

Multi-Year Programme 2017–2020

Planning document for the Federal Authorities



SWISS NATIONAL SCIENCE FOUNDATION

The Swiss National Science Foundation (SNSF) is the most important Swiss agency promoting scientific research. As mandated by the Swiss Federal government, it supports all disciplines from philosophy and biology to the nanosciences and medicine.

Multi-Year Programme 2017–2020

Table of contents

1.	Summary	4
2.	Challenges for research funding	6
2.1	The changing face of science	6
2.2	The SNSF's goals for 2017-2020	8
2.3	Uncertainty in the European environment	10
Part 1	Priorities 2017-2020	12
3.	Excellence and internationality in research and evaluation	12
4.	Early independence for young researchers	14
5.	Contribution to knowledge transfer and innovation	16
6.	Targeted initiatives for setting priorities	18
Part 2	Funding Portfolio 2017-2020	22
7.	Project funding	22
8.	Career funding	24
8.1	Doctoral level	24
8.2	Postdoc level	24
8.3	Assistant professor level	25
9.	Programmes	28
9.1	National Research Programmes (NRPs)	28
9.2	National Centres of Competence in Research (NCCRs)	28
9.3	Sinergia	28
9.4	International cooperation	29
9.5	Special programmes	30
9.6	Bridge - a joint programme with the CTI	31
10.	Infrastructures	32
10.1	General funding policy on infrastructures	32
10.2	R'Equip	32
10.3	Special infrastructure funding initiatives	32

11.	Public science communication	34
11.1	Scientific exchange	34
11.2	Publication grants	34
11.3	Agora	34
Part 3	Service provision and finances	35
12.	Service provision	35
13.	Finances and overhead	37
	References	42
	Abbreviations	43

Cross-cutting themes

Transparency, internationality and excellence	23
Career funding at the universities of applied sciences and of teacher education	25
Clear signals with regard to gender equality	27
Temporary Backup Schemes offer useful insights	36
Portfolio optimisation	36
Shelved projects	41

1. Summary

Research has the power to fascinate. At the same time, it provides an important basis for societal development and – not least in Switzerland with its scant natural resources – for economic prosperity. In this multi-year programme, the SNSF sets out its plans to strengthen and develop Swiss research and contribute to enhancing its already excellent reputation during the 2017-2020 planning period.

Researchers today work in a strongly internationalised, extremely competitive and rapidly changing science system. Digitisation trends and increasing demands for transparency are changing the way in which research is conducted, communicated and evaluated. Against this backdrop and its attendant challenges, the SNSF intends to pursue four **priority targets** between 2017 and 2020:

- Continue to promote **excellence and internationality in research and evaluation** by anticipating future needs, encouraging competition for grants and creating incentives for strengthening cooperation, transparency and good scientific practices.
- Facilitate **early independence for young researchers** and present clear career prospects to encourage researchers to contemplate a career in academia, and to help underpin the excellence and social acceptance of Swiss research in the long term.
- Contribute to **knowledge transfer and innovation**, in particular by launching a new joint programme with the Commission for Technology and Innovation (CTI).
- Develop new research areas and channel competencies towards promising fields through **targeted initiatives aimed at setting priorities**.

A purely responsive mode of funding based on competition between applicants will remain the SNSF's top priority with regard to its **funding portfolio**. Most of the available money will continue to be channelled to project and career funding without any thematic, strategic and structural conditions attached.

Project funding will continue to be the SNSF's flagship funding scheme. It allows researchers from all disciplines to apply for funding for a project of their own choice. To innovate the scheme, the SNSF will introduce excellence grants for outstanding researchers, make it possible for funds to be used more flexibly, and extend the running time so that researchers have more freedom to implement their projects as they see fit. The increase in the average annual payment per grant will enable the SNSF to strengthen international collaboration on research projects, in particular. It will also create incentives to improve access to publications and research data.

In **career funding**, the SNSF will create clearer distinctions between the various schemes to focus more strongly on supporting academic careers. The proposed measures include more substantial grants for the early career schemes (Doc. Grants and Ambizione), introduction of an excellence scheme for women (PRIMA – Promote Women in Academia) as well as additional measures promoting mobility and gender equality in all schemes.

It is important to note that the SNSF plays a subsidiary role in the promotion of young researchers, with the higher education institutions taking the lead. The universities plan to create additional assistant professorships with tenure track (APTT), which will offer young researchers clearer career prospects. Mandated by the Federal Council, the SNSF will support this systemic change by introducing APTT Grants. In addition, the universities of applied science and universities of teacher education are studying different kinds of career

paths at their institutions. The SNSF will monitor these developments and adapt its schemes if necessary in consultation with its partners.

The SNSF is pursuing more specific objectives in its **programmes** by specifying thematic, conceptual and/or organisational requirements. In the 2017-2020 period, it will continue to run the National Research Programmes (NRPs) and National Centres of Competence in Research (NCCRs) with minor adaptations. More far-reaching modifications are planned for Sinergia, which will in future specifically promote collaborative research across disciplinary boundaries that has a high potential for achieving ground-breaking results. By implementing the new funding scheme Bridge, the SNSF and the CTI will jointly close a funding gap between basic research and innovation. The SNSF also plans to introduce priority programmes in the areas of social innovation, digital humanities and clinical research.

As concerns **infrastructure funding**, a key element in the development of many disciplines, the SNSF aims to clarify its role in consultation with the SERI and to focus on the initial funding of research-driven infrastructures. In the 2017-2020 period, it will continue to support the R'Equip scheme for large research equipment, the funding of editions in the humanities, longitudinal studies and biobanks to strengthen medical research, and infrastructures for particle physics, astrophysics and astroparticle physics through FLARE (Funding LArge international REsearch projects).

The SNSF will also continue to support **science communication**, in particular Agora, which promotes dialogue between researchers and the public.

To implement these measures, the SNSF needs an **average annual budget increase of 4.9%**. The additional funds will be used primarily to promote young researchers, to develop the joint programme Bridge with the CTI and to consolidate project funding. The financial planning was elaborated at the end of 2014, prior to the revision of the Federal budget in early 2015. Priorities will be set for the planned measures on the basis of the ERI dispatch 2017-2020.

Relations between Switzerland and the EU have been an additional source of insecurity following the referendum of 9 February 2014. The partial association of Switzerland to the European research programme **Horizon 2020** will elapse at the end of 2016. With this in mind, the SNSF is elaborating scenarios for the event that researchers in Switzerland are again excluded from European funding schemes.

2. Challenges for research funding

2.1 The changing face of science

From the exploration of ancient civilisations to the human genome, the dark depths of the universe, or the properties of nanoparticles the discoveries of researchers have had the power to fascinate time and again. But there is also another aspect: research creates knowledge, thereby laying the foundation for societal development and not least in Switzerland with its scant natural resources for economic prosperity.

Science itself is making continual advances, with the pace of change particularly fast in our day. The trends towards digitisation, internationalisation and a higher demand for transparency in research are mutually influencing and reinforcing each other, giving rise to the notion that we are moving towards science 2.0.¹ **Research themes as well as the way research is conducted, disseminated and evaluated are changing rapidly in many fields.** Against a backdrop of intense competition over research funding and academic positions, these developments present opportunities and risks that are highly relevant to the strategic planning of the Swiss National Science Foundation (SNSF).

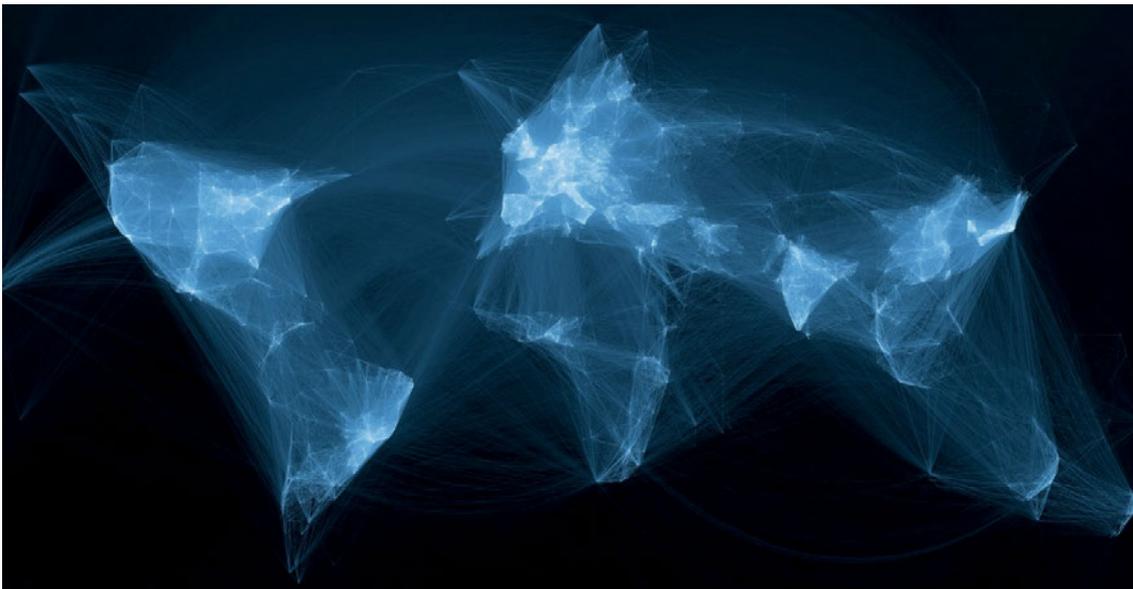
New forms of research are emerging in different research communities whose cultural diversity either remains intact or is redefined. What they all have in common is a rising **predilection for data-driven research**, a trend that has now even reached the humanities. Until recently, data was primarily collected and analysed in order to confirm hypotheses. Today it is fast becoming the raw material of science. The exponential expansion of databases and techniques makes it possible to multiply research questions and methodical approaches. Researchers are also collaborating differently: aided by new technologies, they are now constantly exchanging and jointly processing data, software and interim results across institutions and hierarchies.

The **internationalisation of science** is taken for granted today. The number of publications produced within the scope of international collaborations is growing rapidly. As excellence seeks excellence, it comes as no surprise that such publications have a bigger impact.² Different indicators and rankings not only show that Swiss research is highly international, but also that as members of the international science community, researchers in Switzerland are at the very forefront of scientific progress.³ In order to maintain this leading position, Switzerland, particularly given its small size, needs to keep its borders open to science.

These inherent, scientific developments – in combination with intensified competition over funding and the growing expectations pinned on science by politicians and the public – are causing an **acceleration of research activities**. Fears that under such circumstances the pressure to produce could compromise quality are justified. Various studies have been able to show how difficult it is to reproduce research results, and cases of scientific misconduct regularly attract a great deal of public attention. However, the development towards science 2.0 offers perspectives for mastering these challenges. **It creates the technical prerequisites for wide-ranging and rapid public access to research results and data** and, concomitantly, **for new means of quality assurance**. Data that is publicly accessible enables different research groups to reproduce and verify research findings. Online platforms offer researchers the opportunity of commenting on and discussing the research results obtained by their peers.

Opening up the science system could also benefit **peer review**. In a multi-faceted and dynamic academic environment, it remains the most suitable means of assessing the individual performance and creativity of researchers. However, research evaluation should not be based too strongly on quantitative performance indicators, or else it will only further increase the already excessively high pressure to produce. The challenge for research funding is to review excellence and evaluation standards while keeping a close eye on the scientific content and using indicators with restraint. The SNSF has committed itself to pursuing this objective by signing the high-profile Declaration of Research Assessment (DORA).⁴

The push towards "open peer review" and the corresponding disclosure of reviews could lead to more transparency and better integrate individual research proposals into entire researcher profiles or lines of research. Thanks to the Internet, it has already become much easier to select peers from a wider and more diverse pool of researchers. The basic elements on which research evaluation can draw are also becoming more wide-ranging. All relevant research outputs, e.g. pre-prints, software, research data and contributions to scientific social networks can be taken into account. This points towards new **possibilities for assessing research activities more rapidly and extensively**. Young researchers who need to position themselves when competing for academic posts will be the main beneficiaries of this development.



