

Research at the University of Barcelona



October 2019



UNIVERSITAT DE
BARCELONA

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Foreword to the 2019 edition

It is my pleasure to present the 2019 edition of the report **Research at the University of Barcelona**. This multiannual report will hopefully give you a comprehensive account of our most significant figures in **research, innovation and technology transfer** during the period ending December 2018.

The University of Barcelona is a 569-year-old **research-intensive institution** that promotes activity in nearly all fields of knowledge: experimental, mathematical and engineering sciences, life and health sciences, social sciences and humanities, and the arts. International impact, cooperation in education and a commitment to innovation has been in the DNA of our institution for many years. The University of Barcelona is the **top-ranked university in Spain**, it is very well positioned in Europe, and it is the only Spanish institution ranked among the top 200 universities in the world according to the Academic Ranking of World Universities 2019. It is also included among the 50 best universities for scientific productivity in the world, being the only Spanish university to form part of this select group.

The University of Barcelona is a proud **member of LERU** (the League of European Research Universities), a group that comprises the 23 best research-intensive universities in Europe. The active participation of the University of Barcelona in LERU and other alliances greatly contributes to our **international dimension**, serves to strengthen our institutional policies on research, and bolsters our social, economic and academic impact. The UB is now **coordinating CHARM-EU**, a European University Network promoting European values and education in Europe and around the world.

In order to appreciate our research efforts a few figures will suffice: from 2014 to 2018, our 297 research groups from 60 departments and 17 institutes were granted more than **4,600 research projects**, produced **more than 22,300 ISI indexed publications** and generated **228 patents or intellectual property rights**. Our professionals are also part of 12 joint research institutes together with other universities or public administrations, mostly in the biomedical areas, including close associations with the most prestigious hospitals in the country.

Knowledge transfer to society is one of our driving forces. We participate actively in initiatives like **EIT Health** and the **RIS3 initiative**. For more than 30 years our **Scientific and Technological Centres**, unique in Spain, have provided state-of-the-art facilities both to academia and technological firms, while our successful **Science Park** hosts around 85 hi-tech firms and institutes. Likewise, transfer in the areas of social sciences and humanities is also a priority for us, as we aim to make our knowledge available to society at large and fulfil the **Sustainable Development Goals** for 2030.

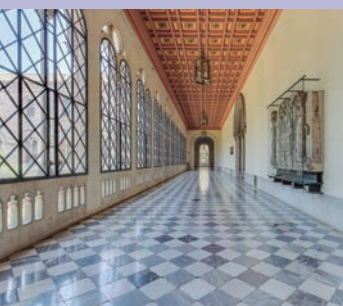
I encourage you to read this report, introducing you to the exciting research activity in which our University engages.

Domènec Espriu

Professor of Theoretical Physics
Vice-Rector for Research
University of Barcelona

Barcelona, October 2019

The University of Barcelona as a leading research university



The University of Barcelona (UB) is a student-oriented research university with more than 560 years of history. The institution has in-depth, multidisciplinary experience accumulated over the decades in several research areas, a background that places the University of Barcelona in a prominent position on the international research scene. The main research areas at the University are Life and Medical Sciences, Experimental Sciences (physics, mathematics, geology and chemistry), Economics, Business, Law, Humanities (philology, philosophy, history and geography), and Educational and Behavioural Sciences. The staff of the institution comprises almost **5,700 academics and researchers** and around 2,300 administrative and technical support members who develop their daily activities within or in close relation with the **297 research groups** recognized by the Generalitat de Catalunya (Catalan Government).

The University of Barcelona is the only Spanish university represented in the League of European Research Universities (**LERU**), which comprises the 23 best research-intensive universities in Europe. Research outcomes at the UB have great potential in terms of their contribution to the economy and social impact. Data gathered for the latest reports on the “Economic Contribution of the LERU Universities” and “**Economic Contribution of the University of Barcelona**” show that the UB has become a key agent in Catalan and Spanish business sectors. The University of Barcelona generates a collective economic impact of €6.42 in the European economy per every euro received to carry out research activities. The presence of the UB in Spain corresponds to figures of about €2,300 million GVA (gross value added). Regarding employability, the impact of the UB on the Spanish economy reached 39,300 job vacancies, which implies that it generates 5.23 jobs for each person directly hired by the University.*

The University of Barcelona occupies a **competitive position** at national, European and worldwide levels in the most important ranking tables designed on a range of variables within different geographical areas. The University of Barcelona is the top university in Spain and the top university in the Ibero-American educational area according to the most relevant rankings, in which the UB has showed a slight improvement of results during this year. We have a recognized and active role creating exciting crossroads where international students, academics and researchers alike are more than welcome to join us and to contribute to the **international impact of our research** projects.

Strategic Research Initiatives

The University of Barcelona encourages researchers to join efforts and forces with institutions around the world to create a synergy of expertise. With this objective, the University is an active core member of EIT Health, a Knowledge Innovation Community (KIC) in the field of health created by the European Institute of Innovation and Technology (EIT) in 2014. The EIT Health is a consortium that offers best-in-class research capabilities, higher education and business expertise at European level.

* https://www.ub.edu/web/ub/en/menu_eines/noticies/2017/12/007.html?

The Spanish association comprises 19 leading organizations plus 11 linked entities — universities, companies, research centres, public health organizations, hospitals and technological centres — committed to health innovation and its impact on the improvement of citizens' quality of life. This represents one of the most important successes of the University of Barcelona in the last five years, as it recognizes the international excellence and scientific competitiveness of its health-related research. In addition, EIT Health opens up access to European funds for education, business creation and innovation projects not only to researchers but also to other stakeholders, such as for spin-offs or institutes in which the UB participates. Since 2015, our university has been active both in campus and in innovation proposals, with an average success rate of 30% and nearly €4 million secured for the UB, over €8 million if we consider the entire UB group.

The University of Barcelona is an active member of international research networks. Among them: (i) **EuroMarine**, a European marine science network; (ii) **Eurolife**, a consortium of European institutions committed to research and higher education in the field of life and health sciences, and (iii) the **European Consortium for Political Research** (ECPR), an association for academic institutions concerned with the teaching and research of political science and international relations.

