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Ca' Foscari
Venezia

Presidio della Qualità
di Ateneo

2019 Annual Research Report

Department of Molecular Sciences and Nanosystems

Reference period 2016-2018

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PART I: Research objectives

Section A - Statement of the Department research objectives and indicators

----- Linee guida per la compilazione

In questa sezione il Dipartimento descrive i settori di ricerca nei quali opera e gli obiettivi di ricerca pluriennali, in linea con il piano strategico di Ateneo; fornisce, inoltre, obiettivi misurabili da raggiungere l'anno successivo, tenendo conto nella formulazione di criticità e punti di miglioramento. È opportuno fare riferimento a, o riportare, estratti di documenti strategici/programmatici del dipartimento.

Section A - Statement of the Department research objectives and indicators

The Department of Molecular Sciences and Nanosystems (DSMN) has undergone a major restructuring in the last 3 years. There are two concurring reasons for that. On the one hand, the period 2015-2018 coincides with the peak of the staff turnover with several senior professors retiring during this period, not all of them being replaced by new staff. As a result, the total number of staff decreased steadily in this period, and the Departmental policy had to cope with this issue accordingly. At the same time, in line with the University vision outlined in its Strategic Plan, the Department has decided to move from an almost monothematic Department strongly hinging upon Chemical Sciences, to a multidisciplinary Department with small but active groups in Physics, Biology, and more recently Mathematics and Engineering. This transformation is still ongoing with the recruitment of new junior staff, as well as the set-up of new dedicated labs.

Within this general framework, the Department has also launched new teaching initiatives, with the opening of new courses (e.g. Physical Engineering), the strengthening of existing ones, as well as the establishment of a new PhD program jointly with Kyoto Institute of Technology. The PhD program in Chemistry has also started a new three years project to find a suitable international partner.

Another point where due care was exercised in the Departmental Developed Plan was related to the Technological Trasfer (TT) and the Third Mission activities, as well as the fund raising plan.

While full details of these novelties can be found in the 2019-2020 Departmental Development Plan (https://www.unive.it/pag/fileadmin/user_upload/dipartimenti/DSMN/documenti/AQ_dipartimento/piani_e_regolamenti/doc_prog/Piano_di_Sviluppo_di_Dipartimento_2019_2020.pdf), as well as in the

following Sections of the present Report, it is here worth emphasizing that this major endeavour will display its effects in full fledge only in the years to come, and hence this Report has to be read in this perspective.

That said, this Section will continue by first putting the Departmental performance within a national and international context, then by highlighting the Departmental Challenges subsuming its vision, and finally by providing indicators and targets to measure this performance.

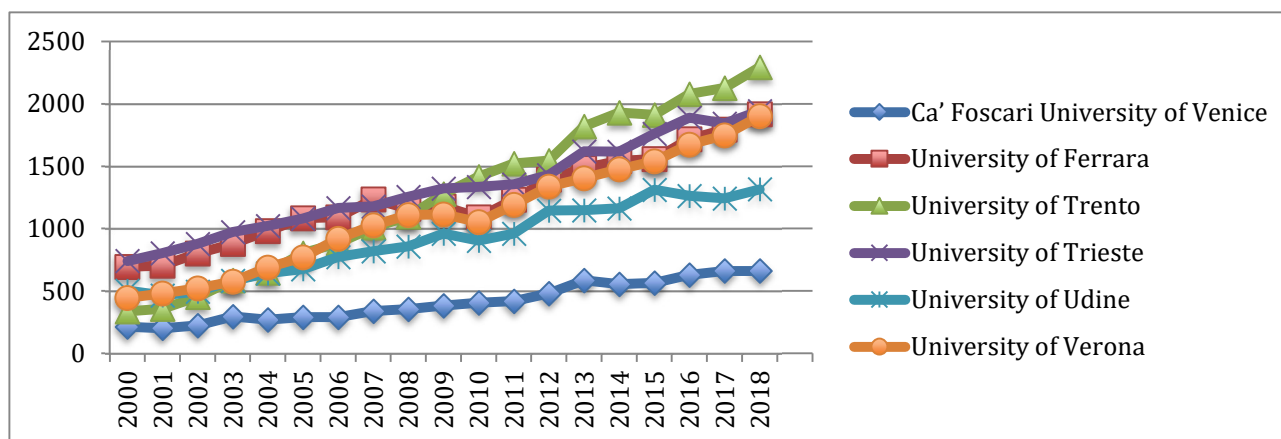


Figure 1: Total number of publications of Ca' Foscari University of Venice and 5 Universities taken as peers (Ferrara, Trento, Trieste, Udine and Verona) for the years 2000-2018 (Source: SciVal)

As a starting point for this Report, it proves useful to frame the overall performance of Ca' Foscari University within the national and international context. The trigger suggesting this analysis stems from the last results of the QS ranking that was suggesting a point of attention to the bibliometric metrics, especially in the Science & Technology Areas. To this aim, we compare here few representative bibliometric indicators with some of our Italian peers having similar sizes and number of students. As already done at the central level in the past, we have selected the Universities of Ferrara, Trento, Trieste and Udine for this task. Figure 1 reports this comparison for the total number of publications within the time window of years 2000-2018, whereas Figure 2 depicts the same comparison for the Field Weighted Citation Impact index. This is a well-known metric (see e.g. here [FWCI](#)) devised in a way such that a FWCI of 1 indicates that the publications have been cited at world average for similar publications (>1 above average, < 1 below average). As such, it is independent of the size (because of the normalization) as well as of the research area (as each paper is compared with all papers in the same area and the same year).