Collaboration networks between researchers. Visualisiert von Olivier H. Beauchesne & Scimago Lab, Daten von Scopus. Computed by Olivier H. Beauchesne & Scimago Lab, Data by Scopus.

This is all the more important given that data-driven research can call for larger research groups. As a result, more postdocs are recruited to support the research work. As the higher education institutions with their current structures are not in a position to offer the ever-growing number of non-professorial teaching staff adequate career prospects, this contributes to the "**postdoc bubble**" which makes an academic career seem less appealing. In Switzerland, the lack of career prospects weighs more strongly because the job market is able to offer talented young people a host of attractive alternatives, with the result that they eventually turn their backs on academia. All too often it is women who decide against pursuing a research career. The promotion of young researchers therefore continues to be the number one priority for the higher education institutions and the SNSF.

Finally, social networks and online communication create new modes of **interaction between researchers and society**. Scientists are already letting the public participate in defining research questions or collecting and assessing data, e.g. for the classification of galaxies in astronomy.⁵ This can bring researchers into closer contact with those likely to apply their research results in society, politics and business, thus giving knowledge transfer and innovation processes a boost.

2.2 The SNSF's goals for 2017-2020

In this multi-year programme 2017-2020, the SNSF explains how it aims to contribute to the positive development of Swiss research in the changing environment described above. This contribution is based on the tasks defined in the Statutes of the SNSF and in its mission statement.

The SNSF will maintain the basic orientation of its funding activities in the next funding period. In accordance with the recommendations issued by the Swiss Science and Innovation Council (SWIR) and based on its evaluation of the SNSF in 2014,⁶ the SNSF will continue to award the bulk of its research funds within the scope of a **purely competitive, responsive mode of funding, without setting any thematic, strategic or structural conditions**.

Taking this as its point of departure, the SNSF has set the following priorities for the 2017-2020 funding period.

Excellence and internationality in research and evaluation: by creating the necessary incentives and offering more flexible funding options, the SNSF aims to promote internationality, transparency and reproducibility in research, maintain a good balance of competition and cooperation within the science system, and support researchers in advancing their research in a dynamic academic environment.

Early independence for young researchers: up-and-coming scientists are of key importance for the sustainable promotion of excellence. In the 2017-2020 period, the SNSF will therefore strive to make its funding schemes more conducive to the achievement of early independence and to create more tangible career prospects for young researchers in collaboration with its partners. In the SNSF's view, this is the best way to boost the appeal of a career in academia.

Contribution towards knowledge transfer and innovation: in collaboration with the Commission for Technology and Innovation (CTI), the SNSF aims to supplement its existing knowledge and technology transfer (KTT) measures with activities at the interface between research and innovation. The aim is to facilitate knowledge transfer from science to society and the economy.

Initiatives with respect to specific priorities: the SNSF intends to meet the specific needs of individual disciplines and research areas through temporary, financially limited initiatives and to support researchers in opening new fields of study and addressing new research questions. It also aims to facilitate networking and to help in building scientific communities in areas of strategic importance.

Part 1 of the multi-year programme describes the four, above-mentioned priorities in greater detail and outlines the background, targets and measures relevant to each of them. Part 2 highlights the impacts of these measures on the SNSF's funding portfolio as well as the corresponding costs. The total funds required for the 2017-2020 period are indicated in chapter 13. As a **planning tool for the federal authorities**, the multi-year programme explains the required increase in funding from the point of view of the SNSF. The growth in funds must be proportionate to the increase for the entire ERI domain, especially the ETH domain and the basic contributions to the universities. Depending on the research funding budget approved by parliament, the SNSF will decide which measures to omit from its multi-year programme in consultation with its partners.

Funding sources for research and development in Switzerland in 2012

CHF billion, total: CHF 18.5 billion



At CHF 878 million in 2012, the SNSF share in the total funds available for research and development in Switzerland amounted to under 5 per cent. However, by allocating funds based on competition, the SNSF has set a standard for the entire science system. While public funds, including

those of the SNSF, are mainly channelled into basic research, the private sector primarily finances applied research and experimental development.

Data source: Federal Statistical Office

2.3 Uncertainty in the European environment

The need for flexibility is particularly strong owing to the **insecurities regarding Switzerland's future association with the European Research Framework Programme Horizon 2020**, as a result of the yes vote in the referendum on "mass immigration" of 9 February 2014.

Up until now, researchers in Switzerland have been highly successful as participants in the European framework programmes. They not only brought back more funds to Switzerland than the country had originally paid into the programme, but they were also able to compete and prove themselves at the highest European level. This creates substantial added value. With the European grants, which can be used at any desired research institution, Switzerland was also able to draw outstanding researchers to the country. This clearly shows how appealing the prospect of doing research in Switzerland is for many scientists. Last but not least, thanks to its association with Horizon 2020 the SNSF can participate in numerous expert groups and committees, thereby gaining greater visibility and influence within the European Research Area.

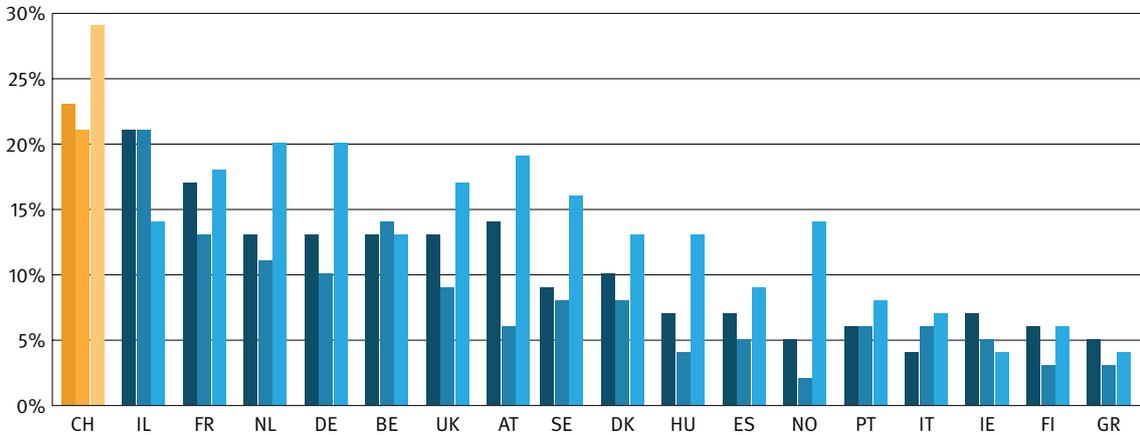
Funding offered by the **European Research Council (ERC)** in the context of Horizon 2020 is particularly relevant to basic research. Following the yes vote in the referendum of 9 February 2014, which aborted Switzerland's plans for association with Horizon 2020, the SNSF offered researchers in Switzerland its Temporary Backup Schemes as an alternative to the ERC grants. The partial association of Switzerland with Horizon 2020, achieved through negotiations with the EU, is only temporary. It will expire at the beginning of 2017, which is when the next ERI funding period starts. If Switzerland and the EU are not able to find a political solution with regard to the freedom of movement agreement, Switzerland will in all likelihood fall back into the status of a third country. Should this scenario become a reality, national funding in the form of the Temporary Backup Schemes would – as their name suggests – not be able to provide a long-term substitute for the lack of European competition.

By autumn 2015, the SNSF will therefore draw up **scenarios** in the event of Switzerland's non-association with Horizon 2020. These scenarios are meant to show the medium and long-term impacts of an exclusion for researchers in Switzerland. The SNSF will evaluate potential measures in order to, as far as possible, close any funding gaps and to reinforce the system's capacity to adapt to developments in the international arena. It will also attempt to estimate the extent to which additional funds would be needed in this context. International links are essential for maintaining the appeal and competitiveness of Switzerland as a place to do research. The SNSF will therefore be aiming to enable researchers to access international competition at the highest level and to sustainably support their international integration and mobility even in difficult circumstances.

For this reason, the present **multi-year programme 2017-2020** of the SNSF would be **subject to substantial changes if the non-association of Switzerland with Horizon 2020 became a reality**.

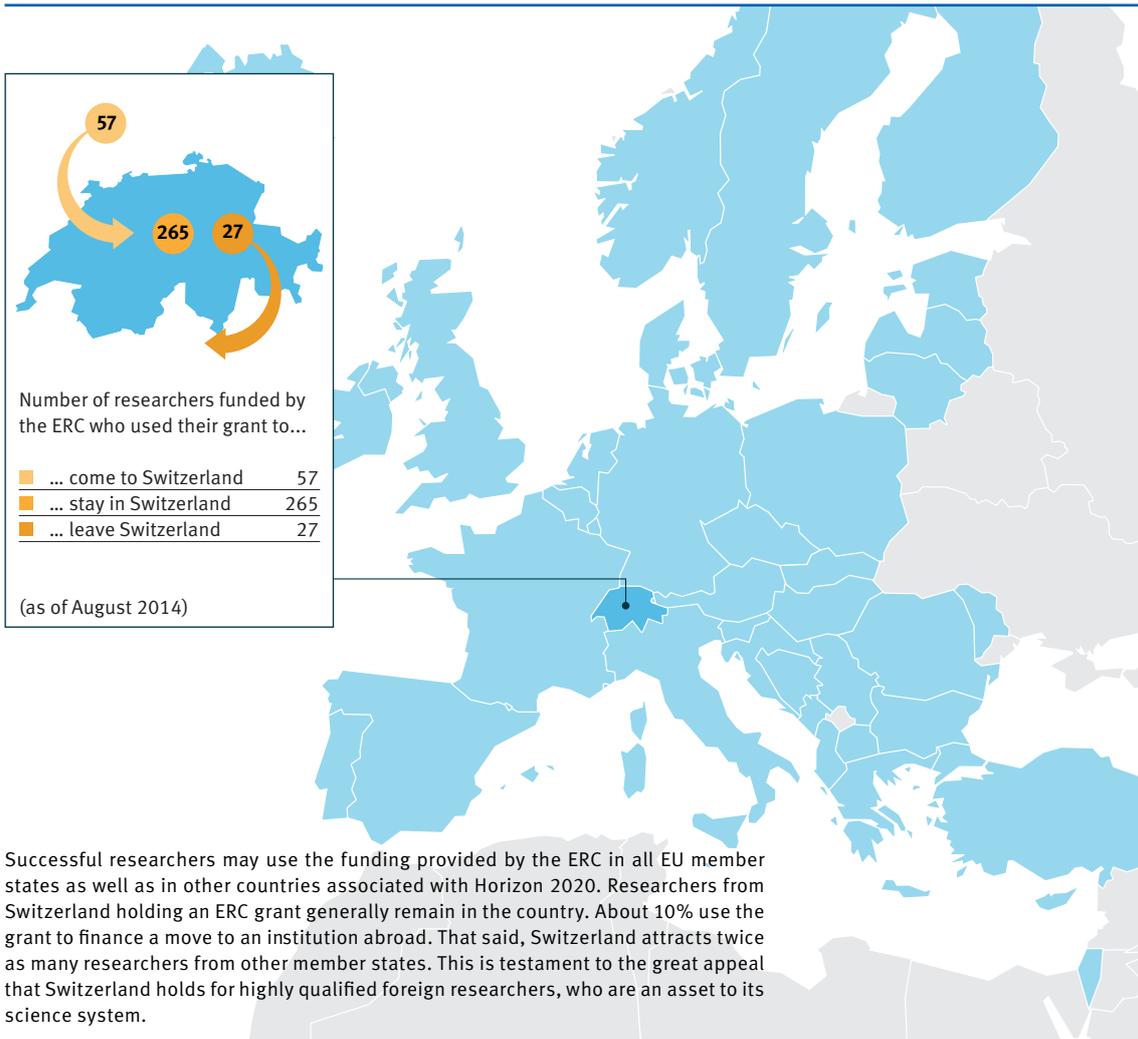
Researchers from Switzerland successful at ERC

Average success rate at the ERC per country
Starting, Consolidator and Advanced Grants



Researchers from Switzerland are generally very successful when applying for funding to the ERC. For the three key funding schemes, they have achieved the highest average success rate since their inception.

