sciences at the ceremony in the Stockholm Concert Hall in 2009.

PHOTO: FRIDA WESTHOLM



H.M. King Carl XIV Gustaf presents the Crafoord Prize in Geosciences to Walter Munk in 2010.

PHOTO: MARKUS MARCETIC

**THE CRAFOORD PRIZE.** Anna-Greta and Holger Crafoord's fund was established in 1980 in order to promote basic research in the disciplines for which the prize is awarded – mathematics and astronomy, the biosciences (primarily ecology), the geosciences and polyarthritis. Both an international prize and a research grant for Swedish researchers are awarded for each of these disciplines in turn.

**THE GÖRAN GUSTAFSSON PRIZES.** Since 1991 the Göran Gustafsson Foundation for natural scientific and medical research has been awarding prizes to young researchers considered to have particular potential to make significant contributions in molecular biology, physics, chemistry, mathematics and medicine. The Academy is responsible for awarding the prize, which comprises a personal award of SEK 100,000 as well as a research grant of SEK 4.5 million divided evenly over three years.

**THE ROLF SCHOCK PRIZES.** As laid down in the terms of Dr. Rolf Schock's will, since 1993 the Academy has been selecting one recipient of a prize in logic and philosophy and one in mathematics. At the same time the Royal Academy of Fine Arts and the Royal Swedish Academy of Music each select laureates in visual arts and music. These prizes are awarded every three years.

**THE SÖDERBERG PRIZE** in economics and jurisprudence has been awarded every other year since 1986 by the Academy and in alternate years in medicine by the Swedish Society of Medicine. The prize is funded by the Torsten and Ragnar Söderberg Foundations, established in 1960.

In addition a number of prizes in different disciplines are awarded by the Academy using funds from the foundations it administers.

Over the last decade, the Academy has appointed nearly 100 **RESEARCH FELLOW POSITIONS** in various disciplines. There is a great deal of competition for these positions for which the Academy makes the selection. The research positions receive funding from the Knut and Alice Wallenberg Foundation, the Tobias Foundation, the Torsten and Ragnar Söderberg Foundations, established in 1960, and the Acta Oncologica Foundation.



Åsa Strand, Department of Plant Physiology, Umeå University, studies Plastid-to-Nucleus Signalling Pathways.



Oleg Kochukhov, Uppsala University, Department of Physics and Astronomy, astronomer in the area of theoretical and observational research in stellar astrophysics.



Anthony Poole, Department of Molecular Biology and Functional Genomics, Stockholm University, whose research field is "Horizontal gene transmission and the development of the three main domains of life".



## ...strengthens the social role of science

THE WORK OF STRENGTHENING the role of science in society is mainly interdisciplinary and includes for instance the Academy's permanent and adhoc committees and projects.

### The Academy's permanent committees

**THE ENVIRONMENTAL COMMITTEE** monitors, identifies and studies critical environmental problems on the basis of the contributions scientific research can make to increase knowledge about the environment in which we live. The committee arranges seminars, debates and symposia, and also drafts responses to consultation documents and other issues linked to the environment.

Since the beginning of the 1980s the Academy has launched and been involved in numerous activities intended to improve teaching in schools and stimulate scientific learning. NTA, Science and Technology for All, is one of these initiatives. Most of these activities are organised through the **SCIENCE EDUCATION COMMITTEE**.

**THE HUMAN RIGHTS COMMITTEE** consists of representatives from the Royal Swedish Academy of Sciences and the Royal Swedish Academy of Letters, History and Antiquities. The task of the committee is to monitor the situation for researchers all over the world who are subject to various forms of legal abuse. Its work is based on the UN Declaration of Human Rights and other international conventions.



Seven issues of the Energy Committee's information leaflet have been published up to now.

## The Academy's ad-hoc committees

Questions that concern energy often cover many different disciplines. The Academy's **ENERGY COMMITTEE** has reviewed and assessed knowledge about current energy issues with the emphasis on their scientific and technological aspects. Trends in the supply and use of energy as well as ongoing research, development and demonstration projects provide the basis for its analyses. Its perspective is global and extends about 50 years into the future. The results of its work are circulated to actors in the field of energy and to the general public.

Education, knowledge and science are vital for positive social development. The Academy's **RESEARCH POLICY COMMITTEE** has the task of undertaking analyses from a broader social perspective and an independent point of view and offering advice that can help to improve the conditions and potential for research in Sweden.

**THE HEALTH COMMITTEE** has focused on experiences of ill-health among school-children. The point of departure consists of the reports on increasing mental illness among the young that have been presented repeatedly since the economic crisis in Sweden in the mid-1990s. Explanations are sought at a social level, in changing social and economic conditions as well as in trends towards increased individualisation in society and the greater demands made of young people. The committee has among other things initiated a systematic overview of current knowledge on the prevention of mental ill-health among children. The project has produced two state of the science statements and organized an open hearing with policy and decision makers.



## ...participates in cooperation on global issues

THE WORK OF INTERNATIONAL, global cooperation is led primarily by the presidium and involves both cooperation within the framework of international academic and research organisations as well as bilateral collaboration.