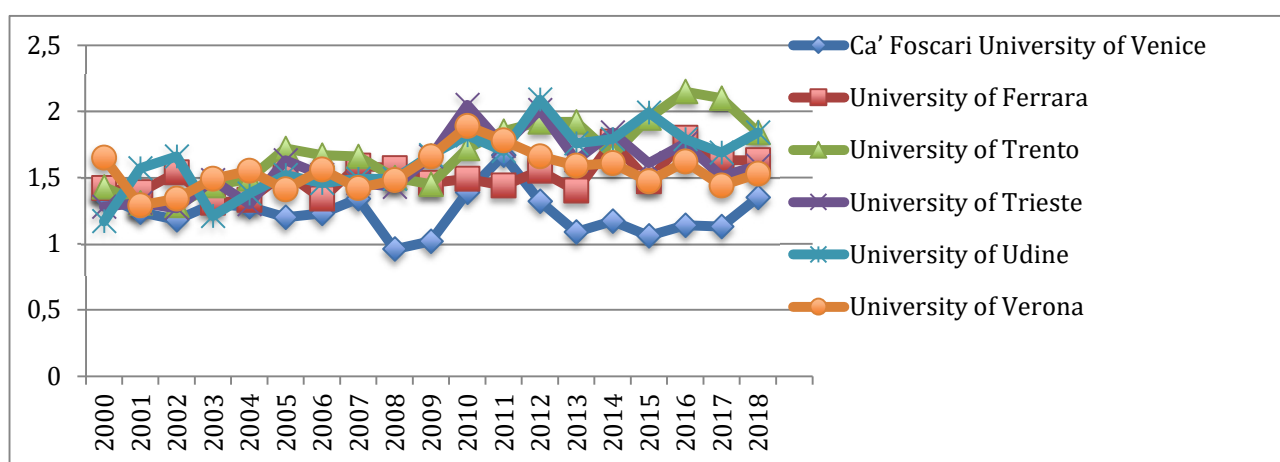


Figure 2: The Field-Weighted Citation Impact of Ca' Foscari University of Venice and 5 Universities taken as peers (Ferrara, Trento, Trieste, Udine, Verona) for the years 2000-2018 (Source: SciVal)

The outcome of this analysis at the University level clearly shows that that Ca' Foscari is underperforming in terms of the total output compared with our peers. This can be ascribed to the total number of researchers involved in the area of Science and Technology, that is significantly lower at Ca' Foscari as compared with its peers. However, Figure 2 clearly shows that this trend persists -- albeit at a much less extent, also for the

FWCI that is normalized by the size and the background field. These general framework will be relevant to understand the Departmental strategies that will be further elaborated below.

As anticipated above, the current main departmental endeavour hinges upon the improvement of the metrics reported in Figures 1 and 2, and mainly relying on the Natural and Life Science section. For this reason, a new initiative for establishing an additional technological research group mirrored by a new teaching major, denoted as 'Physical Engineering' and currently present only at the Politecnico of Milano and Torino, has been recently launched. In parallel, the Department has devoted a considerable attention to the recruitment of new faculties with specific background, mostly from abroad.

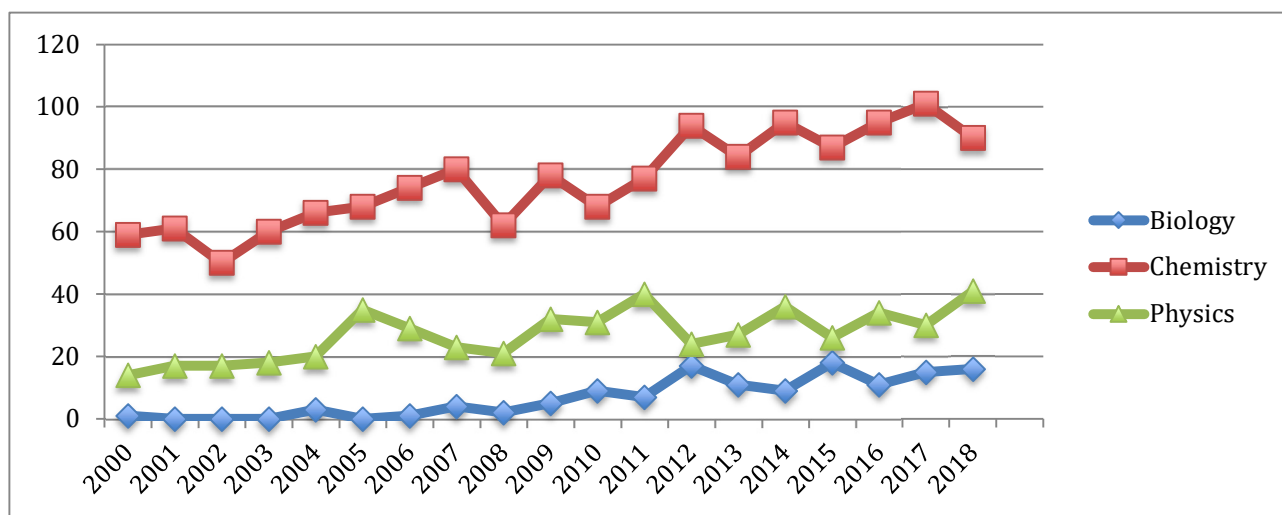


Figure 3: Total number of publications of DSMN differentiated for the three different macro areas Chemistry, Physics, and Biology for the years 2000-2018 (Source: SciVal)

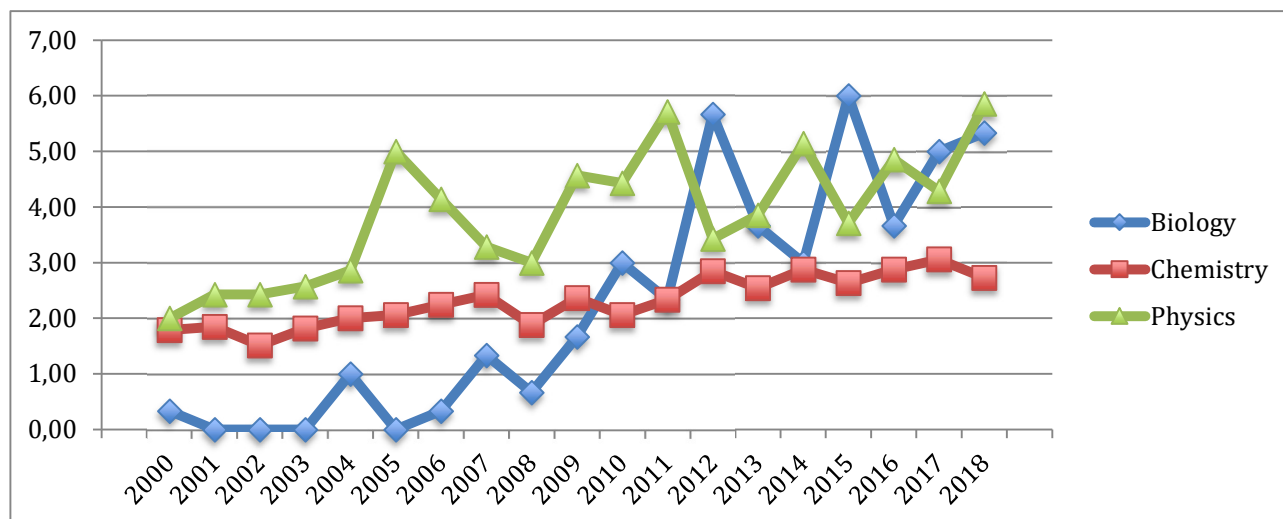


Figure 4: Total number of publications/person of DSMN differentiated for the three different macro areas Chemistry, Physics, and Biology for the years 2000-2018 (Source: SciVal)