■ Starting Grants (2007–2013)
■ Consolidator Grants (2013)
■ Advanced Grants (2008–2013)



Successful researchers may use the funding provided by the ERC in all EU member states as well as in other countries associated with Horizon 2020. Researchers from Switzerland holding an ERC grant generally remain in the country. About 10% use the grant to finance a move to an institution abroad. That said, Switzerland attracts twice as many researchers from other member states. This is testament to the great appeal that Switzerland holds for highly qualified foreign researchers, who are an asset to its science system.

Data source: ERC Executive Agency

PART 1 PRIORITIES 2017-2020

3. Excellence and internationality in research and evaluation

Background

The SNSF awards research grants based on a competitive process, thereby playing a key role in setting scientific standards and guaranteeing high-quality research in a rapidly changing environment. By creating the right incentives, the SNSF encourages innovative research approaches, a readiness to take risks, scientific integrity, and transparency with regard to research results and data. At the same time, the SNSF's funding activities support researchers in their pursuit of excellence. Seen in this light, the SNSF's role is to create conditions that are conducive to research, keep track of changing needs and provide flexible support. The aim is to grant researchers the time and freedom they need to develop their own creativity and research ideas.

In this context, the SNSF faces the challenge of finding the right balance between rigorous standards of excellence, on the one hand, and flexibility, freedom and confidence, on the other. It strives to ensure that competition over research ideas remains fair, to promote a balance between cooperation and competition in the science system and to enable researchers in Switzerland to hold their own in the global arena.

The SNSF keeps close track of developments in the science system so that it can flexibly adapt its funding schemes and evaluation processes to changing needs. As mentioned above, it sees the dynamic changes in the way research is conducted, reviewed and published as a challenge. The potential and risks that arise in this context particularly loss of quality and insufficient reproducibility of research findings due to increasing pressure to produce results have also been considered.

Different parties also see some room for improvement with regard to funding high-risk research. This is one of the conclusions drawn from the evaluation conducted by the Swiss Science and Innovation Council (SWIR), an external assessment of the evaluation procedure, and a survey among researchers.⁷ The high workloads of Research Council members and external experts pose a further challenge: they need to be reduced in order to maintain high quality standards in the evaluation procedure.

In order to define appropriate measures, the SNSF can draw on its own monitoring activities and the above-mentioned evaluations, as well as the experience it has gathered with the Temporary Backup Schemes (SNSF Starting and Consolidator Grants) and the deeper insights into European research funding gained in this context.

Aims

- Gear all funding activities to the principle of competitive research funding and strive for an optimum degree of competition
- Create incentives for good scientific practice, scientific integrity and transparency
- Make the funding conditions more flexible so that researchers are free to focus on their projects
- Improve support of international cooperation in all funding schemes
- Consider and promote gender equality in connection with all funding activities
- Provide better support for high-risk/high-reward research
- Develop the evaluation procedure
- Reduce the workloads of Research Council members.

Measures

- Make specific adjustments to career funding, infrastructure funding and the funding of scientific cooperation and integration in order to increase comparability and critical mass in the evaluation procedure
- Continue support for open access to scientific publications, introduce new measures for improving research data management and help to ensure good scientific practice, including the reproducibility of research results
- Introduce excellence grants in project funding, extend the funding period and make the eligible costs more flexible in all funding schemes
- Make additional funds available for international cooperation in all funding schemes
- Extend measures for promoting gender equality
- Reorganise the Sinergia programme with a view to funding multidisciplinary, collaborative projects where breakthrough research is expected. Promote high-risk/high-reward research in this context.
- Unburden researchers, Research Council members and external reviewers to a certain extent by simplifying the portfolio of funding schemes and refining the evaluation procedure.

4. Early independence for young researchers

Background

Switzerland is capable of competing for the best minds at the highest level and attracting highly qualified scientists who play a fundamental role in our country's outstanding research output.

The number of doctoral students and postdocs, who do most of the actual research work, has doubled in the last twenty years. However, the number of professorships has not increased proportionately. And because there are few assistant professorships in Switzerland compared to other countries,⁸ particularly Anglo-Saxon ones, academic careers between postdoc and full professorship involve many uncertainties and are hard to plan. This can result in a very long postdoc phase with an uncertain outcome that causes frustration for the individual researchers and for other people as well. The possibility of making career decisions at an earlier stage is also important for society at large: keen and talented researchers should have better career prospects in academia, or else they should be encouraged to apply themselves to other forms of work in industry or in other sectors.

Swiss researchers who are appointed as professors generally perform well. Nevertheless, risks often seem to outweigh opportunities for young Swiss researchers considering a career in science, particularly if they are women. Consequently, part of Switzerland's potential to produce talented young scientists appears to be wasted. The share of Swiss university graduates that decide to pursue an academic career has been stagnant for the past 20 years. Although nationality does not affect laboratory work science is per se international the regional integration of research can suffer, and with it the appreciation and diffusion of scientific knowledge in business, industry and society at large.

In order to remedy this situation, the federal government is looking to remodel academic career structures. The federal report "Massnahmen zur Förderung des wissenschaftlichen Nachwuchses in der Schweiz" particularly envisages the creation of additional tenure track assistant professorships (also known as APTT posts) at Swiss higher education institutions. The SNSF's role is to support this remodelling by offering suitable incentives.

With its own career funding schemes, the SNSF focuses on the best young researchers who clearly have the aptitude to pursue an academic career through to a full professorship. It offers them appropriate support in each career phase, as much independence as possible and an opportunity to prove themselves. The SNSF is convinced the best way to make an academic career more appealing is by allowing researchers to be independent at an early stage.

Aims

- Create clear-cut career prospects for young researchers in close coordination with the higher education institutions
- Gear career funding schemes more closely to academic careers, scientific excellence and independence
- Improve the promotion of gender equality and mobility
- Support the federal government's efforts to bring about systemic change in higher education
- Define clear responsibilities and improve the division of tasks in consultation with "swissuniversities" and the higher education institutions.

Measures

- Give career funding schemes a clearer positioning and make them more distinct
- Amend evaluation structures in order to guarantee strong competition and critical mass in all career phases
- Upgrade schemes for funding scientific independence, particularly Doc.Grants and Ambizione
- Implement a new scheme called PRIMA (Promote Women in Academia), which will provide generous funding to excellent women researchers, along with further transversal measures to promote gender equality
- Introduce a wide range of measures in all funding schemes to promote gender equality and mobility
- Introduce APTT grants to support systemic change at higher education institutions
- If necessary, adapt the SNSF professorship scheme to the changing conditions at universities and to the needs of universities of applied sciences and universities of teacher education
- Continue to discuss the promotion of young researchers internally and with partners in view of the changes taking place in the higher education system and developments in Europe.

5. Contribution to knowledge transfer and innovation

Background

The long-term contribution of knowledge-oriented research to the development of society and the economy is easily confirmed with the help of examples. However, knowledge transfer and innovation are based on processes that are neither linear nor standardised or easy to plan. These processes have only been partially explored up to now.

The SNSF primarily finances knowledge-driven research, while also aiming to support the development and application of knowledge in the economic, political and societal realms. Since 2011, researchers have been able to submit their project funding applications as use-inspired basic research. Broader impact is one of the criteria according to which these research projects are evaluated. This option is often chosen by researchers from universities of applied sciences. In the form of NRPs and NCCRs, the SNSF promotes research projects focusing on topics of strategic importance for the future of science, the economy and society in Switzerland.

Unlike the SNSF, the CTI funds applied research involving partners from industry and the business world. A joint analysis conducted by the two institutions identified a funding gap between basic research and innovation. This is exemplified by cases where the results of knowledge-driven research suggest an application potential, but more work would be needed to assess it in detail and convince business partners and other actors that it can be realised.

The SNSF has taken initial steps to address this gap within the scope of specific National Research Programmes (NRPs) conducted in cooperation with the CTI (on topics such as smart materials, wood and energy) as well as through precoR, a funding scheme for pre-competitive research in materials science and fabrication technology. Important insights were also gained in the time-limited Nano-Tera.ch programme, set up by the federal government to strengthen the engineering sciences; evaluating the programme is one of the SNSF's supplementary tasks. Attempts made at bridging this gap abroad have been a further source of inspiration, particularly the Proof of Concept scheme run by the ERC and the Innovation Corps programme of the National Science Foundation in the USA.

Aims

- Identify and assess application potential in basic science projects
- Facilitate knowledge transfer from science to society and the economy
- Close the funding gap between the SNSF and the CTI and finance activities in the transition phase between research and innovation based on the competencies and experience of both organisations
- Facilitate interactions between science and innovation activities, researchers and implementation partners, as well as between universities, federal institutes of technology (ETHs) and universities of applied sciences
- Contribute to basic conditions that are conducive to innovation in Switzerland
- Make available the latest scientific knowledge and convey the importance of basic research to the general public in appropriate forms.

Measures

- Continue funding scheme for use-inspired basic research and keep on improving it through ongoing monitoring
- Implement the Bridge programme in collaboration with the CTI in order to make the most of the innovation potential of results obtained through pre-competitive research
- Offer funding options for a “proof of concept” through Bridge and systematically support young researchers in rigorously testing their application ideas so that they can gain the confidence needed to step out into the business world
- Allow for universities and universities of applied sciences to conduct joint projects within the scope of Bridge
- Continue the Agora funding scheme as a means of motivating researchers to intensify their science communication.

6. Targeted initiatives for setting priorities

Background

As a "reactive" funding agency, i.e. one that responds to researchers' actual needs, the SNSF is different from many other funding organisations around the world. According to the SWIR assessment, this guarantees highly flexible and efficient funding and has been a major factor in putting Switzerland at the forefront of international research.⁹ In recent years, the SNSF has used about 80% of its budget for this purpose in project funding, Sinergia and career funding, and it will continue to do so in the future in harmony with the SWIR recommendations.

As the foremost national funding agency for basic research, the SNSF has an overall view of the science community that enables it to identify the latest trends and needs, place individual requests in a wider context and create new synergies. The SNSF adds value by helping to open up new research fields and by channelling competencies and resources into promising areas.

Prioritising certain areas can entail participation in international initiatives (e.g. ERA-NETs) or joint programming initiatives as well as the launch of specific, short-term national initiatives. The SNSF starts its own initiatives only if special incentives are clearly necessary, if they are based on insights gained through research monitoring and coordinated with stakeholders, and if research institutions and other actors are not in a position to take effective measures. Only 2-3% of the SNSF's total budget goes into such initiatives.

The priorities identified for the 2017 to 2020 period with regard to the SNSF's initiatives are based on analyses carried out by the individual divisions of the Research Council as well as consultation with stakeholders. Foremost are initiatives addressing areas of strategic importance in the humanities and social sciences, along with clinical research and biomedicine as well as infrastructure-intensive areas in the natural and engineering sciences. Recurring themes include the interface between science and application or innovation, expanding the available data, and higher data quality. Infrastructure funding often plays an enabling role in the development of whole groups of disciplines.