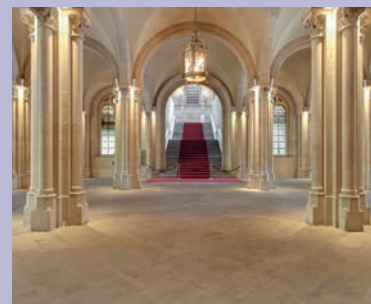
Good Research Practices

The University of Barcelona is highly committed to the improvement of the institution's policies and practices in terms of recruitment, hiring and guaranteeing the optimal working conditions for its researchers. The University obtained the **HR Excellence in Research** in 2015, an award conferred by the Directorate-General for Research and Innovation of the European Commission. This accreditation certifies that the University of Barcelona is a research-intensive university committed to the continuous improvement and implementation of its human resources policies, following the principles of the **European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers**. The UB is presently at the implementation phase of the HRS4R revised Action Plan. After this phase has been completed, **by April 2021**, the institution will have to follow the procedures leading to the HR Excellence in Research Award **renewal phase**.*

The University of Barcelona stipulates that everyone involved in research, including investigators and trainees, must work to the highest standards to promote the assurance of **research integrity** in fulfilment of the mission and goals of the University. To achieve these principles, the University of Barcelona provides the academic community with several platforms and committees of reference. Among them:

- the **University of Barcelona Bioethics Commission** (CBUB), which evaluates the ethics of the research projects carried out by members of the University of Barcelona (academics and researchers);
- the **Animal Experimentation Ethics Committee** (CEEa), which is responsible for ensuring compliance with the legislation that regulates the use of animals for experimentation and other scientific purposes, and
- the **Biosafety Commission**, which ensures the fulfilment of the required obligations imposed by regulations in biosafety issues.

* <https://www.euraxess.at/jobs/hrs4r/award-renewal>



HR EXCELLENCE IN RESEARCH



World Reputation

The University of Barcelona is the top-ranked university in Spain according to the prestigious **QS World University Rankings** 2019 and, according to the new edition of the **Academic Ranking of World Universities** (ARWU), the UB is the only university in Spain listed among the top 200 universities worldwide according to the criteria set by this prestigious ranking. The great scientific performance of the UB, in indexed articles and high-level publications in *Nature* and *Science*, is a determining factor regarding the position the UB holds.

The University of Barcelona continues to be **the best positioned in Spain in the Web Ranking of Universities**, Webometrics. The UB occupies the 34th place in Europe and the 140th in the world. The University of Barcelona was included once again in the world's top 100 universities in two prestigious international rankings, sitting at number 96 in the **Best Global Universities** 2018 (BGU) and at position 87 in the **Center for World University Rankings** (CWUR) 2018.

On the other hand, **the UB is the Catalan institution with most frequently cited researchers worldwide**, with a total of 14 researchers appearing in the list of the most influential scientists, according to one of the most prestigious classifications in the international academic and scientific community, published by Clarivate Analytics, which identifies experts that lead studies with the highest international scientific impact in 21 fields of sciences and social sciences, ranging from clinical medicine and neurosciences to agriculture, economics and the environment.

Awards and Distinctions

In the last call of the Severo Ochoa and María de Maeztu distinctions conferred by the Spanish Ministry of Economy and Competitiveness, the Institute of Neurosciences and the Institute of Theoretical and Computational Chemistry, both part of the University of Barcelona, were recognized as **María de Maeztu Excellence Units**. These two institutes joined the Institute of Cosmos Sciences of the University of Barcelona (ICCUB) and the Barcelona Graduate School of Mathematics (BGSMath), a centre affiliated with the University of Barcelona, which had obtained this distinction previously. Moreover, the Institute for Bioengineering of Catalonia (IBEC), the Institute for Research in Biomedicine (IRB Barcelona) and the Centre for Research in Agricultural Genomics (CRAG), all three institutes in which the University of Barcelona participates, are recognized as **Centres of Excellence by the Severo Ochoa** programme.

Furthermore, **19 researchers** from the University of Barcelona received awards at the 10th edition of the **ICREA Academia** programme. This programme contributes to the intensification of research carried out by university professors who are in a fully active and expansive phase of their research careers. **ICREA** (Catalan Institution for Research and Advanced Studies) is a foundation supported by the Catalan Government and currently employs **40 researchers** that perform their work **with the University of Barcelona**.



Facts and Figures

- 16 faculties, 60 departments, 73 bachelor's degrees, 157 university master's degrees and 48 doctoral programmes
- More than 5,700 researchers, technicians and research assistants
- Over 62,000 students. More than 10,000 students awarded bachelor's and master's degrees. More than 500 doctoral theses submitted every year
- 17 University of Barcelona research institutes, 12 Catalan research institutes in which the University of Barcelona participates, 5 research centres, 10 observatories and 3 documentation centres
- 297 research groups recognized by the Generalitat de Catalunya (Catalan Government), which included some 40 ICREA researchers, 34 Ramón y Cajal researchers, 28 Juan de la Cierva and 17 Beatriu de Pinós researchers
- 877 active research projects and more than 133 million euros obtained from active national and international research projects and contracts with companies
- More than 5,700 scientific publications in 2018 (WoS)
- The Learning and Research Resources Centre (CRAI) offers general library services and a range of specialized teaching support and research support services
- The Scientific and Technological Centres (CCiT-UB): a comprehensive and state-of-the-art research support facility with 36 technical units
- The Bosch i Gimpera Foundation (FBG): promoting and managing the transfer of knowledge and technology generated at the University of Barcelona.

Source: *The University of Barcelona* in figures (October 2019) and UB Office of Research Management – OGR (UB-GREC Database, December 2018).



UB in Figures

Founded
in
1450

- ✓ With a large cultural, historical and architectural heritage
- ✓ Public and strongly research-oriented university
- ✓ Comprehensive: almost any discipline

Organization



16 faculties
60 departments
16 libraries

"The UB is the top university in Spain and Latin America in the international rankings."