Currently, there are 43 faculties in the Department, out of which 33 belong to the Chemistry field, 7 to the Physics field (including an ERC starting grantee in 2016), and 3 to the Biology field (all recently recruited). See Part II Section A for details on these points. In order to highlight the current performance of the Department, as well as its potential for the future, we have benchmarked these 3 areas within an international context,

using the same metrics as before, as well as additional ones that can be computed at this level of details. This is reported in Figures 3-5. Figure 3 depicts the total number of publications of the current members of the Department belonging to the three different areas (Chemistry, Physics, and Biology). In all three cases, a clearly increasing trend can be seen, with absolute values roughly proportional to the numerosity of the field. This can be more conveniently seen by plotting the total number of publication per person, as shown in Figure 4, again divided in the three areas of Chemistry, Physics and Biology. Clearly, the three performances are comparable with larger fluctuations in Biology and Physics due to the small numbers involved, and a smoother trend in Chemistry. The area of Biology appears to be particularly active, likely due to the fact that all three new faculties are rather young and hence at full steam toward an increasing future performance. The fluctuations in the Biology are also visible in the calculation of the FWCI (see Figure 5) that, as discussed above, is the most significant metric in such is independent of size and field. In all three cases, a value mostly above 1, in fact significantly above 1 in some cases, is visible. This clearly testifies that the strategy implemented by the Department in term of new recruitment has been, and will be producing a positive outcome. **A detailed description of the scientific production of the Department is provided in Part II Section B.**

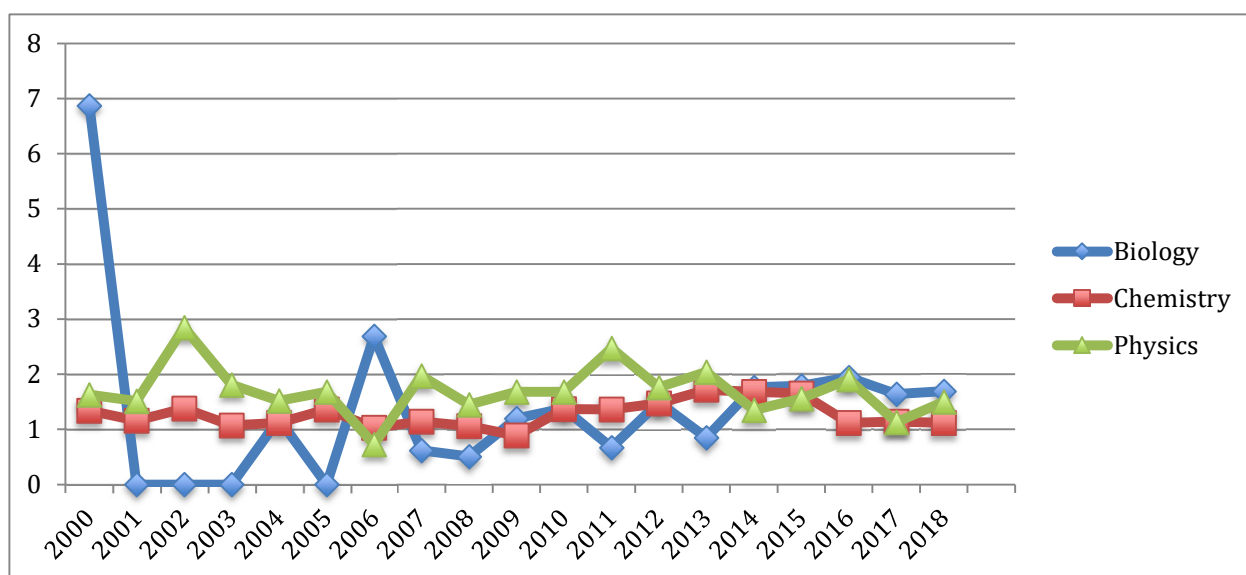


Figure 5: The Field-Weighted Citation Impact of the DSMN divided by the three main research areas (Chemistry, Physics, Biology) for the years 2000-2018 (Source: SciVal)

The Department has put a considerable effort in widening its international perspective. This has been accomplished by taking full advantages of all the opportunities offered by our international office (e.g. by scouting possible high level visiting scholars and professors), as well as through its own endeavour. Examples include in increased the number of members of the Department coordinating one Erasmus International Mobility Program, the establishment of an international PhD school with the Kyoto Institute of Technologies, as well as an improved protocol for the students applying for the Erasmus outgoing and incoming mobility. **Full details of these actions can be found in Part III Section E.**

Another major focus of the Department has been the establishment of a strong plan for the Third Mission. This has been addressed along two different lines. First and foremost on the technological transfer, where a number of links as well as common project have been implemented with small and medium enterprises (SMEs) at the regional and national level. Secondly, the Department has been increasingly engaged with

outreach activities such as, for instance, Science Gallery. **A detailed description of these activities can be found in Part III Section D.**

Our next task is to present the current performance of the Department, as well as to highlight the future strategy for the next years. As such, it will have a stronger focus on the future rather than in the past.

The Department of Molecular Science and Nanosystems (DSMN) strives to be a modern active Department fully dedicated to multidisciplinary studies, with three fundamental disciplines (Chemistry, Physics, and Biology) teaming up to address these studies.

As implicit in the name, a strong focus of the Department hinges on studies of nanomaterials with two specific challenges on nanomedicines and cultural heritage, as well as on Molecular Studies with a specific challenge focus on sustainability.

Challenge 1. Nanomaterials for Nanomedicine

Next generation of nanomedicine will rely on the application of innovative materials with unprecedented properties and performances. This will pave the way to the possibility of having a personalized therapy with very limited side effects. The multidisciplinary nature of the Department is perfectly suited to tackle this issue and DSMN has set this challenge as one of the three top challenges for the next three years. This challenge will operate in close contact with the Research Institute for Complexity, one of the six Institute of the [Research for Global Challenges](#) program established by Ca' Foscari University, as well as with the European Center for Living Technologies ([ECLT](#)), an international center involving 18 international partners and based in Venice where one Research Unit on [BioInspired Design](#) is involving a number of the Department members.