Aims

- Provide support that meets the specific needs of individual disciplines
- Promote innovative research approaches, which are often interdisciplinary and/or translational, as well as high methodological standards and data quality
- Facilitate networking of science communities, research activities and infrastructures
- Support researchers in opening new fields of study and framing innovative research questions
- Channel competencies towards promising research fields
- Bolster the impact and visibility of Swiss research.

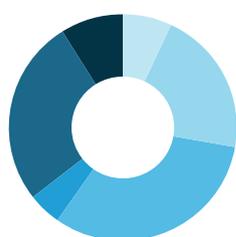
Measures

- Promote research excellence and integration in the field of digital humanities, which is becoming increasingly important for exploring new approaches in the humanities
- Support basic theoretical research in social innovation as well as the establishment and networking of the relevant community
- Continue measures already in place to strengthen clinical research in Switzerland
- Introduce broader measures to reinforce the data quality and integration of biobanks and continue to provide support for longitudinal studies, e.g. as a basic requirement for the development of personalised healthcare
- Make more funds available for particle physics, astrophysics and astroparticle physics through FLARE and improve the coherence and quality of the funding decisions in order to facilitate access to research infrastructures and increase the impact and visibility of research
- Initiate measures in collaboration with the federal authorities, the Academies of Arts and Sciences and other stakeholders to improve coherence and transparency in infrastructure funding.

Priorities, goals and measures in the funding portfolio of the SNSF in 2020

Priorities	Aims and measures	Funding portfolio				
		Project funding	Career funding	Programmes	Infrastructures	Public science communication
Excellence and internationality in research and evaluation	Introduce excellence grants and make project funding more flexible	7				
	Gear Sinergia more closely to multidisciplinary, collaborative research (breakthrough research)			9.3		
	Increase comparability and critical mass in evaluation procedure		8	9.4	10.1	11.1
	Support open access publications	7	7	7	7	7
	Provide incentives for research data management and good scientific practice	7	7	7	7	7
	Make additional funds available for international cooperation	7	7	7	7	7
	Simplify portfolio to ease the pressure on Research Council and peer-review process	7	8.2.1	9.3 9.4.1	10.1	11.1
Early independence for young researchers	Additional measures for gender equality and mobility	8	8	8	8	8
	Clearer positioning of career schemes and focus on academic careers		8.1 8.2.1			
	Higher amounts for Doc.Grants and Ambizione		8			
	Introduce PRIMA for excellent women researchers		8.2.3			
	Introduce APTT grants to support systemic change at higher education institutions.		8.3.2			
Contribution to knowledge transfer and innovation	Monitor and continually improve support for use-inspired basic research	7				
	Bridge - joint programme with the CTI			9.6		
	Continue Agora					11.3
Specific initiatives for defining areas of emphasis	Initiative to promote research excellence and integration in the digital humanities			9.5		
	Initiative to promote theoretical basic research in social innovation			9.5		
	Continue measures already in place to strengthen clinical research in Switzerland.			9.5.3	10.3.2	
	Initiative to enhance data quality and the integration of biobanks				10.3.3	
	Measures for better access to research infrastructures for particle physics, astrophysics and astroparticle physics				10.3.4	
	Measures to increase coherence and transparency in infrastructure funding				10.1	

The numbers above refer to the relevant chapters

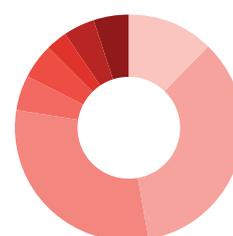


Career funding

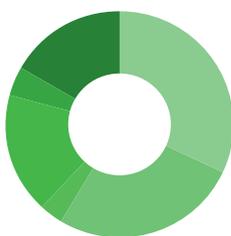
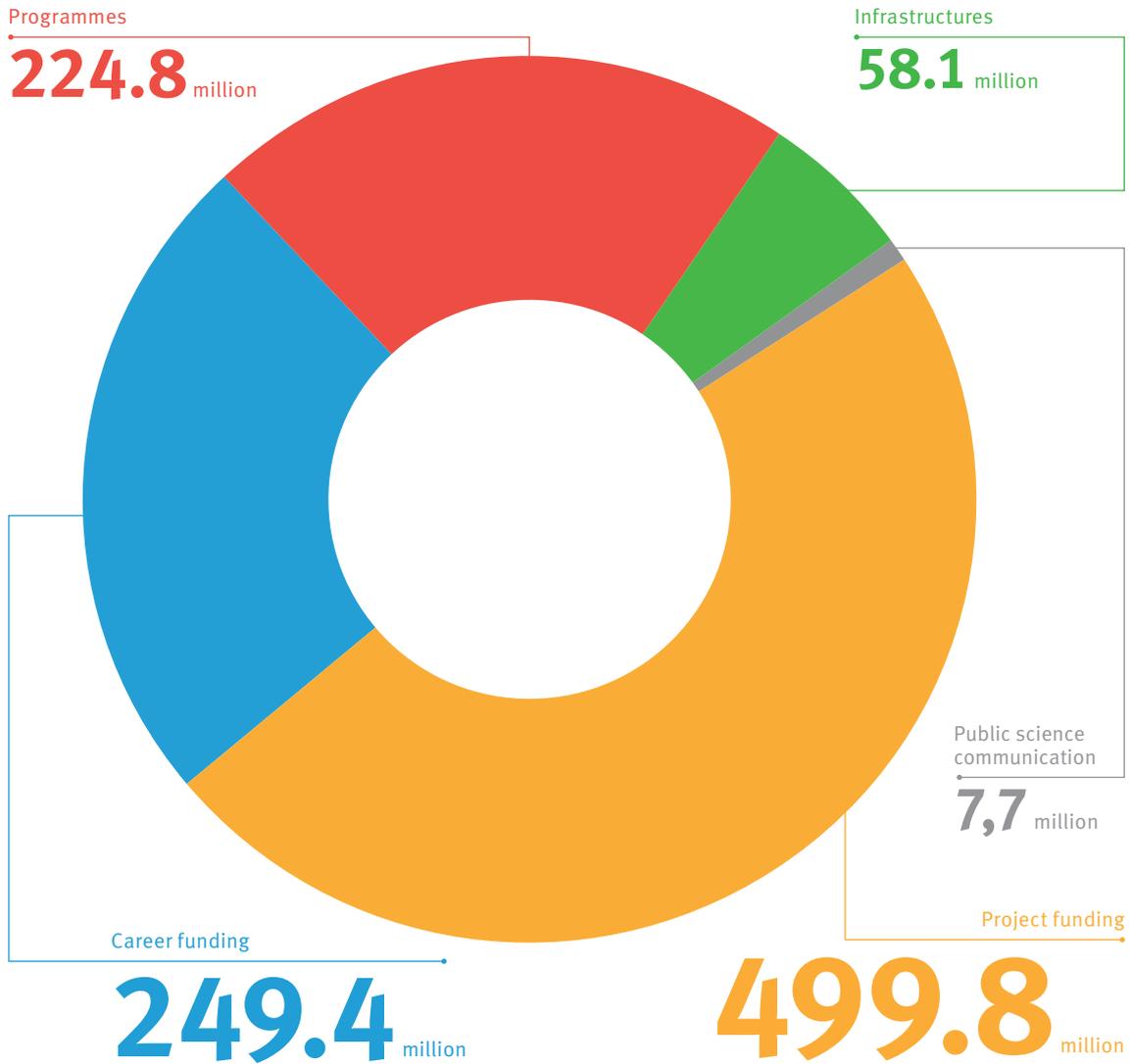
18 million	Doc. Grants	(8.1.1)	66 million	SNSF professorships	(8.3.1)
51.4 million	Postdoc.Mobility	(8.2.1)	22 million	APTT-Grants/Young energy researchers	(8.3.2)
80 million	Ambizione	(8.2.2)			
12 million	PRIMA	(8.2.3)			

Programmes

28 million	NRP	(9.1)	6.8 million	Social innovation/Digital humanities	(9.5)
78.3 million	NCCRs	(9.2)	10 million	Investigator Initiated Clinical Trials	(9.5.3)
68 million	Sinergia	(9.3)	11.1 million	Bridge	(9.6)
11.7 million	International programmes	(9.4)			
10.9 million	Bilaterale programmes	(9.4)			



Funds required 2020 (in CHF million, without overhead)



Infrastructures

18.6 million	Research infrastructures	(10.1)	10 million	Longitudinal studies	(10.3.2)
15.5 million	R'Equip	(10.2)	2.4 million	Biobanking	(10.3.3)
2 million	Editions	(10.3.1)	9.6 million	FLARE	(10.3.4)

Public science communication

4.2 million	Scientific exchange	(11.1)
1 million	Publication grants	(11.2)
2.5 million	Agora	(11.3)



PART 2 FUNDING PORTFOLIO 2017-2020

7. Project funding

Project funding is and will continue to be the mainstay of the SNSF's funding portfolio. It stands for the responsive mode of funding, enabling researchers in all disciplines to request funding for projects they have chosen themselves in order to pursue new ideas and achieve research targets. The content or organisation of the projects is not prescribed, the key criterion for the awarding of grants being scientific quality. Approximately half of the SNSF's budget is allocated to project funding, which is therefore of crucial importance in terms of setting standards and funding research, the two main roles of the SNSF.

While maintaining its basic orientation, the SNSF aims to optimise project funding based on the results of a broad-based survey among researchers in Switzerland as well as internal analyses and the experience gained from running the Temporary Backup Schemes. The changes are likely to include an extension of the maximum funding period from three to four years, more flexibility with regard to eligible costs and a substantial increase in the spending level in order to better finance different needs linked to the realisation of research projects.

The increased project funds will be used to promote international cooperation in particular. Funds are also to be allocated to cover the indirect costs of using research infrastructures (e.g. processing time), open access publications and research data management, as well as conferences and workshops with international participation. The eligible costs are to be made more flexible so that researchers can focus single-mindedly on their research projects. Excellence grants will in future offer outstanding researchers a simplified procedure for joining an ongoing project on a similar topic. Furthermore, participation requirements and the demarcations between project and career funding schemes will be examined. Interdisciplinary research will in future be funded within the scope of a modified Sinergia programme (see chapter 9.3). Aiming to offer targeted funding at the interface between basic and use-inspired research, the SNSF will retain the category "use-inspired basic research", for which there is a dedicated evaluation process.

It is not easy to predict how these changes will impact on the demand for research funding. The requested growth in funds is based on the assumption of an annual 2 per cent rise in the number of new grants. It takes into account the probable increase in applications in connection with the higher number of professors predicted by the Federal Statistical Office. The targeted increase in the spending level is likely to lower the success rates at the SNSF to a certain extent. If demand is stronger than expected and causes a major decline in success rates, the SNSF will consider redistributing the funds across its funding schemes as a countermeasure.

Systematically promote transparency, internationality and excellence in all funding schemes

➤ Facilitate the accessibility of research results and data

The SNSF will continue to support **open access (OA) publications** within the scope of projects; it will also seek to increase the share of OA publishing, in particular through contributions to publication costs, and coordinate its measures with higher education institutions, libraries and other stakeholders. As a basis for developing its open access policy, the SNSF in collaboration with academic publishing houses will implement a pilot project called OAPEN.ch to examine the impacts of the simultaneous publication of digital and print products.

As better **access to research data** undisputedly raises the quality of research, gives rise to new research questions and increases efficiency in general, the SNSF will, where appropriate, request a data management plan to be included in the application, make a financial contribution towards the costs of data storage as part of a grant proposal and systematically support the development of infrastructure in the area of data management.

➤ Funding of international cooperation and mobility

Researchers are keen to strike up partnerships with the best cooperation partners from all over the world. The SNSF therefore aims to facilitate collaborations with research-intensive countries through different forms of cooperation (Money Follows Cooperation Line, Lead Agency procedure) and to allocate more funding for international collaborations within the scope of research projects.