UB is fully integrated in the city and in the metropolitan area

6 campus

People



> 5,700 teaching and research staff (**> 450** international)
> 2,300 administrative and technical staff
> 62,000 students (**129** nationalities)

Research



17 UB research institutes
of which **4** Institutes of **excellence**
877 active research projects
34 H2020 active projects
4 ERC grants
> 5,700 scientific publications in 2018 (ISI)
133.3 million € obtained for research and technology transfer

Education



Academic programmes:

73 Bachelor
157 Master
48 Doctoral
> 540 PhD theses read



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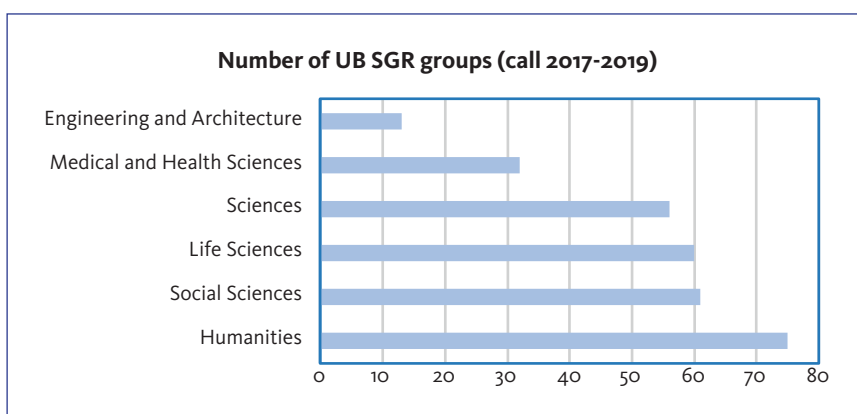
Source: *The University of Barcelona in figures* (published in October 2019, all data referred to 2018)

1. OVERVIEW OF RESEARCH AT THE UB

The most significant research at the UB is conducted by the **UB's 297 research groups** that have been recognized and supported by the Generalitat de Catalunya (Catalan Government) by the **SGR call 2017-2019**, which aims to give support to the research activities conducted by the best teams. Within these 297 SGR groups, 27 of them are interuniversity SGR research groups with multiple affiliations (that is, with the UB and other Catalan institutions). If considered according to their category, there are:

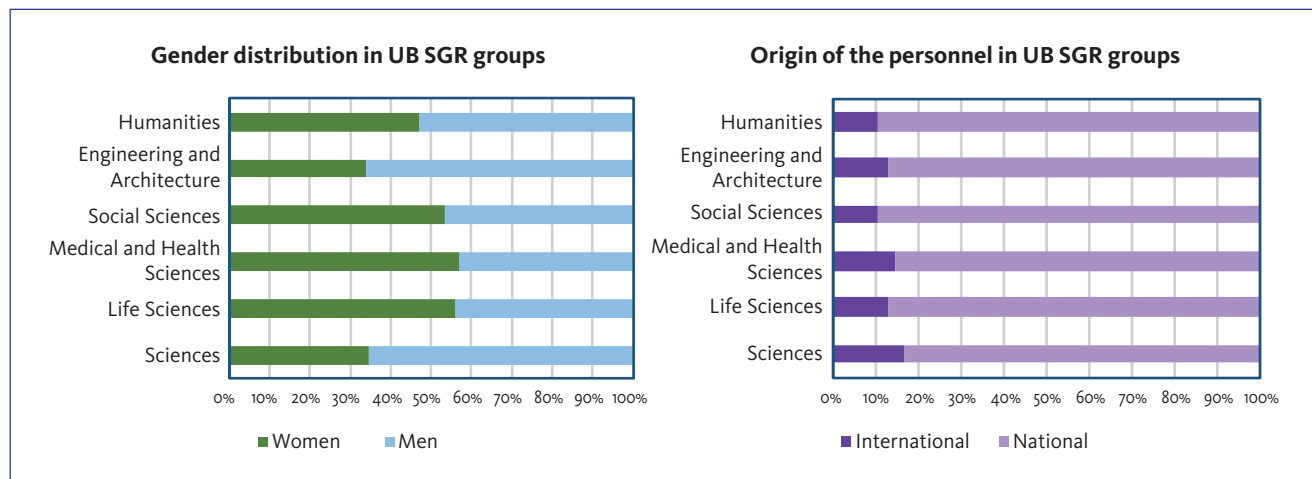
- **276 UB consolidated research groups (GRC)**, research groups formed by research personnel with a stable and consolidated path with a common strategy that has allowed it to advance knowledge in its area, with recognized and impacted research results;
- **10 UB pre-consolidated research groups (GRPRE)**, research groups that obtained recognition as emerging in the previous call, SGR 2014, and which, given the duration of the latter, cannot meet the requirements to appear in the modality of a consolidated group;
- **11 UB emerging research groups (GRE)**, research groups with a brief trajectory of joint work but with the potential to become consolidated research groups in their field in the period in question.

According to their main field of knowledge, established by the Catalan Government, these 297 UB SGR groups are distributed in **six categories**, which include social sciences (economics, business, law, sociology, education); humanities (geography and history, philology, philosophy and fine arts); sciences (chemistry, geology, physics and mathematics); life sciences; medical and health sciences, and engineering and architecture.