Challenge 2. Cultural Heritage 4,0

The city of Venice is the ideal benchmark for all studies related to Cultural Heritage, and this has always been a traditional topic at the Ca' Foscari University of Venice. However, the field has witnessed a major involvement of imaging techniques, the development of new and dedicated nanomaterials and adaptive gels, and the establishment of new dedicated large scale facilities.

In line with the University strategic plan, the Department will join the general effort in supporting studies and projects on Cultural Heritage. This will be carried out within [the Research Institute for Digital and Cultural Heritage](#), as well as in collaboration with the [Center for Cultural Heritage](#) a joint research center with the Italian Institute for Technology (IIT) fully dedicated to applications of modern nanotechnologies to cultural heritage studies. Here the challenge is to make the University in general, and the DSMN department in particular, a leading institution at the national and international level acting as a hub for attracting new and talented young scientists

Challenge 3. Sustainable and Green Chemistry

Green and Sustainable Chemistry represents an innovative and modern area of chemical research playing a fundamental rule in sustaining the world economy. As there is a strong connection between these studies and the establishment of key enabling technologies including **nanotechnologies**, these studies are perfectly suited for our Department and are carried out in close collaboration with the [Research Institute for Green and Blue Growth](#) and hence perfectly in line with the University Strategic Plan. This has been a traditional field of the Department, where several groups have already accomplished important achievements at the international level in the field of lignin, glycerol and other biomass valorization processes as well as chemical transformations in water.

Below, we provide a list of specific targets that the Department would like to achieve, along with the corresponding measurable indicators that we select to measure its accomplishment.

Target 1: Increase the fund raising activities with respect to previous year on a 3 years basis

Indicator for Target 1:

$P1 = \frac{[(\text{Number of presented projects 2017-2020}) - (\text{Number of presented project 2016-2019})]}{(\text{Number of presented projects 2016-2019})}$

$P1 \geq 5\%$

Target 2: Increase the number of publications appearing in the top 10% of the Subject Category with respect to previous year on a 3 years basis

Indicator for Target 2

$P2 = \frac{[(\text{Number of top 10\% papers 2017-2020}) - (\text{Number of top 10\% papers 2016-2019})]}{(\text{Number of top 10\% papers 2017-2020})}$

$P2 \geq 2\%$

Target 3: Increase Educational Programmes in Scientific disciplines respect to previous A.Y. on a 3 years basis

Indicator for Target 3

$P3 = \frac{[(\text{Number of scientific courses A.Y. 2017-2018/-2020-2021}) - (\text{Number of scientific courses A.Y.2016-2017/A.A.2019/2020})]}{(\text{Number scientific courses A.Y. 2017-2018/-2020-2021})}$

$P3 \geq 5\%$

Target 4: Increase of international Master end PhD courses with respect to previous year on a 3 years basis

Indicator for Target 4

$P4 = \frac{[(\text{Number of international Master and PhD courses 2017-2020}) - (\text{Number of international Master and PhD courses 2016-2019})]}{(\text{Number international MOU 2017-2020})}$

$P4 \geq 5\%$

Target 5: Increase the Departmental national and regional network with respect to previous year on a 3 years basis

Indicator for Target 5

$P5 = \frac{[(\text{Number of MOU with SME 2017-2020}) - (\text{Number of MOU with SME 2016-2019})]}{(\text{Number MOU with SME 2017-2020})}$

$P5 \geq 5\%$

PART II: Human resources and scientific production

Section A – Human resources

Subsection A.1 – Research Personnel

TAB I: FACULTY

ROLE	2016	2017	2018
Full Professors	9	7	10
Associate Professors	21	19	17
Researchers	11	10	9
Fixed-Term Researchers	3	5	6
TOTAL	44	41	42

Detected at 31 December of every year

(source: <http://cercauniversita.cineca.it/>)

TAB II: RESEARCH GRANT HOLDERS AND PHD STUDENTS

ROLE	2016	2017	2018
Research Grant Holders [Assegnisti]	10	17	14
PhD students	23	22	27