Mobility is an important prerequisite for an academic career. The SNSF supports mobility **for doctoral students and, as a new feature, also for postdocs** who are financed within the scope of SNSF projects.

➤ More time for research

The SNSF believes that grantees should be able to dedicate more time to their research work; for this reason, it will continue to grant clinicians "**protected time**" and to support "**research time**" for researchers in the humanities and social sciences.

Postdocs and, as a new feature, also doctoral students with family commitments can benefit from a **support grant** (see chapter 8).

8. Career funding

The range of funding schemes envisaged for the future should systematically support young researchers in developing their scientific careers. In the next funding period, the SNSF wishes to gear the career funding schemes more closely to the promotion of early scientific independence and excellence. This goal is the SNSF's number one priority. In order to implement the measures planned in this context, it will need additional funds (see chapter 13).

8.1 Doctoral level

8.1.1 Doc.Grants

The education of doctoral students is primarily the responsibility of the universities. The SNSF intends to limit its support at doctoral level to a single, flexible scheme – Doc.Grants¹⁰ – which will provide individualised support to doctoral students in all disciplines. The existing Doc.CH scheme for the humanities and social sciences will thus be replaced by a broader and more flexible funding scheme. Doc.Grants can be used by doctoral students who seek independence and excellence at an early stage and would like to acquire the funds needed for their doctorate by themselves. They offer doctoral students a free choice of host institution (with a PhD supervisor) in Switzerland. The option of providing initial funding for doctoral students abroad is still being evaluated. The applications are evaluated at national level.

8.2 Postdoc level

8.2.1 Postdoc.Mobility

Even though geographic mobility is no longer the dominant factor for integration into the international science community, research experience abroad is still an important component in the development of young researchers. At many universities, a stay abroad is still regarded as a prerequisite for a professorship. To fund mobility after the doctorate, the SNSF will merge the two schemes Early and Advanced Postdoc.Mobility (EPM and APM) to form a new scheme called Postdoc.Mobility, which will be more closely geared to the pursuit of academic careers. The evaluation procedure should be as competitive as possible. In order to make the challenges of a stay abroad more manageable, particularly for researchers with children, the option of a grant for a period of research after returning to Switzerland will remain in place.

8.2.2 Ambizione

Ambizione grants enable young researchers to conduct, manage and lead an independent project at a Swiss higher education institution. The scheme thus plays a key role in promoting early scientific independence. With the modification and extension of Ambizione, the SNSF will be in an even better position to assist researchers in achieving this goal. Young researchers engaged as non-professorial teaching staff at higher education institutions will also be able to apply for Ambizione in the future. This will result in the entire career level engaging in direct competition. Ambizione's low success rate of under 20 per cent, compared to other career funding schemes, should be raised to 25-30 per cent. The running time of projects will be extended from three to four years, as recommended in a recent evaluation report.

In its strategic planning, the CRUS is expecting an extension of Ambizione. This will support the universities in their aim to help young researchers fully realise their potential.¹¹

8.2.3 PRIMA (Promoting Women in Academia)

PRIMA is intended for the selective and targeted promotion of excellent women researchers. It will replace the existing MHV grants for promoting women scientists who had to interrupt or scale back their careers due to their family situation. Offering flexibility and generous funding, PRIMA aims to provide the best possible support for outstanding women researchers after the doctorate and prepare them for an independent academic post. PRIMA affords talented female scientists optimum conditions that help to reduce the institutional barriers still in place. It is hoped that PRIMA will help to increase the low share of women professors in Switzerland compared to other European countries.

8.3 Assistant professor level

8.3.1 SNSF professorships

The SNSF will continue to award SNSF professorships to support talented young researchers who are not yet assistant professors, but clearly have the aptitude for an academic career and for obtaining a professorship in Switzerland or abroad. The SNSF will evaluate measures aimed at securing a clearer positioning for SNSF professors at higher education institutions. Academic career structures are likely to change due to the creation of additional tenure track assistant professorships; if necessary the SNSF will modify its SNSF professorship scheme accordingly.

Career funding at universities of applied sciences and of teacher education

The universities of applied sciences and the universities of teacher education are in need of new talent with both scientific and practical competencies. In the coming years, these institutions plan to redefine their career models and implement pilot programmes to develop autonomous profiles that reflect this dual challenge. The SNSF is eager to see the results generated by these programmes. The SNSF's competitive career funding schemes are also open to young researchers at universities of applied sciences and universities of teacher education, and it is ready to bring these schemes more closely into line with the career models defined by these institutions as far as this is reasonable and necessary. In collaboration with the universities of applied sciences and of teacher education, the SNSF will first examine how its schemes for assistant professors could be used more effectively to advance the careers of researchers with a use-inspired profile. The examination will be based on the experience gained from the Assistant Professor Energy grants and the SNSF professorships for energy research at universities of applied sciences, which played a pilot role in this respect.

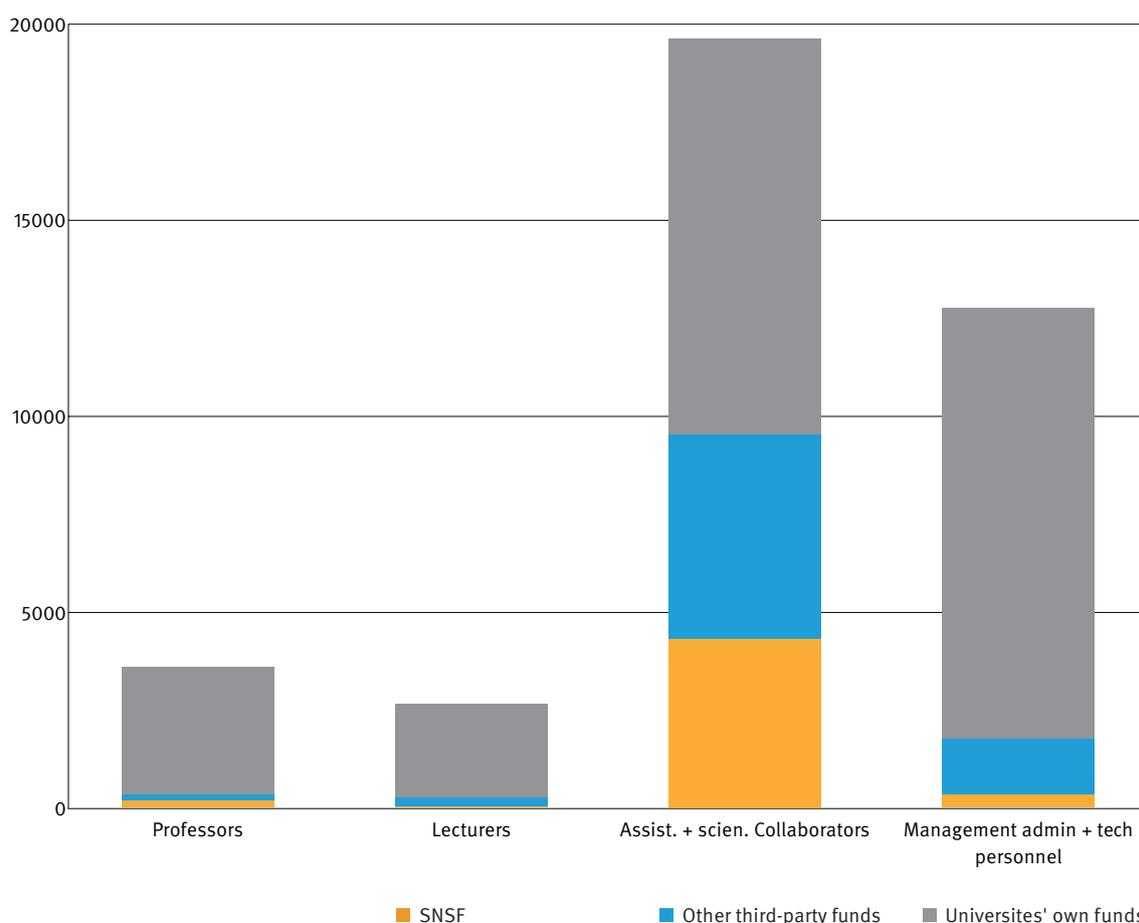
8.3.2 Grants for assistant professorships with tenure track (APTT)

As an additional measure aimed at supporting the planned changes to the university system and the creation of additional APTT positions, the SNSF plans to introduce APTT grants. These grants would offer newly appointed tenure track assistant professors generous funding for their research projects. A pilot measure in energy research is currently ongoing in the form of the Assistant Professor Energy grants. It is of key importance that the SNSF measure is accompanied by direct incentives for higher education institutions, which must have clear guidelines in place for APTTs to meet international standards.

SNSF professorships and APTT grants will be evaluated by comparing the candidatures in these two funding schemes. This increases competition and makes it possible to transfer funds from one scheme to the other, depending on quality.

Financing of personnel at Swiss universities

(in full-time equivalents by employee category, 2013)



Assistants and scientific collaborators are the mainstay of the workforce for research and development at Swiss universities. At 22%, the share of financing by the SNSF is the highest for this employee category. The rest of the funding for assistants and scientific collaborators is provided by the universities themselves (52%) and through other third-party funds (26%).

In order to avoid lengthening the postdoctoral phase, the SNSF will in future limit the maximum funding period per person. No comparable data are available for universities of applied sciences and universities of teacher education.

Data source: Federal Statistical Office

Clear signals with regard to gender equality

Gender equality is essential for advancing diversity in research. Through additional measures and funds, the SNSF wishes to support the best women researchers during the 2017-2020 period and help improve basic conditions for women in science.

➤ **Introduction of PRIMA**

The SNSF will launch new funding opportunities called PRIMA for excellent women researchers in the advanced postdoc phase. The aim is to increase the share of female candidates for professorships at Swiss higher education institutions (see chapter 8.2.3).

➤ **Temporary special measures for women researchers at assistant professor level**

Another clear signal of the SNSF's commitment to gender equality concerns the introduction of additional support measures for female SNSF professors and APTT grant holders, e.g. greater portability of grants as well as incentives for Swiss higher education institutions to nominate female grantees for professorships. Measures for increasing the average amount of funding for women at assistant professor level are also being considered for all funding schemes.

➤ **Accompanying measures in all funding schemes**

The SNSF offers **support grants** for postdocs with families, allowing them to temporarily reduce their work-time percentage and hire a support person for the same period. This support option is to be extended to doctoral students and adjusted to their needs. As the SNSF pays for childcare, the reduction of work-time should become the exception.

The **gender equality grants** offering additional individualised and flexible support for the career development of SNSF-funded young women researchers will be continued. For example, the grant covers, mentoring, coaching, courses and workshops.

9. Programmes

The SNSF's programmes are geared to specific objectives on the basis of thematic, conceptual and/or organisational requirements. They are in part subject to a mandate from the federal government.

9.1 National Research Programmes (NRPs)

The National Research Programmes are relevant both scientifically and politically as the knowledge they generate can help to resolve issues of great importance for society. The NRPs are conducted on the basis of a mandate from the federal government. For the years 2017-2020, the SNSF plans to launch 5 or 6 new NRPs, each with a budget of CHF 15-20 million. The SNSF will put a special emphasis on monitoring the programmes and their results. The main aim is to ascertain by means of an impact analysis whether the NRPs are achieving their goal of producing useful knowledge for stakeholders. If sufficient synergies can be generated, the SNSF will continue to link the NRPs to European collaborative projects within the framework of joint programming initiatives (JPIs).¹²

9.2 National Centres of Competence in Research (NCCRs)

NCCRs aim to strengthen Swiss research structures and networks in the long term in areas of strategic importance for the future of Swiss science, business and society.