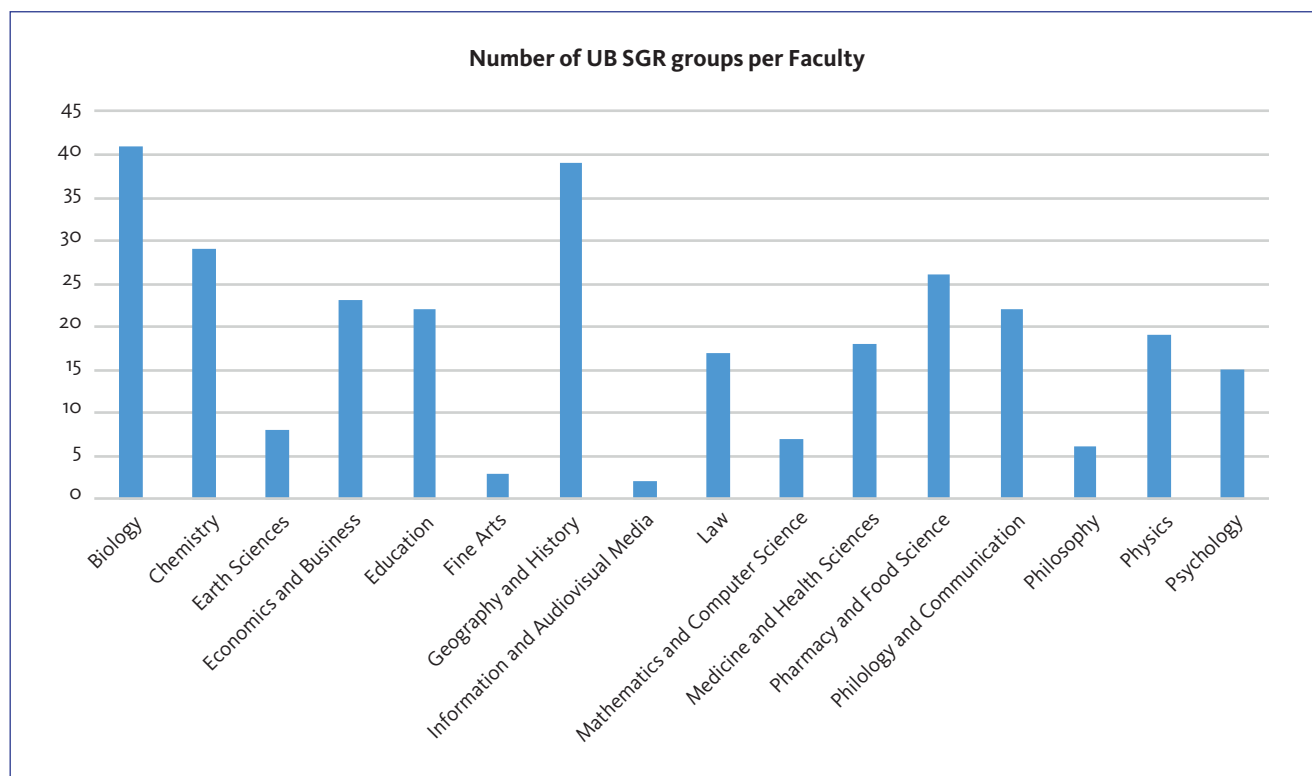


Considered globally, there is a fair **gender distribution** within the SGR groups, with 48.47% of active members being women, although there is a significant deviation in sciences (maths, physics, chemistry) and engineering and architecture. As for the origin of UB researchers in terms of their nationality, 12.85% of staff come from other countries.

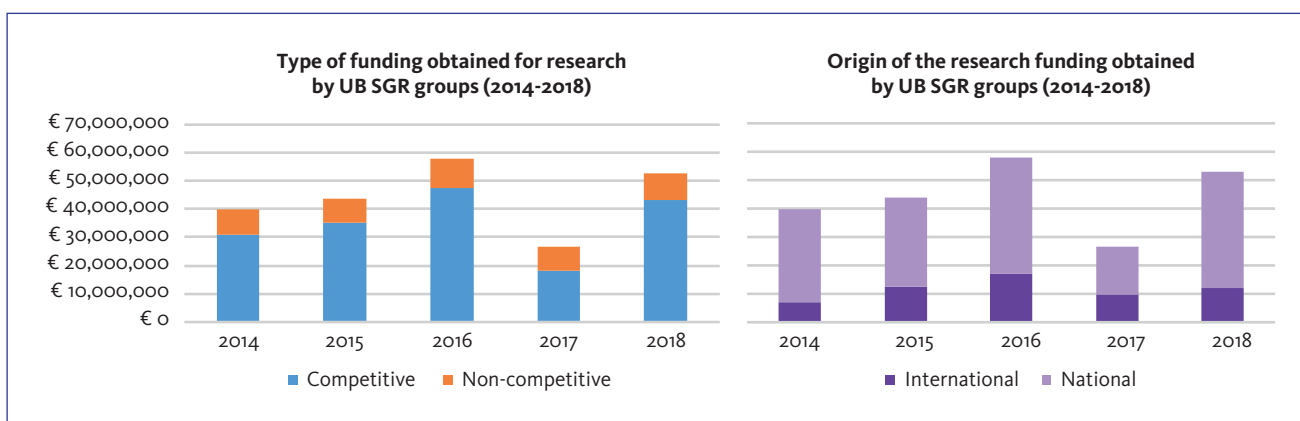
OVERVIEW OF RESEARCH AT THE UB



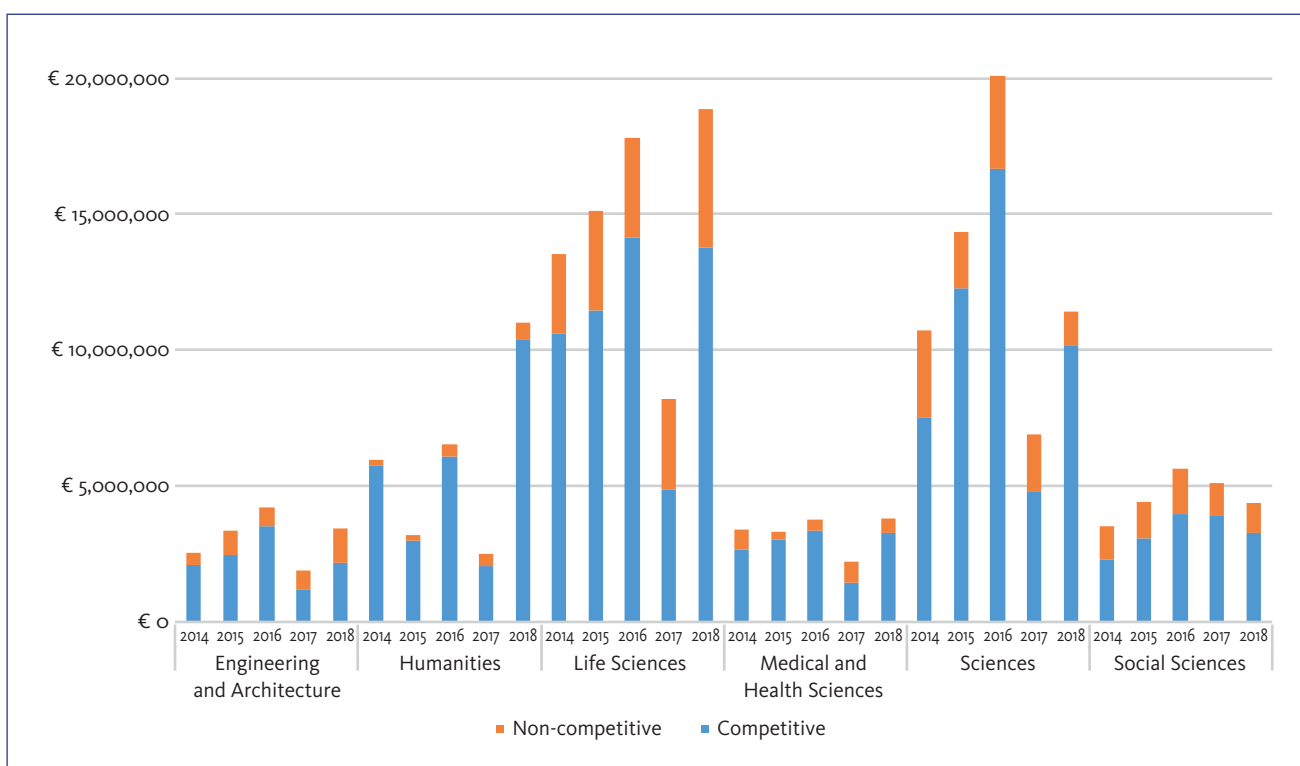
The personnel of these 297 recognized research groups are integrated within the 16 faculties that comprise the academic structure of the UB. The size of each faculty varies significantly and so does the distribution of these research groups, as shown in the graph below.