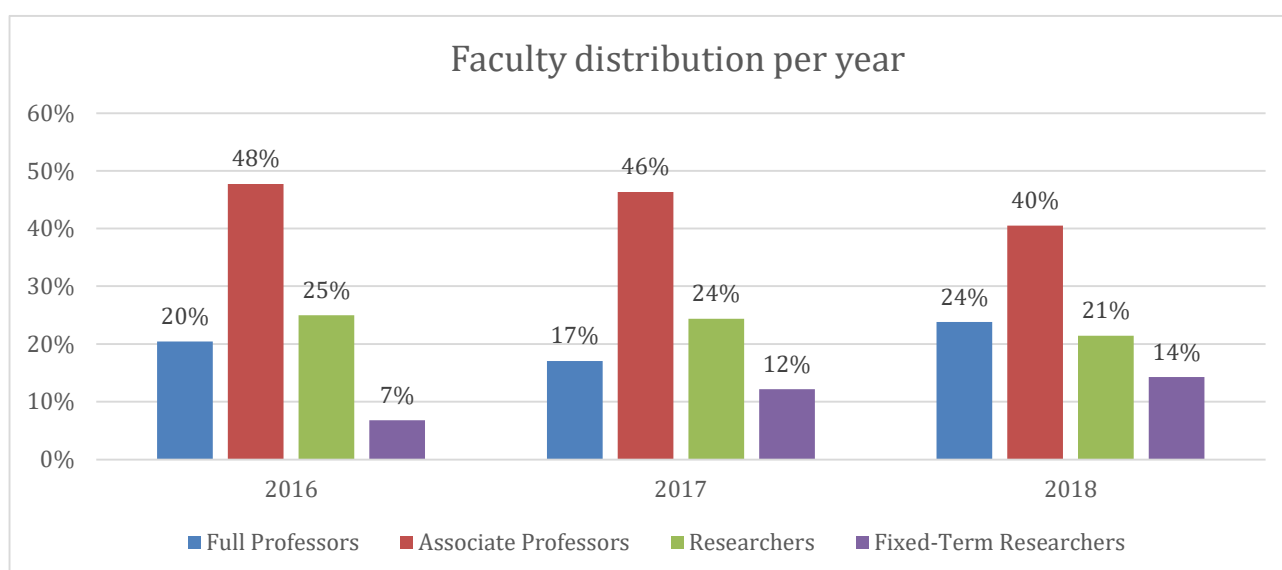


Figure 6: Distribution of the Faculty in terms of roles, for different years

TAB III: FACULTY - ACADEMIC DISCIPLINE

CUN SCIENTIFIC AREA	ITALIAN SSD - DESCRIPTION	2016	2017	2018
01 - MATHEMATICS AND INFORMATICS	MAT/05 - MATHEMATICAL ANALYSIS	-	-	1
02 - PHYSICS	FIS/01 – EXPERIMENTAL PHYSICS	3	3	3
	FIS/03 – PHYSICS OF MATTER	3	2	3
03 - CHEMISTRY	CHIM/01 - ANALYTICAL CHEMISTRY	5	5	6
	CHIM/02 - PHYSICAL CHEMISTRY	8	8	7
	CHIM/03 - GENERAL AND INORGANIC CHEMISTRY	8	8	6
	CHIM/04 - INDUSTRIAL CHEMISTRY	8	6	6
	CHIM/06 - ORGANIC CHEMISTRY	5	6	6
05 - BIOLOGY	BIO/07 - ECOLOGY	1	-	-
	BIO/10 – BIOCHEMISTRY	1	1	1
	BIO/11 - MOLECULAR BIOLOGY	1	1	1
	BIO/19 – MICROBIOLOGY	1	1	1
09 - INDUSTRIAL AND INFORMATION ENGINEERING	ING-IND/22 - MATERIALS SCIENCE AND TECHNOLOGY	-	-	1
	TOTAL	44	41	42

(source: <http://cercauniversita.cineca.it/>)

As anticipated, a significant turnover of the Faculty staff has taken place in the last 3 years, and is still ongoing as part of the Departmental strategy of reinjovinate the staff and open new fields. This is only partially captured in the data of Table I.

The Department has devoted a considerable attention to the recruitment of new faculties with specific background, mostly from abroad within an international context. In particular, three new young faculties have been hired in the Biology sector. In the framework of the new bachelor program, 'Physical Engineering', and in order to increase the scientific basis of the Department, new positions (a RTD/B and a full professor) have been filled in two important areas such as MAT/05 - MATHEMATICAL ANALYSIS and ING-IND/22 - MATERIALS SCIENCE AND TECHNOLOGY.

Additional insights can be obtained by considering the data of Table II for the Research Grant Holders (Post-docs) and the PhD students, where significant changes have occurred notwithstanding an almost constant number of both.

In 2017, the Department has launched a new international PhD programme "Science and Technology of Bio and Nanomaterials" in partnership with the Kyoto Institute of Technology (Kyoto, Japan), mostly supported by external public institutions and private companies. The Department offers also a fruitful joint PhD Program in Chemistry with Dipartimento di Scienze Chimiche e Farmaceutiche of Università di Trieste that in 2019 has

become an international PhD programme thanks to the presence in the board of seven top scientists from all over the world (UK, France, Netherlands, Spain, Switzerland, Austria and Australia). The data reported in Table II about the number of PhD students account for both doctoral programmes.

As for the Post-doc, an important point worth emphasizing is the increased number of positions supported by private grants, e.g. from Companies through internal agreements.

Section B - Scientific production (2016-2018)

Subsection B.1 – Overall scientific production

This section reports the details of the analysis summarized in Figures 3-5 of Section A, regarding the scientific output of the Department. Table IV illustrates the different venues selected for the scientific output, showing once again that Journal articles is the main focus of the Departmental scientific production. While the total number of publications per year in journals have decreased from 157 to 147, the number of publications in journals per year and per Faculty has remained constant to 3.5 from 2016 to 2018, showing that this decrease was the result of the decrease in the Faculty population (Table I)

TAB IV: TOTAL SCIENTIFIC PRODUCTION¹

ARCA CLASSIFICATION	2016	2017	2018	TOTAL
Books	0	0	1	1
Journal articles	157	145	147	449
Book parts	14	5	4	23
Conference proceedings	2	5	1	8
Book editing activities	-	-	-	-
Patents	10	8	4	22
Other	-	-	-	-
TOTAL	183	163	157	503

TAB V: DEPARTMENTAL SCIENTIFIC PRODUCTION DETAILS

	2016	2017	2018	TOTAL
Scopus publications ²	151	144	146	441
Publications in English ³	148	134	137	419

¹ Source: [University Repository ARCA](#). Only publications with an ISBN/ISSN code have been considered. Conferences abstracts and posters have been **excluded** from the count of Conference Proceedings. Date of recognition: 28.10.2019

² Source: **Scopus**, all document type.

³ Source: **ARCA**.

OTHER INDICATORS OF INTEREST OF THE DEPARTMENT (OPTIONAL)

The Department, in accordance with already established rules, will continue to adopt the criteria defined by the International scientific community for the evaluation of the research, taking into account the bibliometric sectors (only articles indexed in Web of Science (WoS)/Scopus databases).

In particular the number of articles published per year, the Journals' quality considering the impact factor parameter, IF (belonging to the first decile of each subject category), the number of total citations of the published articles and Hirsch index (h index) are periodically monitored and evaluated.

As alluded previously, a total of 150 indexed publications per year has been achieved despite a 10% decrease in the number of researchers in the 2016-2018 period ([See Part II Section A for details on this point](#)), with a percentage between 30% and 36% of them being in the Top 10% Journals (Scientific Journal Rankings, Top 10 SJR%).

As essentially the whole scientific production of the Department is indexed in the main international databases, indicators such as the percentage of articles registered on WoS and Scopus make little sense in this context. Rather, a major goal had been set for 2018 of at least 100 publications with 30% in the Top 10 SJR% ([for details see also Piano Triennale](#)). This goal has been successfully achieved, with 53 publications out of 146 falling within this category corresponding to 36.4% of scientific production.

The Department is aiming to further increase the total number of publications, while at the same time striving to improve the quality of the scientific products and also carefully considering the type of Journals to publish in, selecting those with a higher impact factor.

An indicator used to monitor and incentive the number and quality of publications and which takes the above parameters into account is the internal funding that the Department allocates annually for research, ADIR (for the details see also the ADIR guidelines and Piano Triennale). Among the criteria for access to the ADIR funds, a minimum number of publications of 3 and a maximum of 15 in the three-years period of reference has been proposed. The publications, most of which are assessed with a bibliometric method and indexed on either WoS or Scopus databases, are divided into 10 classes (deciles) per subject category that takes into account the average impact factor over 5 years, and each of these classes is associated with a percentage score. A score is assigned to each bibliographic repertoire: the maximum score, obtained from the sum of bibliometric and non-bibliometric products per researcher, is 1500 points. This algorithm is parameterized so that more productive researchers are supported more than less productive ones.