Based on the SWIR's impact analysis, which rated the scheme as highly functional and capable of delivering results, the SNSF is planning to continue the NCCRs by launching a fifth series. Five or six new NRPs are envisaged, each with a budget of CHF 15-20 million for the first four-year phase. The core elements of the scheme will remain unchanged. However, based on an evaluation the scheme will be continually developed through specific changes to the selection process and to the manner in which it is conducted. In order to reinforce the structural impacts, the SNSF intends to evaluate measures and review the allocation of roles in the NCCRs. In addition, output in all criteria areas is to be monitored more intensively in order to better assess and document the performance of the NCCRs.

9.3 Sinergia

Sinergia was introduced in 2008 with the goal of encouraging researchers to venture into new fields and address new research questions. A look at Sinergia's performance up to now shows that the scheme has been successful with regard to the formation of networks. However, it is less clear how effective it has been in promoting "breakthrough research", particularly across disciplinary boundaries. For this reason, the SNSF has decided to modify Sinergia so that it specifically supports collaborative research across disciplinary boundaries that has the potential to achieve pioneering results (breakthrough research). Such research is often high-risk/high-reward. The new Sinergia programme will be flexible enough to support projects of different sizes. The CRUS approves of the SNSF plan to modify Sinergia.

13

9.4 International cooperation

International cooperation is taken for granted by researchers today. Projects involving collaboration with research-intensive countries are supported by the SNSF through the existing funding schemes "Lead Agency" and "Money Follows Cooperation Line". The SNSF has special programmes in place to support international cooperation in areas where there is a clear need. Through International Joint Research Projects and the r4d programme (Swiss Programme for Research on Global Issues for Development), the SNSF specifically supports cooperation with less research-intensive countries (see chapters 9.4.1 and 9.4.2). In addition, the federal government, supported by the SNSF, finances bilateral programmes for scientific cooperation with selected non-European countries with a large or promising research potential. The SNSF is ready to continue its efforts in this area.

9.4.1 International Joint Research Projects (IJRP)

By introducing a new single funding scheme, the International Joint Research Projects, the SNSF will simplify and streamline its support of international cooperation with less research-intensive countries. Periodic calls will replace the specific calls for developing countries, for countries in Eastern Europe (former SCOPES countries) and if possible for specific bilateral cooperation programmes of the Swiss federal government. In the longer term, the partner countries' increasing competitiveness paves the way for the integration of the bilateral programmes into project funding, where the Lead Agency and Money Follows Cooperation Line procedures enable cross-border cooperation with more research-intensive countries.

Improved periodicity should enable researchers to plan international cooperation, avoiding any artificial demand generated by irregular calls, and should improve the quality of the proposals. The broader pool of projects should further increase the competitiveness of the evaluation procedure. For the Swiss part of the grant, the spending level and project duration will be in line with project funding.

9.4.2 Programme for Research on Global Issues for Development r4d

The Swiss Agency for Development and Cooperation (SDC) and the SNSF are conducting the Swiss Programme for Research on Global Issues for Development (r4d.ch), aimed at researchers in Switzerland and in developing countries who are engaged in joint research on issues of global importance. The programme focuses on reducing poverty and protecting public goods in developing countries. During the 2017-2020 period, the SNSF and the SDC will jointly focus on the existing thematic modules, which are currently addressing the priority areas, social conflicts, employment, food security, ecosystems and public health. The SNSF is ready to continue its collaboration with the SDC beyond this point in a suitable form.

9.5 Special programmes

9.5.1 Social innovation

Social innovation focuses on finding answers to societal challenges that are not based on process and product innovations, but attempt to change societal and individual behaviour patterns instead. This understanding of innovation is gaining traction in research, politics and practice all over the world. The SNSF aims to ensure that Swiss research does not fall behind other countries in this area.

An external analysis has shown that Switzerland urgently needs more basic research on social innovation so that science is able to generate substantial knowledge as a basis for social and political decision-making. By implementing special funding measures in the 2017-2020 period, the SNSF is looking to strengthen basic theoretical research in social innovation and to facilitate the (inter)national networking of the relevant community.

9.5.2 Digital humanities

The tools and methods of digital humanities are revolutionising and influencing various aspects of research in the humanities. As in other groups of disciplines, the changeover to digital gives rise to new research questions as well as innovative methodical approaches.

The digital humanities are developing at a fast pace and have already come to be internationally recognised as an independent discipline in recent years, as well as at Swiss higher education institutions. Different national funding organisations have launched their own initiatives for digital humanities. By means of an incentive programme in 2017-2020, the SNSF aims to promote national and international networking within the interdisciplinary community, stimulate research, strengthen research excellence and make it easier for young researchers to find their feet in the new field. In so doing, the SNSF is helping to increase the visibility and outreach of research in the humanities.

9.5.3 Investigator-initiated clinical trials (IICT)

Investigator-initiated clinical trials enable researchers to address burning clinical questions regardless of their commercial value, while applying the most rigorous methodological standards. Results will often be immediately transferable to patients, through changes in the evaluation of treatment options or the availability of more medical treatments.

IICTs build on specialised infrastructures and competences developed in previous funding periods with the Swiss Clinical Trial Organisation (SCTO) and the Clinical Trial Units (CTU) network. To further improve the quality of clinical trials and help the Swiss community to position itself as a competence centre for clinical trials, the funding for IICTs is complemented by measures to support 'protected time for clinicians' and to cover CTU service costs (see chapter 7).

Since results from such trials could be of great interest to public health authorities and health insurance companies, models for co-financing should be developed which also respect the academic freedom of the clinical researcher and the privacy and data ownership of the patient. The programme is clearly different from the planned initiative to promote personalised health.

9.6 Bridge – a joint programme with the CTI

In order to accelerate the transfer of research findings and their application, the SNSF is planning a new programme called **Bridge** together with the CTI. Both organisations are applying for additional funds for the new programme (see chapter 13). The aim of Bridge is to support researchers who see an application potential in their research in the form of a product or service, but need to do more work to flesh out this vision and show convincingly that the potential is there.

Two lines of funding are envisaged in the programme. Funding opportunities for a proof of concept will be offered to young researchers who are eager to exploit the application potential of their scientific results and to continue their careers outside academia. Secondly, researchers who combine excellent research with a clearly innovative idea will be funded via "pre-competitive projects". In this context, it will be possible to support individual applicants as well as small collaborations in order to merge complementary competencies (e.g. from universities/ETHs and universities of applied sciences).

The aim of Bridge, which is open to all disciplines and types of innovation, is to transform research findings into marketable or socially relevant innovations. The key evaluation criteria are scientific excellence, innovation potential and the competence of the researchers involved. Based on the preparatory work and experience gained so far (see chapter 5) mainly researchers from technical disciplines are expected to use Bridge, at least in the first phase.

10. Infrastructures

10.1 General funding policy on infrastructures

In the coming period, the SNSF intends to redefine its role with regard to infrastructure funding in collaboration with the SERI. The evaluation conducted by the SWIR has created a basis for this.

The funding of infrastructures can be decisive for the development of entire groups of disciplines and must therefore be based on strategic and broadly supported decisions. This calls for the intensification of national coordination, a goal that the SNSF will continue to pursue during the 2017-2020 period in collaboration with other ERI stakeholders. Initial steps in this direction have been taken in the form of the Swiss road map for infrastructures, which has been coordinated with the European Strategy Forum on Research Infrastructures (ESFRI), and the launching of an initial joint call for new research infrastructures of national importance by the SNSF and the SERI.

In the future, the SNSF aims to strictly limit its infrastructure funding and, based on calls for proposals, finance strongly research-driven infrastructures where it makes sense to do so. This funding will usually be limited to a start-up phase of 10 years and provided on condition that the follow-up funding is guaranteed. A further requirement is for the infrastructure to fit into the national and international portfolio, where it must have a meaningful role. This represents the only basis on which infrastructure funding is compatible with the SNSF's remit and the allocation of funds based on the principle of competition.

To complement the general funding of research infrastructures, between 2017-2020 the SNSF is planning to finance academic editions (chapter 10.3.1), longitudinal studies (chapter 10.3.2) and biobanks (chapter 10.3.3) while taking into account the above-mentioned principles. This is complemented by the federal mandate for FLARE (Funding Large International Research projects, chapter 10.3.4). The SNSF will also continue to support large-scale research apparatuses within the scope of R'Equip (Chapter 10.2).

10.2 R'Equip

R'Equip is aimed at researchers in Switzerland who need top-quality, innovative equipment for their research work. In contrast to other infrastructure funding, for which long-term plans are to be made in the context of the ERI Dispatch, the SNSF will continue to accept applications for R'Equip grants needed to acquire and develop large-scale research apparatuses. Co-financing by the higher education institutions will remain an important component of such funding.

10.3 Special infrastructure funding initiatives

10.3.1 Editions in the humanities

Support for extensive edition projects, in which materials are collected, processed and made available for further research, will be continued by the SNSF through separate calls. As in other infrastructure funding, the support is limited to a certain period, and it is necessary for the higher education institutions or other organisations to assume co-responsibility or act as sponsors. A digital processing and publishing concept as well as plans for long-term archiving are further important conditions for funding. The transfer of infrastructures of national importance in the humanities to SAHS is conceivable after a period of initial financing.

10.3.2 Longitudinal studies

Longitudinal studies and their long-term, high-quality databases enable researchers to ask unique (longitudinal) research questions related to public health. They lend themselves, in particular, to the study of chronic diseases with slow progression. The SNSF has funded longitudinal studies, which grow and gain in value over time, for a decade. Today, some of them arguably belong to the best in the world in their respective fields. For the period 2017-2020, the SNSF particularly aims to strengthen the network between different longitudinal studies and the collaboration with the Swiss Biobanking Platform (see chapter 10.3.3).

Since longitudinal studies are usually highly successful, they are stopped only rarely. To maintain competition among proposals, scope for integrating new studies into the programme is essential. Several existing SNSF-funded longitudinal studies have reached a maturity state that would allow them to serve as important elements of the proposed Personalised Health Initiative of the confederation, for which large datasets are an important prerequisite. The SNSF's financial planning therefore does not include the costs for studies that are transferable to the Personalised Health Initiative.

10.3.3 Biobanking initiatives

A well-functioning biobanking system and easy access to large datasets valorise longitudinal studies (see chapter 10.3.2) and are important prerequisites both for the study of rare diseases and for the development of personalised medicine. In 2017-2020, the SNSF will continue to contribute to the consolidation of the Swiss Biobanking Platform, launched in 2014 to coordinate, harmonise and standardise biobanking activities. It will also continue to provide incentives for the interlinking of biobanks, which will enable researchers to tackle new scientific questions on the basis of shared data. With this funding the SNSF is again contributing to the prerequisites of the Personalised Health Initiative. But, as its coordination activities address also non-biomedical and non-human biobanks, the scope of the Biobanking Platform goes beyond that.

10.3.4 Use of infrastructures for particle physics, astrophysics and astroparticle physics

Through the FLARE scheme, the SNSF, on a mandate from the federal government, supports the use of international research infrastructures in the fields of particle physics, astrophysics and astroparticle physics, particularly participation in experiments conducted at CERN in Geneva and at the European Southern Observatory in Chile.

By modifying this scheme, the SNSF aims to improve the coherence and quality of funding decisions in these fields, in which high infrastructure costs, international collaborations and long-term commitments are the rule. To support new experiments and increase the impact and visibility of Swiss research within large consortia, the SNSF needs additional funds from the federal government for 2017-2020 in connection with FLARE, one of the SNSF'S supplementary tasks (see chapter 13). The SNSF aims to further increase the participation of international experts in the evaluation process.