Sweden is represented in a number of international academic organisations. *The International Council for Science*, ICSU, is an organisation consisting of a large number of non-government scientific associations. ICSU runs several research programmes, such as The International Geosphere Biosphere Programme, IGBP, whose international secretariat is housed by the Academy. Many of the Academy's national committees also belong to the various ICSU unions for different specialised areas.

In 2010, the Swedish Secretariat for Environmental Earth System Sciences, SSEESS, was established at the Academy. SSEESS strives to enhance Swedish involvement in international trans-disciplinary research efforts in Global Environmental Change, and will also provide a central, science-based, and independent source of information for Swedish policy and decision makers.

The Academy plays an active role in a number of other organisations and associations, to which a large number of the world's academies, research councils and similar organisations belong. Meetings and other continuous contacts enable the development of strategies on global issues, such as sustainable development, the economical use of energy and consumption and distribution concerns.



SSEESS (the Swedish Secretariat for Environmental Earth System Sciences) Neda Farahbakhshazad, scientific coordinator; Kevin Noone, director; Astrid Auraldsson, coordinator, and Dan Wilhelmsson, scientific coordinator.

FOTO: ERIK HUSS



## ... encourages a scientific approach in education

**SCIENCE AND TECHNOLOGY FOR ALL**, NTA, is organised in partnership with the Royal Academy of Engineering Sciences, IVA, and offers local authorities and schools the possibility of developing their teaching through the use of scientific and technological themes. The teaching programme includes guides for teachers and pupils, sets of material for laboratory work, and training for teachers and NTA coordinators in using the themes. Each local authority is responsible for the programmes in their own schools and for further training, but they also participate in a continuous development project based on their use of the training and teaching material.



The recipient of the Ingvar Lindqvist Prize in Mathematics for 2006, Stavros Louca, Rinkeby School. He is one of Sweden's best maths teachers and his pupils often achieve top placings in national mathematics contests.



The Nobel Prize Posters are produced annually by the Academy and provide a popular scientific presentation of the Nobel Prize in Physics and Chemistry and the Prize in Economic Sciences. The posters are distributed worldwide. High school children and young adults are the primary target group but many prominent institutions also subscribe.

The Academy is eager to support and encourage teachers in their important endeavours. For this reason teachers' days are arranged with lectures on research developments. Since 1991 the **INGVAR LINDQVIST PRIZE** has been awarded for notable contributions to the teaching of mathematics and the natural sciences.

**POSTERS** which present the Nobel Prizes in Physics and Chemistry and the Prize in Economic Sciences in popular terms are produced each year and circulated to every upper-secondary school in Sweden and the science departments of the higher education institutions. These posters are translated into more than ten languages and distributed all over the world.



## ...is a learned society with a tradition

THE ROYAL SWEDISH ACADEMY OF SCIENCES was founded in 1739 by Jonas Alströmer, Anders Johan von Höpken, Sten Carl Bielke, Carl Linnæus, Mårten Triewald and Carl Wilhelm Cederhielm. The Academy's aim was to develop practical utilities in agriculture, forestry and mining that could benefit the rebuilding of the country during the hard times following the Sweden's period of major wars.

The current activities of the Academy are based on the foundation laid by the chemist J. Jacob Berzelius, when he reformed its operations as its Permanent Secretary in the 1820s. Greater focus was placed on basic research in mathematics and the natural sciences. Since its foundation in 1739, about 1 600 Swedish and 1 200 foreign members have been elected to the Academy.



Carl Linnæus (23 May 1707–10 January 1778), founder of the Royal Swedish Academy of Sciences and Swedish botanist, physician, and zoologist, who laid the foundations for the modern scheme of binomial nomenclature. He is known as the father of modern taxonomy, and is also considered one of the earliest ecological thinkers.



J. Jacob Berzelius (20 August 1779–7 August 1848), Permanent Secretary of the Academy 1818–1848, was a Swedish chemist. He worked out the modern technique of chemical formula notation, and is considered one of the fathers of modern chemistry.



Cover portraits, Members of the Academy – from the left to the right, top down.

Sune Svanberg, Lars Calmfors, Catherine Cesarsky, Olle Häggström, Ylva Engström (PHOTO: SIMON SÖDERBERG), Gösta Mittag-Leffler, Partha Dasgupta, Kersti Hermansson, Jeffrey Friedman, Bengt Kasemo (PHOTO: JAN-OLOF YXELL), Inga Fischer-Hjalmars, Janne Carlsson, Erna Möller, Erling Norrby, Björn von Sydow, Pierre Deligne (PHOTO: RANDALL HAGADORN), Peter Gärdenfors (PHOTO: M. EARTHY), Håkan Wennerström, Anders Björner, Barbro Åsman, Svante Arrhenius, Gunnar Wetterberg (PHOTO: JENNY LUNDBERG), Per Krusell (PHOTO: LASSE LYCHNELL), Carl Woese.

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**THE ROYAL SWEDISH ACADEMY OF SCIENCES**, founded in 1739, is an independent organization whose overall objective is to promote the sciences and strengthen their influence in society. The Academy takes special responsibility for the natural sciences and mathematics, but endeavours to promote the exchange of ideas between various disciplines.