This strategy appears to be rewarding: the number of pro-capite publications has increased over the years, both in absolute terms and in terms of the fraction of peer-reviewed publications indexed in either Scopus or WoS. This ensures that these funds are invested on Faculty members who guarantee an optimal return in terms of publications and patents. A specific strategy to help and stimulate low-performing Departmental members has also been implemented.

Additional identified indicators hinge on, performance of the new recruited Faculty staff and the number of publications related to the new interdisciplinary research lines.

The Department Research Committee periodically monitors the scientific publications of all the Department members, proposing improvement solutions to increase their quality. In particular, work is being undertaken to monitor publications in view of the new "Valutazione della Qualità della Ricerca" (VQR3), which will focus on the 2015-2019 period.

Figure 7: ASJC Subject Category distribution 2016-2018

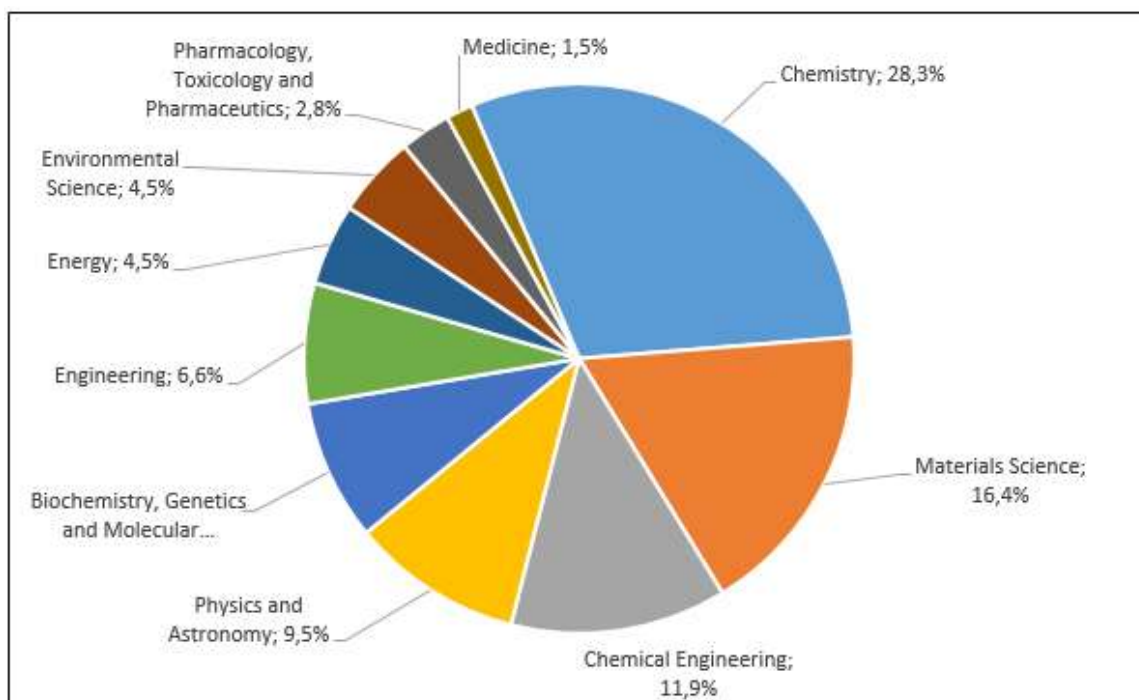
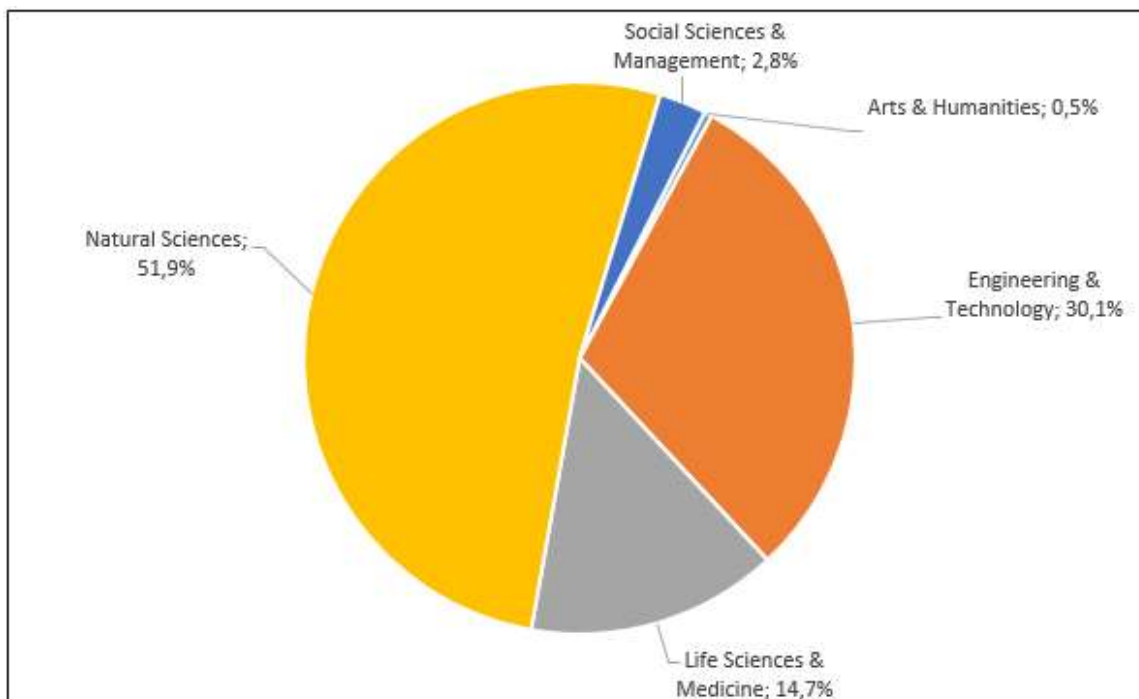