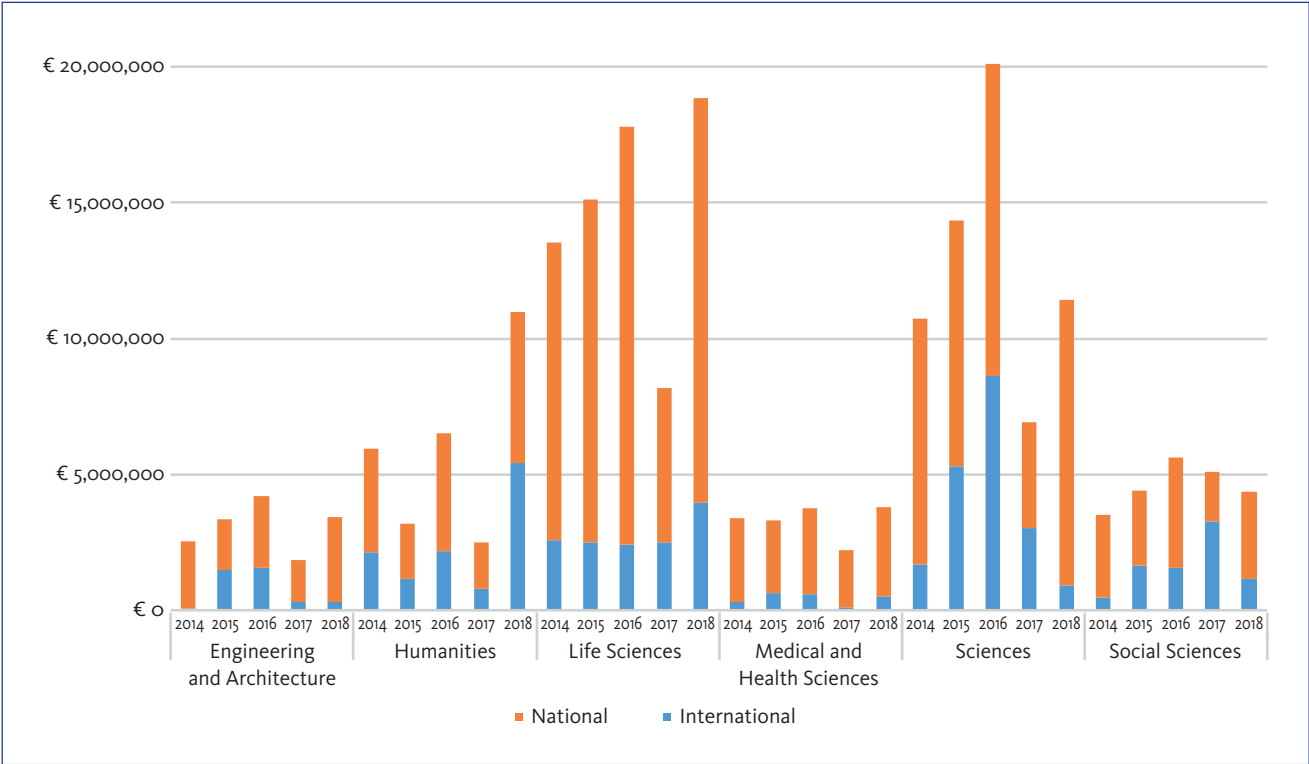


As for the research funding obtained by UB SGRs between 2014 and 2018, 79% came from competitive calls and up to almost 27% of this funding was of international origin, mainly from the European Union Horizon 2020 programme.