11. Public science communication

The SNSF supports science communication between researchers in all its funding schemes by covering the costs of participation in scientific workshops and conferences, publications in open access journals and the digital publication of books (see chapter 7). Funding options for publications, conferences and workshops that are not the result of SNSF-funded research projects as well as for communication between researchers and the public are provided under schemes devoted to science communication.

11.1 Scientific exchange

With its support for scientific conferences, international exploratory workshops and international short visits, for which demand has increased consistently in recent years, the SNSF enables national and international exchanges, especially between young researchers. These funding opportunities will be merged into a single scheme for scientific exchange to streamline the management of applications and simplify the funding portfolio.

11.2 Publication grants

Publication grants will continue to offer researchers funding options for publishing digital books that have not been produced within the scope of a research project funded by the SNSF. The quality of the relevant publications is the principal criterion. The SNSF finances the digital publication of books if they are freely accessible 24 months after initial publication (see the SNSF's open access policy). The researchers are free to publish a printed book in parallel to the digital version.

11.3 Agora

The Agora funding scheme, introduced in 2012, supports communication projects by researchers seeking to foster a dialogue with the public about their research and its significance for society. The SNSF will continue Agora during the coming funding period, taking into account the results of an evaluation planned for 2015.

Part 3 SERVICE PROVISION AND FINANCES

12. Service provision

At the organisational level, the SNSF continually analyses its structures, processes and tools in order to meet current and future challenges in its sphere of activity. Requirements and needs are continually rising, especially in the areas of scientific evaluation, governance, planning and accounting, as well as in handling data and in communication.

Scientific evaluation by the Research Council, supported by the Administrative Offices, is a key component of service provision. In view of the forthcoming funding period, the SNSF will take into account the organisational impacts of the planned changes to evaluation structures, e.g. in career funding. Drawing on the experience gained from the Temporary Backup Schemes, it will examine measures for developing the evaluation procedure and reducing the workload of the Research Council, e.g. by using international panels more frequently.

Almost all processes linked to the evaluation procedure and to the lifetime management of grants are now conducted electronically. The relevant applications are regarded as highly efficient by partner organisations of the SNSF. They are continually being refined and developed to ensure a smooth evaluation process, efficient lifetime management and reliable basic data. Important goals for the coming years include implementing an e-dossier to support entirely paperless processes and – as far as technically and legally possible increased data exchange with external partners. The SNSF aims to improve the analysis and communication of data in order to make funding activities more transparent. In this context, it will increasingly visualise data to allow for more individualised and interactive use.

During the next funding period, the SNSF will continue to assess the impacts of the planned changes by conducting periodic evaluations particularly of new schemes and developing its internal monitoring activities. Governance has already been optimised through the appointment of a Compliance Committee.

Cost drivers in the context of service provision include the development of personnel costs (as evaluation work becomes more demanding, the Administrative Offices are assuming additional tasks in order to reduce the workloads of the Research Council members), the type of evaluation (panels are generally associated with higher costs), the structure and working methods of the bodies (e.g. the SNSF delegates some of its evaluation activities to the local Research Commissions) and the development of communication measures and IT. For the 2017-2020 period, the SNSF expects an increase of 4% in service provision costs, which thus come to lie approximately one per cent under the requested overall growth rate.

Temporary Backup Schemes offer the SNSF useful insights for developing its funding activities

The SNSF launched the Temporary Backup Schemes in spring 2014, following Switzerland's exclusion from the ERC funding schemes. The aim was to offer researchers working in Switzerland funding opportunities that were similar to the ERC's and just as appealing and competitive. The SNSF aims to apply the experience and insights gained in this context to its own funding activities. It will, for example, consider giving international panels a stronger role, review the structure of two-phase evaluation procedures and state more precisely how it expects SNSF-funded researchers to be integrated at research institutions.

Portfolio optimisation

Alongside the four priorities for 2017-2020, the SNSF has set itself the goal of optimising and simplifying its funding portfolio. Although the number of funding schemes will not be significantly lower than today, the funding portfolio will become more coherent in many respects:

- Reducing the number of career funding schemes and, above all, positioning them more clearly
- Giving Sinergia a clear focus and integrating interdisciplinary projects into Sinergia
- Consolidating infrastructure funding and clearly distinguishing it from project funding and programmes
- Consolidating funding for international research projects
- Merging conferences and international exploratory workshops.

13. Finances and overhead

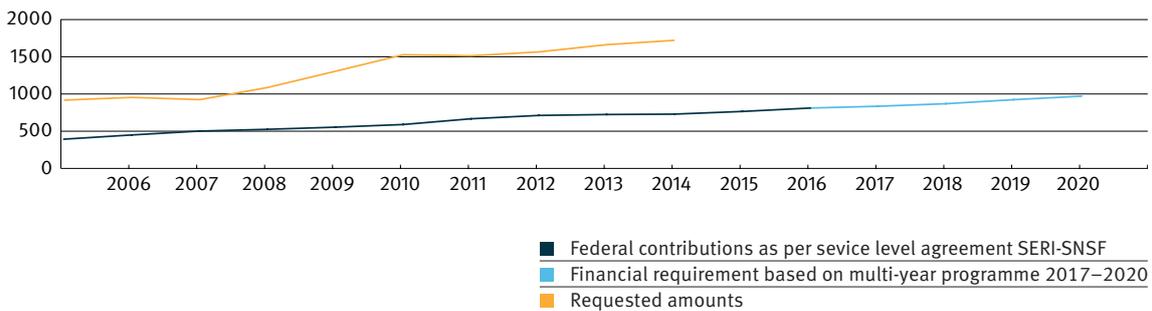
The **financial planning** shows, on the one hand, the financial needs created by new commitments which the SNSF will enter into between 2017 and 2020 in order to continue the existing funding measures and implement new measures. On the other hand, the planning takes into account the costs of grants already approved in the previous funding period, which will only affect finances in the coming years. In this context, the SNSF distinguishes between the **basic contribution and supplementary tasks** in its financial planning. With the basic contribution, the SNSF finances all its funding activities, for which it can independently create funding schemes and make decisions in accordance with statutory provisions. Supplementary tasks are binding tasks assigned by the federal government, for which the SNSF receives specific additional funds.

Factoring in supplementary tasks, the SNSF envisages that it will **need a total of CHF 4,570.6 million, which corresponds to an average annual growth rate of 4.9%**. At 4.7%, the annual growth rate of the basic contribution is slightly lower.

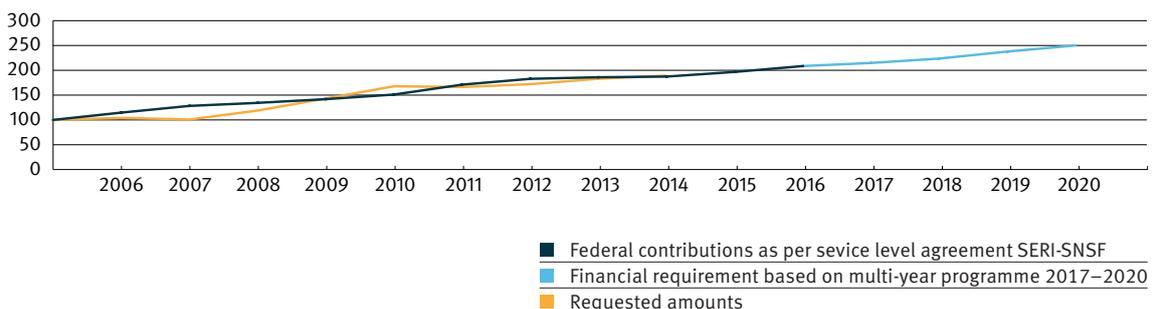
For newly awarded grants in **project funding and Sinergia**, the SNSF envisages an annual growth rate of approximately 2%. As more funds are expected to be awarded per grant (chapter 7), this makes it necessary to lower the success rates (see shelved projects). Due to the costs carried over from the previous period, the required funding does not precisely correspond to the predicted growth in new grants. The reason for the sharp rise in financial requirements expected for 2019 lies in the foreseeable cumulation of grant instalments in project funding in connection with the gradual replacement of three-year projects by four-year projects.

Demand and available funds

(in CHF million, without NCCRs and supplementary tasks)



(indexed: 2005=100, without NCCRs and supplementary tasks)



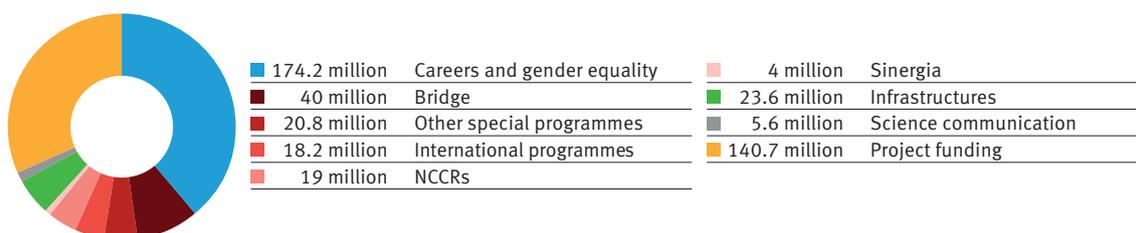
The strong growth in the basic contribution is largely attributable to **career funding**. In order to achieve the targets prioritised in this area (see chapter 8), the need for funding will rise from CHF 170 million in 2016 to approximately CHF 235 million in 2020. The additional funds will mainly be used to support early scientific independence and gender equality at postdoc level through Ambizione and PRIMA.

The SNSF needs a further CHF 80 million for the 2017-2020 period in order to introduce special programmes in the humanities and social sciences, provide better support for international projects with less research-intensive countries and compensate the SDC's cost-sharing, which will be discontinued. Moreover, these additional funds will be needed to compensate for the higher lifecycle costs of the NCCRs and to slightly increase the funds for supporting research infrastructures and scientific exchanges.

The federal government plans to prioritise the two following **supplementary tasks**: providing support for the APTT grants (see chapter 8.3), on the one hand, and Bridge, the new joint programme with the CTI (see chapter 9.6), on the other. The SNSF is expected to assume a CHF 40 million share in the financing of Bridge for the 2017-2020 period. For the extension of FLARE, another supplementary task, the SNSF will require an additional CHF 8 million for 2017-2020.

Additional funds needed in 2017-2020 compared to the 2016 level

Total: CHF 446.1 million (plus 70 million for overhead and service provision)



Average yearly growth in financial requirement compared to 2016

	2017	2018	2019	2020	Average
Growth in basic contribution	3.0%	4.2%	6.5%	5.3%	4.7%
Growth in supplementary tasks	47.5%	23.3%	2.3%	1.9%	17.4%
Total growth in contribution	4.6%	4.8%	5.5%	4.7%	4.9%

For **service provision**, the SNSF envisages an annual increase of 4% in the amount of funds needed; this lies approximately one per cent below the overall growth rate for funding.

Given the current overhead rate of 15%, CHF 450 million will be needed for payment of the **overhead contributions** to cover the indirect costs incurred at higher education institutions.¹⁴ If the overhead rate is gradually increased to 20%, as requested by the higher education institutions, this would require a further CHF 111 million.¹⁵ The SNSF agrees to this measure, provided it does not come at the expense of research funding but is factored into the basic financing of the higher education institutions.

There are still considerable **insecurities** for the SNSF with regard to some spheres of activity for which it is currently difficult to estimate the funds needed. If the federal government launches an initiative on **personalised health**, the SNSF is ready to carry out the research funding activities as a supplementary task that falls within its remit – just as it has assumed an evaluation role for the initiatives SystemsX.ch and Nano-Tera.ch. The funding estimate for **longitudinal studies** is based on the assumption that highly advanced studies will be outsourced to the personalised health initiative (chapter 10.3.2). The financial budget for **infrastructures** is based on the research policy orientation that the SNSF is striving to achieve (see chapter 10), the consequences of which are not yet sufficiently clear. For the **bilateral programmes** with select priority countries conducted by the SNSF as a supplementary task for the federal government, the funding requirements remain unchanged for the time being. The SNSF is currently discussing all of these topics with the SERI. In addition, there is a lack of clarity with regard to tax liability and social security in the case of fellowship holders. Last but not least, it needs to be stressed that demand in the different funding schemes is very hard to predict.