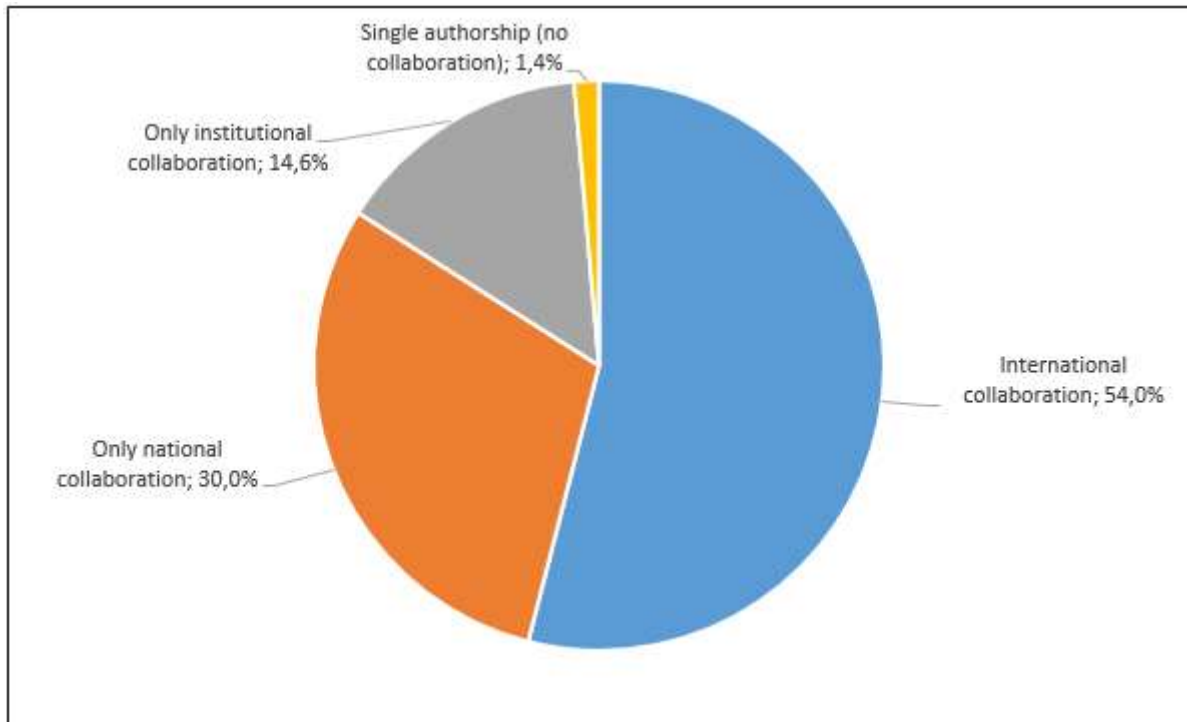
Figure 8: QS Subject Category distribution 2016-2018



TAB VI: Scopus scholarly output by amounts of international, national and institutional collaboration

Collaboration	%	Scholarly Output 2016-2018	Citations	Citations per Publication	Field-Weighted Citation Impact
International	54.0%	225	2285	10,2	1,53
Only national	30.0%	125	940	7,5	1,06
Only institutional	14.6%	61	281	4,6	0,89
Single authorship	1.4%	6	16	2,7	0,86

Figure 9: Scopus scholarly output by amounts of international, national and institutional collaboration



Subsection B.3 – Bibliometric analysis by Faculty role

By SciVal – Benchmarking Module. Document type: Articles; Books; Book chapters; Conference papers; Reviews

Faculty detected at: 31.12.2018

TAB VII: Scientific production: three-year period 2016-2018

FACULTY	In staff	In Scopus	Scopus scholarly output	Citation count (2016-2018)	Citation per publication	FWCI (2016-2018)	Top 10 citation percentile (%)	Top 10 CiteScore (%)	Top 10 SJR (%)	Top 10 Snip (%)
Full Professors	10	10	140	1448	10.3	1.4	29.3	52.3	50.8	18.9
Associate Professors	17	17	192	1454	7.6	1.13	22.9	35.7	29.6	12.8
Researchers	9	9	88	476	5.4	1.07	14.8	23.1	19.2	5.1
Fixed-Term Researchers	6	6	70	645	9.2	1.4	35.7	40.9	48.5	19.7
OVERALL	42	42	400	3500	8.8	1.29	26.5	40.5	38.2	15.9

Faculty detected at: 31.12.2018

TAB VIII: Scientific production: 2018

FACULTY	In staff	In Scopus	Scopus scholarly output	Citation count	Citation per publication	FWCI	Top 10 citation percentile (%)	Top 10 CiteScore (%)	Top 10 SJR (%)	Top 10 Snip (%)
Full Professors	10	10	44	229	5.2	1.55	31.8	50	52.5	22.5
Associate Professors	17	17	67	279	4.2	1.15	28.4	31.7	33.9	18.3
Researchers	9	9	31	101	3.3	1.33	29	18.5	18.5	3.7
Fixed-Term Researchers	6	6	30	151	5.0	1.42	40	44.4	44.4	18.5
OVERALL	42	42	134	572	4.3	1.34	30.6	35.2	36.4	18

Faculty detected at: 31.12.2017

TAB IX: Scientific production: 2017

FACULTY	In staff	In Scopus	Scopus scholarly output	Citation count	Citation per publication	FWCI	Top 10 citation percentile (%)	Top 10 CiteScore (%)	Top 10 SJR (%)	Top 10 Snip (%)
Full Professors	7	7	29	221	7.6	1.01	20.7	57.1	46.4	27.6
Associate Professors	19	19	59	464	7.9	1.06	13.6	34.5	21.8	5.4
Researchers	10	10	28	143	5.1	0.95	7.1	20.0	16.0	8.0
Fixed-Term Researchers	5	5	17	164	9.6	1.41	35.3	43.8	43.8	18.8
OVERALL	41	41	107	845	7.9	1.14	17.8	39.0	30.0	13.9

Faculty detected at: 31.12.2016

Scientific production: 2016 (TAB X)

FACULTY	In staff	In Scopus	Scopus scholarly output	Citation count	Citation per publication	FWCI	Top 10 citation percentile (%)	Top 10 CiteScore (%)	Top 10 SJR (%)	Top 10 Snip (%)
Full Professors	9	9	29	236	8.1	0.76	17.2	24.1	20.7	0.0
Associate Professors	21	21	65	578	8.9	0.98	16.9	29.8	30.4	3.6
Researchers	11	11	32	257	8.0	0.93	9.4	34.5	24.1	6.9
Fixed-Term Researchers	3	3	16	266	16.6	1.84	37.5	66.7	66.7	46.7
OVERALL	44	44	106	1065	10.0	1.09	18.9	35.4	33.7	10.5

Subsection B.4 - Scientific production of newly recruited and promoted researchers in the three-year period

TAB XI: NEWLY RECRUITED RESEARCHERS

ENTRY ROLE AT CA' FOSCARI	Number	ARCA products ⁴	Products indexed in Scopus ⁵
Full Professors	2	59	56
Associate Professors	1	12	17
Fixed-Term Researchers	6	74	70

TAB XII: PROMOTED RESEARCHERS

AQUIRED ROLE AT CA' FOSCARI	Number	ARCA products	Products indexed in Scopus
Full Professors	3	44	36
Associate Professors	3	36	34
Fixed-Term Researchers/Type B	-	-	-

It is possible to see in TAB XI that in this three-year period the Department has recruited 9 new researchers in all the three roles. A particular attention has been paid for young Fixed-term researchers. From the Table it is evident that all the newly recruited personnel are very active in scientific production, that is also mainly indexed in Scopus.