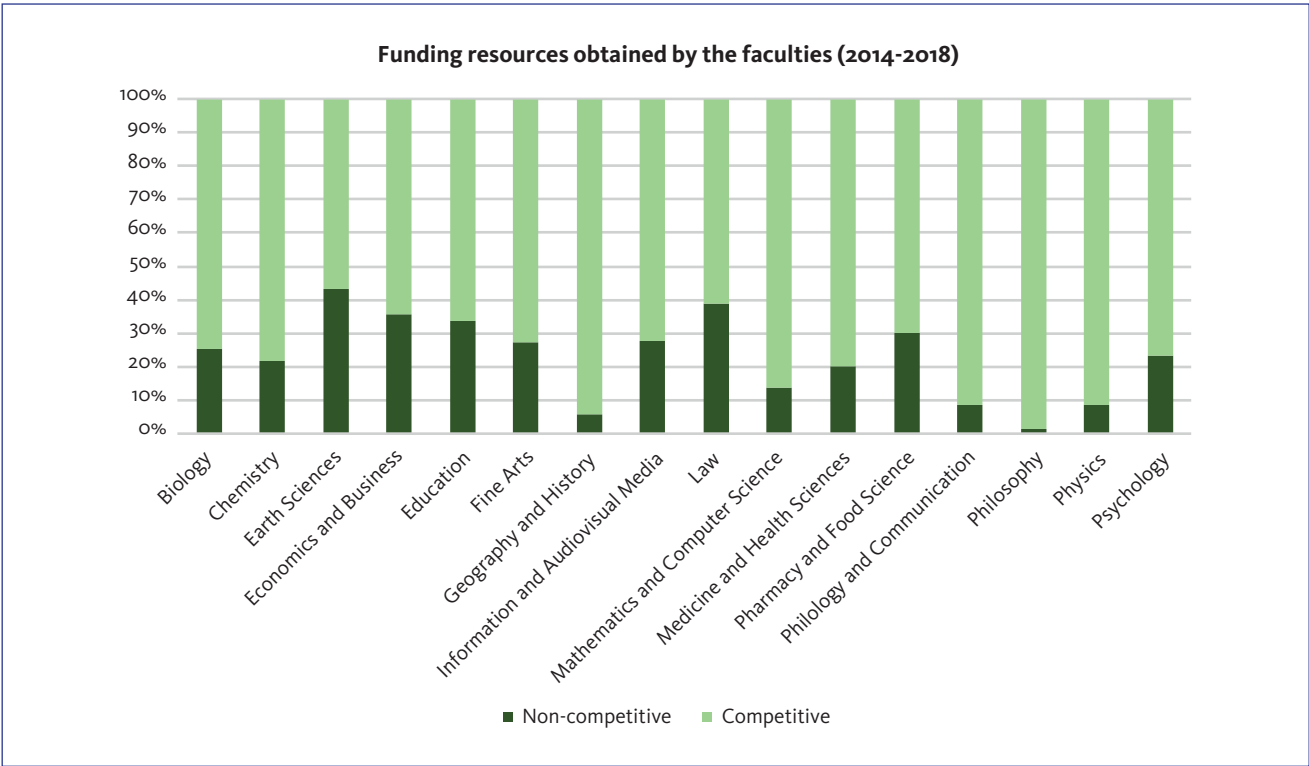


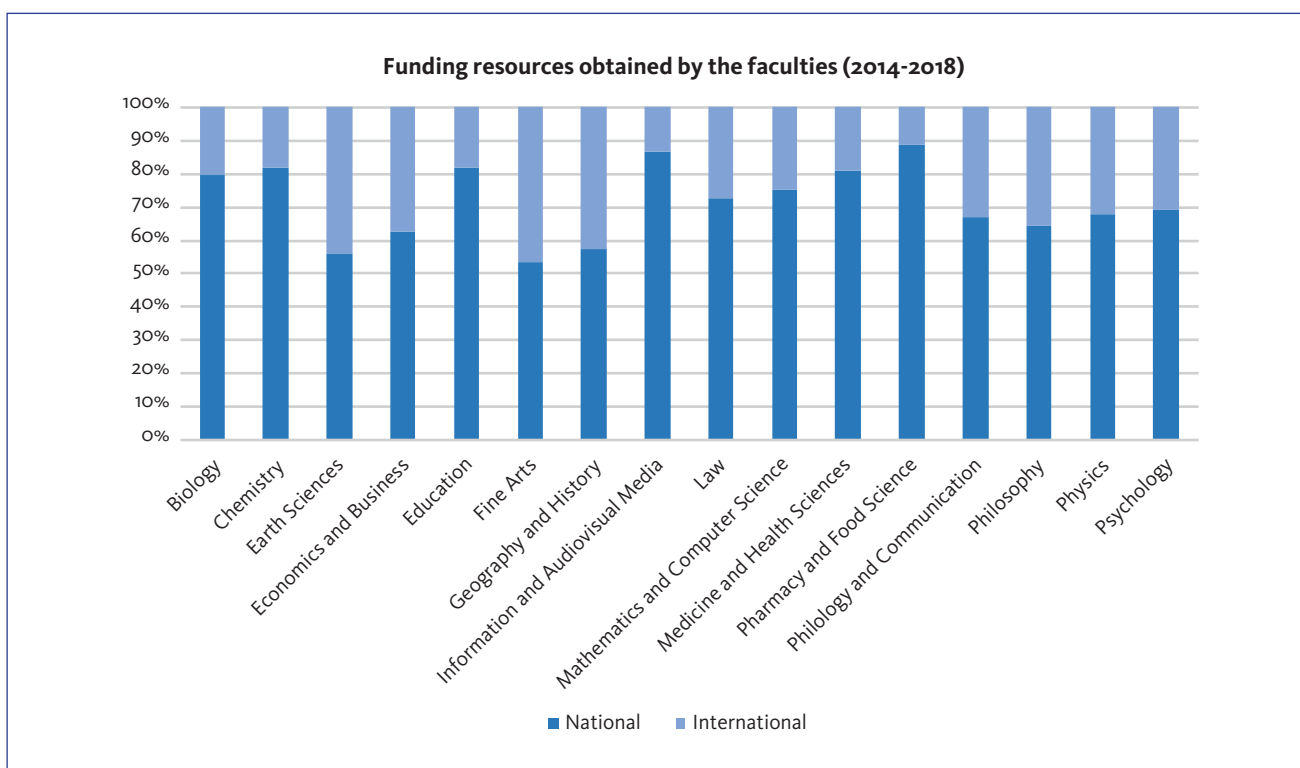
The following graphs show the evolution of the **amount of funding** obtained from 2014 to 2018 for research projects by UB SGR groups, depending on type and origin, and according to the respective knowledge areas to which the research groups belong.