The current financial planning is based on the service level agreement 2013-2016 between the SNSF and the SERI. It takes into account the general conditions at the time of decision-making, in December 2014, before the negative development of the federal budget was foreseeable. As soon as the financial budget for the 2017-2020 period is decided by parliament, the SNSF shall set definitive priorities. Only then will it be able to prioritise its different projects such that they can be optimally integrated into the overall research funding framework in consultation with partners. It is therefore important to grant the SNSF sufficient **flexibility**. For the purposes of this financial planning document, it has been assumed that Switzerland will again take a full part in the European framework programme Horizon 2020 as of 2017. If the current partial association is discontinued and the SNSF is consequently obliged to offer substantial backup measures (see chapter 2.3), additional funds will be needed.

Overview of financial requirement (in CHF million)

		Chapter	2016	2017	2018	2019	2020	Additional funds 2017–2020 (compared to 2016 ceiling)
Project funding	Project funding (incl. support and mobility grants, Research data management, protected time, CTU service costs)	7	436,9	444,7	456,0	487,7	499,8	140,7
Career funding	Doc.Grants (incl. replacement of Doc.CH and Doc.Mobility)	8.1.1	8,6	7,0	10,5	14,0	18,0	15,1
	Postdoc.Mobility (incl. replacement of Doc.Mobility, APM, EPM)	8.2.1	51,4	50,1	51,4	51,4	51,4	-1,3
	Ambizione	8.2.2	30,1	37,0	49,0	59,0	80,0	104,6
	PRIMA (incl. replacement of MHV)	8.2.3	6,8	10,2	9,3	9,0	12,0	13,3
	SNSF professorships	8.3.1	70,1	66,5	63,0	64,5	66,0	-20,4
	Additional gender equality measures	8	–	1,8	4,6	4,7	6,6	17,7
Programmes	Sinergia	9.3	66,0	66,0	66,0	68,0	68,0	4,0
	International programmes (r4d, international joint research projects and multilateral cooperation)	9.4	5,9	7,8	10,9	11,2	11,7	18,2
	Social innovation and digital humanities	9.5	–	2,7	4,5	6,8	6,8	20,8
	Investigator Initiated Clinical Trials (ICT)	9.5	10,0	10,0	10,0	10,0	10,0	–
Infrastructures	Research infrastructures and R'Equip	10.1 10.2	31,0	31,8	32,4	33,3	34,1	7,6
	Editions (new projects)	10.3.1	–	2,0	2,0	2,0	2,0	8,0
	Longitudinal studies	10.3.2	10,0	10,0	10,0	10,0	10,0	–
	Biobanks	10.3.3	2,4	2,4	2,4	2,4	2,4	–
Science communication	Science exchange, publications and Agora	11	6,0	7,1	7,3	7,5	7,7	5,6
Service provision	Service provision	12	48,0	49,9	51,9	54,0	56,2	20
Total basic contribution			783,1	807,0	841,2	895,5	942,7	353,9
NRPs/NCCRs	National Research Programmes (NRPs)	9.1	28,0	28,0	28,0	28,0	28,0	–
	National Centres of Competence in Research (NCCRs)	9.2	72,0	75,2	76,2	77,3	78,3	19
Total NRPs/NCCRs			100,0	103,2	104,2	105,3	106,3	19
Overhead	Overhead	13	100,0	105,0	109,9	114,4	120,7	50
Total Overhead			100,0	105,0	109,9	114,4	120,7	50
Supplementary tasks incl. overhead	FLARE	10.3.4	7,6	9,6	9,6	9,6	9,6	8,0
	Bilateral programmes	9.4	10,9	10,9	10,9	10,9	10,9	–
	Young energy researchers	8.3	12,0	16,0	14,0	10,0	6,0	-2,0
	APTT grants	8.3.2	–	4,0	10,4	14,4	18,4	47,2
	Bridge	9.6	–	4,5	10,6	11,9	13,0	40
Total supplementary tasks			30,5	45,0	55,5	56,8	57,9	93,2
Grand Total			1'013,6	1'060,2	1'110,8	1'172,0	1'227,6	516,1

Shelved projects

In order to avoid unrealistic financial demands, the SNSF has decided not to implement a number of existing and envisaged measures.

For existing funding measures:

- **Cautious planning of funds needed for project funding:** by means of the planned annual growth of approximately two per cent, the SNSF will be able to cover the expected increase in external demand due to the higher number of professors predicted by the Federal Statistical Office. In the past, there had been a clear correlation between the number of professors and the number of applications submitted to the SNSF. However, it is difficult to predict how demand will develop in the future if we take further parameters into account (e.g. impact of the changes to project funding set out in chapter 7, submission activity of researchers at universities of applied sciences and universities of teacher education). Without substantial growth in funds, the targeted increase in the spending level will result in significantly lower success rates. To prevent success rates from dropping sharply, the SNSF will draw on what reserves it still has for the time being or redistribute funds so that success rates do not fall too low.
- **Doc.Mobility fellowships on hold:** the SNSF assumes that the higher education institutions, as envisaged in the CRUS's strategic planning, will introduce measures to promote mobility for doctoral students who are not funded through SNSF projects. The SNSF will only make a final decision on shelving Doc.Mobility once a replacement scheme has been implemented.

For new measures:

- Abandoning the option of **higher salaries for doctoral students** in the form of a so-called bandwidth model as an incentive for higher education institutions
- Foregoing measures to support **translational research**
- Shelving the envisaged **scientific incentive programme** that would enable researchers to submit new, ambitious research topics which can only be successfully studied as part of a programme. The SNSF is not abandoning the idea altogether, but would prefer to pursue it further in the coming period without making any financial demands and perhaps issue a call for proposals during the period with financial implications as of 2021.
- Shelving the initiative for funding the **return of established researchers** to Switzerland; the idea is being discussed as a possible measure should Switzerland's status again be relegated in 2017 to that of a third country with respect to the Horizon 2020 programme.

References

- ¹ cf. Science Europe (2015), Statement on Science 2.0; Waldrop, M. (2008), Science 2.0: Great New Tool, or Great Risk?, Scientific American.
- ² Adams J. (2013), "The fourth age of research", *Nature*, 497, 557-560
- ³ cf. Parr, C. (2015), The 100 most international universities in the world 2015, Times Higher Education, <http://www.timeshighereducation.co.uk/news/the-100-most-international-universities-in-the-world-2015/2018125.fullarticle>
- ⁴ American Society for Cell Biology (2013), San Francisco Declaration on Research Assessment (DORA), <http://www.ascb.org/dora-old/files/SFDeclarationFINAL.pdf>
- ⁵ Galaxy Zoo, <http://www.galaxyzoo.org/>
- ⁶ SWIR (2014) "Evaluation des Schweizerischen Nationalfonds in Bezug auf die strategische Förderung von Forschungsinfrastrukturen und Fachgebieten"
- ⁷ SWIR (2014) "Evaluation des Schweizerischen Nationalfonds in Bezug auf die strategische Förderung von Forschungsinfrastrukturen und Fachgebieten"; Coryn, C. L. S., Applegate, E. B., Schröter, D. C., Martens, K. S., & McCowen, R. H. (2012). *An evaluation of the transparency and overall quality of evaluation at the Swiss National Science Foundation: Final report*. Kalamazoo, MI: Western Michigan University, The Evaluation Center; Langfeldt, L., Ramberg, I., Gunnes, H. (2014), Swiss Research Funding, Researcher Survey for the Swiss National Science Foundation, NIFU
- ⁸ "Massnahmen zur Förderung des wissenschaftlichen Nachwuchses in der Schweiz", a report by the Federal Council in response to the postulate WBK-SR (12.3343), p. 23, 26-27
- ⁹ SWIR (2014), Evaluation des Schweizerischen Nationalfonds in Bezug auf die strategische Förderung von Forschungsinfrastrukturen und Fachgebieten, S. 30–31
- ¹⁰ The names of all new schemes are temporary.
- ¹¹ CRUS (2014), Strategische Planung 2017-2020 der Schweizer Universitäten, p. 6; the universities' strategic plan was submitted in 2014, before the CRUS, the KFH and the COHEP came together as swissuniversities.
- ¹² This is currently the case for NRP 68 "Soil as a Resource" and NRP 69 "Healthy Nutrition and Sustainable Food Production". As these two programmes are due to end in the coming period, it will be necessary to consider in what form involvement with the two JPIs could be continued without the NRPs.
- ¹³ CRUS (2014), Strategische Planung 2017-2020 der Schweizer Universitäten, p. 21
- ¹⁴ As regards the modalities of settling and paying the overhead, the SNSF proposes maintaining the current model, in which the awards of the previous year are taken as a calculation basis. This model has proven efficient and, in the SNSF's estimate, it guarantees continual payment without leading to an unjustifiable peak in 2017, even if the extension of grants from three to four years in project funding is factored in.
- ¹⁵ The increase is requested by the universities within the scope of the CRUS's strategic planning. Cf. CRUS (2014), Strategische Planung 2017-2020 der Schweizer Universitäten, p. 23

Abbreviations

Academies	Swiss Academies of Arts and Sciences
APTT	Assistant professorships with tenure track
CRUS	Rectors' Conference of the Swiss Universities (a part of swissuniversities since 2015)
CTI	Commission for Technology and Innovation
CTU	Clinical Trial Units
DORA	Declaration of Research Assessment
ERI Dispatch	Federal Dispatch on the Promotion of Education, Science and Innovation
ESFRI	European Strategy Forum on Research Infrastructures
ESO	European Southern Observatory
EU	European Union
FLARE	Funding LArge international REsearch projects
Horizon 2020	European Framework Programme for Research and Innovation 2014-2020
IICT	Investigator Initiated Clinical Trials
KFH	Rector's Conference of the Swiss Universities of Applied Sciences (a part of swissuniversities since 2015)
KTT	Knowledge and technology transfer
Nano-Tera.ch	Swiss initiative for engineering complex systems for health, security and the environment
NCCR	National Centre of Competence in Research
NRP	National Research Programme
PRIMA	Promoting Women in Academia
R'Equip	SNSF funding programme for research equipment
r4d	Swiss Programme for Research on Global Issues for Development
SCOPES	Scientific Cooperation with Eastern Europe
SCTO	Swiss Clinical Trial Organisation
SDC	Swiss Agency for Development and Cooperation
SERI	Swiss State Secretariat for Education, Research and Innovation
SNSF	Swiss National Science Foundation
SWIR	Swiss Science and Innovation Council
SystemsX.ch	Swiss Initiative in Systems Biology

Publishing information

Published by

Swiss National Science Foundation
Wildhainweg 3
Postfach 8232
CH-3001 Berne
+41 (0)31 308 22 22
com@snf.ch
www.snsf.ch

Printing and binding

Stämpfli Publications SA, Berne

Paper

Cover: Claro Bulk, FSC, 170 g/m²
Contents: Claro Bulk, FSC, 135 g/m²

Cover picture

The Matterhorn and the solar panels of the restaurant on the Klein Matterhorn, canton of Wallis, Switzerland, photograph taken in October 2010.

© Keystone / Ludwig Weh, photographer

© April 2015 / Swiss National Science Foundation, Berne

Number of copies printed: 900 in German / 500 in French / 600 in English

**Knowledge is the key
to the future.**

**Research creates
knowledge.**