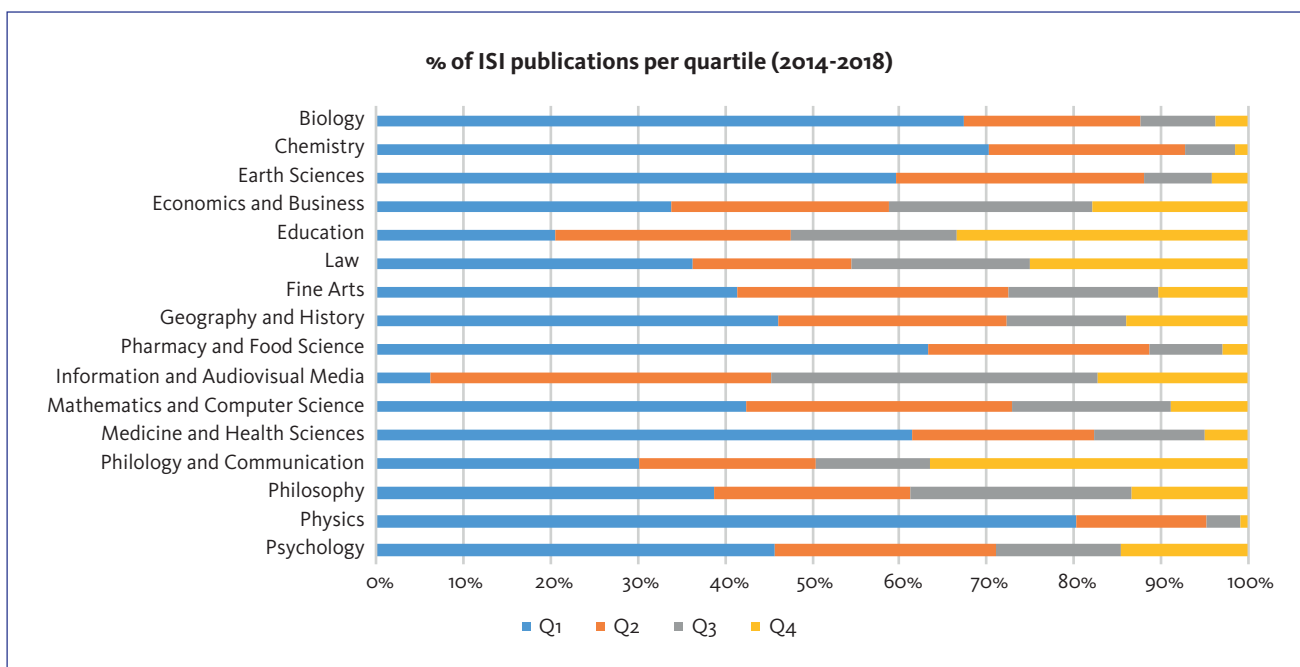


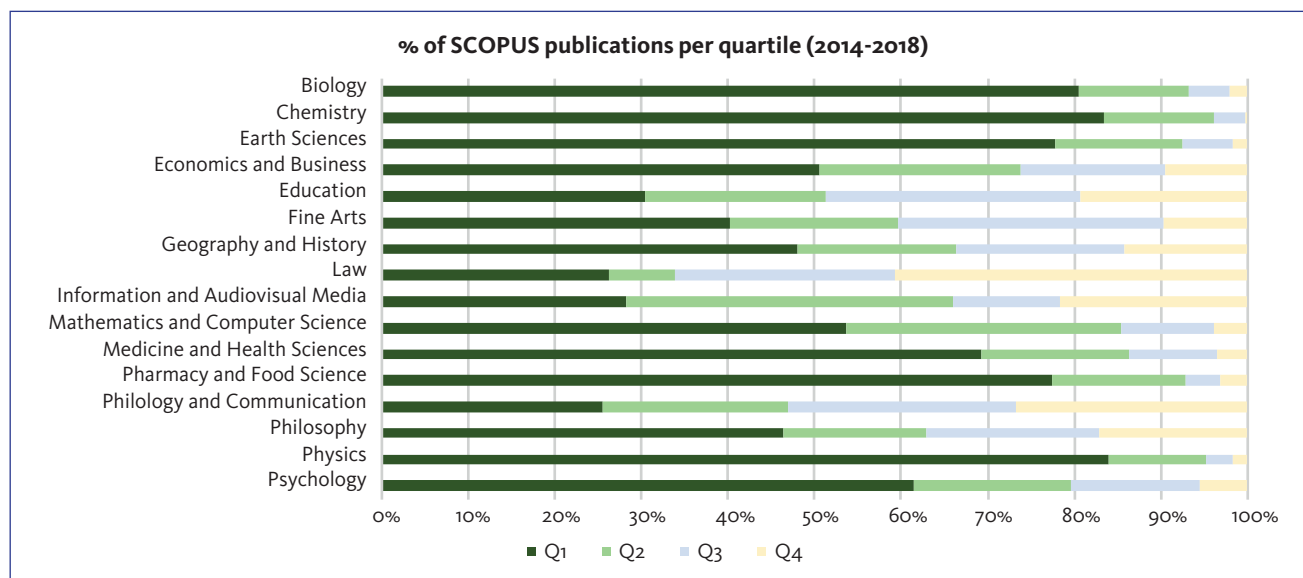
The distribution of the **funding resources** obtained by the 16 faculties for the 2014-2018 period is shown in the following graphs. In total, 79% of the funding comes from competitive calls and 73.44% has a national origin.





Regarding the **scientific output** of the 16 faculties of the UB for the period 2014-2018, the ISI and the SCOPUS analyses of publications are as follows:

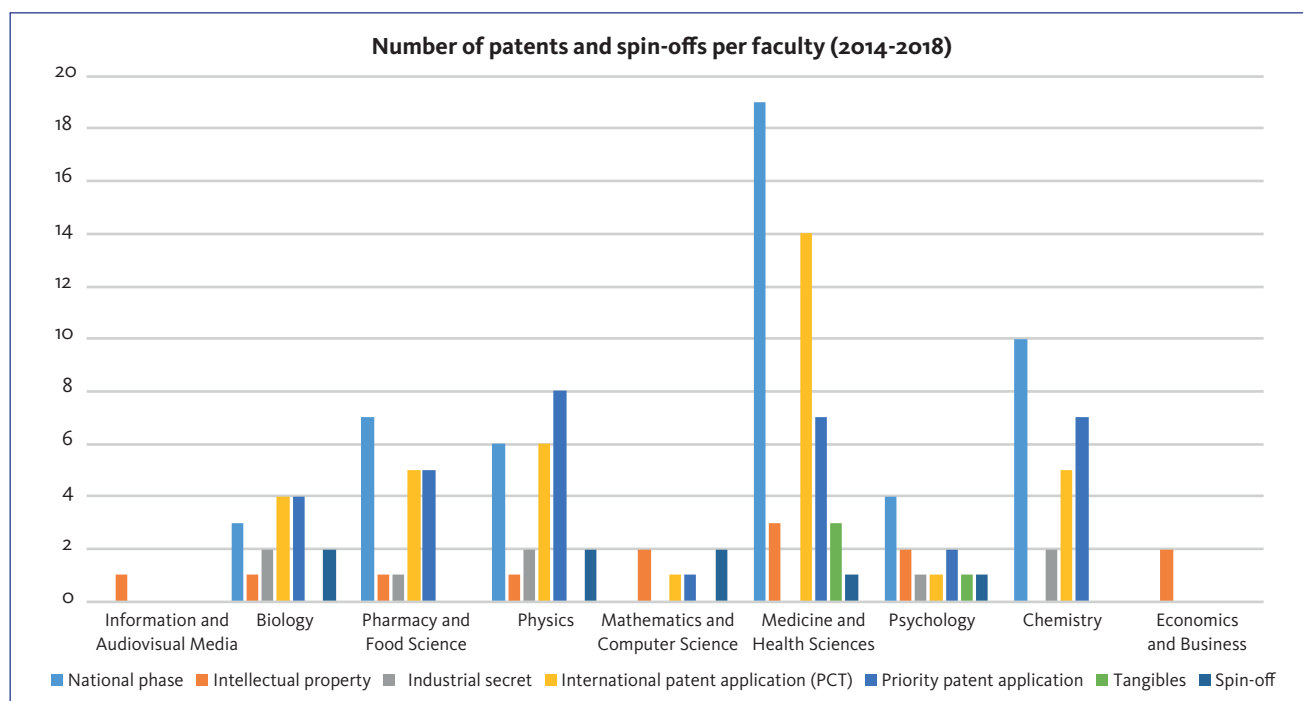




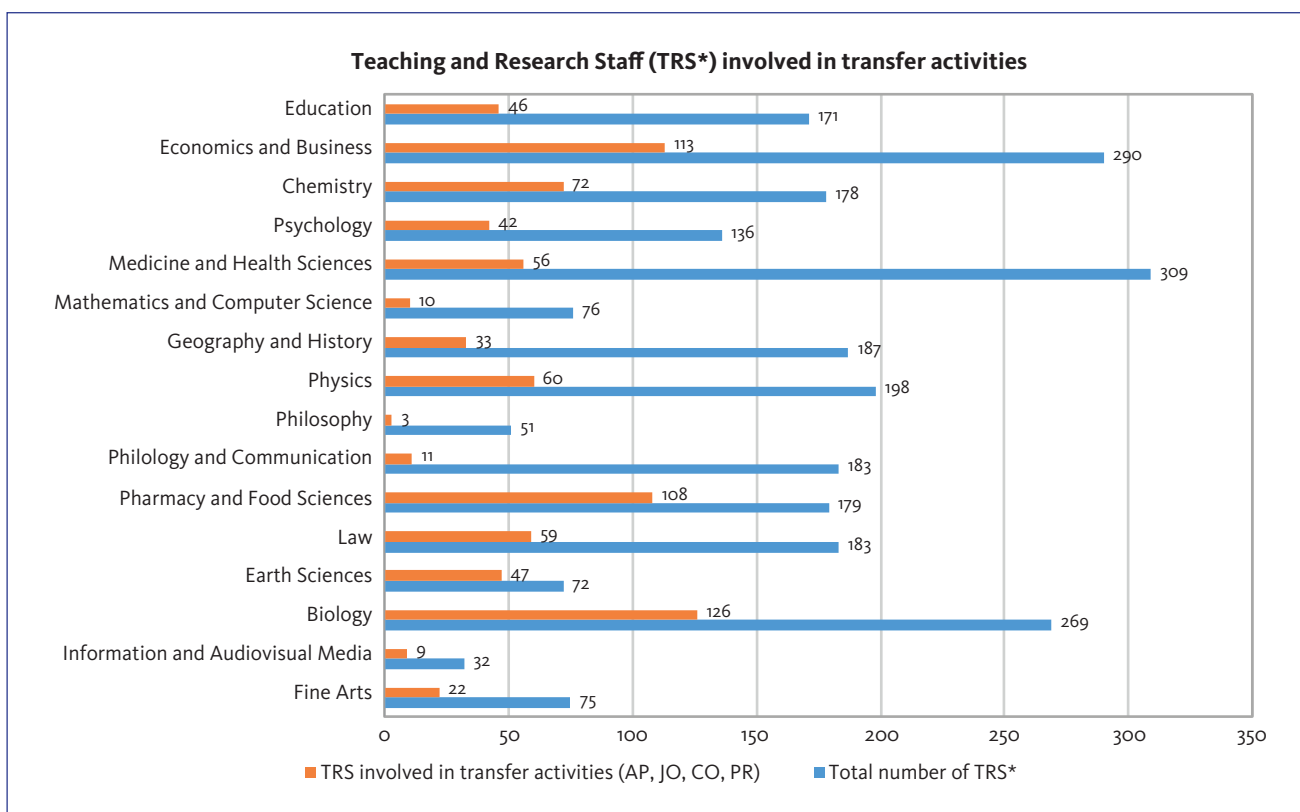
In order to join forces with R&D activities and to improve the quality of their innovation capacities, the UB conducts a number of projects **promoting knowledge and technology transfer** in basic research, between the UB and private companies and public institutions. The University of Barcelona thereby ensures that such institutions can play an instrumental role in technological innovation and fully develop the potential of the quaternary sector.

Collaboration between UB research groups and business sectors is managed by the **Bosch i Gimpera Foundation (FBG)**, which takes care of all those aspects related to the knowledge transfer activity of the UB. Researchers at the UB can transfer their research findings using a variety of mechanisms, including **contract research agreements, collaborative research agreements, patent licensing** and **company creation**.

The **transfer indicators for the faculties at the UB** during the last five years are shown in the figure below.



The total number of **teaching and research staff as lead or principal investigator researcher involved in transfer activities** (contract research projects, public grants for transfer, agreements with companies and institutions for consulting services and the organization of workshops for transfer initiatives) varies significantly from one faculty to another. However, as shown in the next graph, in all faculties there is significant interest in participating in these activities.



TRS* Teaching and research staff (as of December 2018), including all TRS categories with a full-time contract, acting as head researcher in transfer actions.