As regard as promoted researchers see in TAB XII, both Full and Associate Professors have been recruited. It is possible to check that everyone has good scientific products.

⁴ Source: **ARCA** Repository. Only publications with an ISBN/ISSN code have been considered. Conferences abstracts and posters have been **excluded** from the count of Conference Proceedings. Downloaded on: 28.10.2019

⁵ Source: **Scopus**.

NEWLY RECRUITED AND PROMOTED RESEARCHERS - BIBLIOMETRIC ANALYSIS

By SciVal – Benchmarking Module. Document type: Articles; Books; Book chapters; Conference papers; Reviews

Newly recruited researchers in the three-year period 2016-2018

TAB XIII: Scientific production: three-year period 2016-2018

FACULTY	In staff	In Scopus	Scopus scholarly output	Citation count (2016-2018)	Citation per publication	FWCI (2016-2018)	Top 10 citation percentile (%)	Top 10 CiteScore (%)	Top 10 SJR (%)	Top 10 Snip (%)
Full Professors	2	2	56	874	15.6	1.81	46.4	70.0	70.0	25.5
Associate Professors	1	1	17	121	7.1	1.24	29.4	36.4	45.5	25.0
Fixed-Term Researchers	6	6	70	645	9.2	1.4	35.7	40.9	48.5	19.7
OVERALL	9	9	143	1640	11.5	1.54	39.2	52.0	56.7	22.5

Promoted researchers in the three-year period 2016-2018

TAB XIV: Scientific production: three-year period 2016-2018

FACULTY	In staff	In Scopus	Scopus scholarly output	Citation count (2016-2018)	Citation per publication	FWCI (2016-2018)	Top 10 citation percentile (%)	Top 10 CiteScore (%)	Top 10 SJR (%)	Top 10 Snip (%)
Full Professors	3	3	36	203	5.6	1	13.9	35.3	35.3	14.7
Associate Professors	3	3	34	273	8.0	1.23	32.4	41.9	40.0	22.6
Fixed-Term Researchers (Type B)	0	0	-	-	-	-	-	-	-	-
OVERALL	6	6	69	476	6.9	1.13	23.2	39.1	38.1	18.8

Subsection B.5 - Researchers with no scientific production⁶

NONE RESEARCHERS WITH NO SCIENTIFIC PRODUCTION

NONE RESEARCHERS WITH NO SCIENTIFIC PRODUCTION RECRUITED/PROMOTED IN THE THREE-YEAR PERIOD 2016-2018

COMMENTS CONCERNING THE CRITICAL ISSUES (IN PARTICULAR AS REGARDS RESEARCHERS WITH NO SCIENTIFIC PRODUCTION)

The pro-capite productivity of DSMN researchers has increased steadily over the years, both in absolute terms and in terms of the fraction of peer-reviewed publications indexed in either Scopus or WoS, indicating that the policies for helping low-performing members (also favoured by retirements) combined with the ADIR funds on a meritocratic basis have yielded measurable positive results.

In fact, it can be noticed that no Faculty members at any level (full professors, associate professors, researchers and fixed-term researchers) display a null scientific production over the three-year period 2016-18.

⁶ Researchers with no scientific publications in the three-year period (source: University Repository ARCA)

PART III: Resources, incentives, actions

Nelle sezioni e nei quadri della Parte III il Dipartimento specifica quante risorse proprie sono state dedicate alla ricerca, con quali criteri sono state distribuite, che risultati sono stati ottenuti.

Section A – Departmental research funding

----- Linee guida per la compilazione

Indicare come sono distribuite le risorse dipartimentali per la ricerca (ad esempio mettendo un link al regolamento ADIR), quali sono stati i risultati delle assegnazioni e i criteri di valutazione degli stessi.

As detailed in a [dedicated document](#), as well as in Part II, Section B the Department has an established strategy to distribute the internal funding (ADIR) along the lines established by the University general rules. Generally speaking, the aim was twofold. On the one hand, it is believed that every member of DSMN should have a small dedicated budget that can be used to trigger additional activities (for instance to promote international collaborators and partnerships) for an impact research. On the other hand, the distribution among different researchers should reflect the ability to reach out such additional activities. Therefore, the general algorithm was parameterized so that more productive researchers were supported more than less productive researchers. This strategy appears to be rewarding as the number of pro-capite publications is increasing in the 2018 respect 2017 in terms of the fraction of peer-reviewed publications indexed in either Scopus or WoS, as detailed in Part II Section B..

Section B – Funding for research grants and scholarships

----- Linee guida per la compilazione

Indicare eventuali regolamenti/criteri dipartimentali di assegnazione delle risorse per assegni (Research grant positions) e borse di ricerca (Post-doc scholarships). Fornire ad esempio il link al regolamento considerato, descrivere quali sono stati i risultati delle assegnazioni e i criteri di valutazione degli stessi.

As mentioned earlier, the Department is funding a number of Research Grants most of which supported by external grants, as outlined in the Table of Subsection B.1. In the case of Departmental support, a minimum of 30% co-funding is requested to the group proposing the fellowship. In all cases, the evaluation assessment of the candidates is carried out along the general University guidelines.

TAB XV: Subsection B.1 – Research Grant Holders

Research grant holder	SSD	Research Topic	Funding sources
Roberto Sole (anni 2016-2017 - 2018 durata 36 mesi)	CHIM/04	Enhancement of Biomasses for the synthesis of Biopolymers to be used as tanning agents for the production of highly sustainable leather	EUROPEAN PROJECT LIFE BIOPOL € 72000
FACCHIN Manuela (2016)	CHIM/02	Synthesis and characterization of carbon dots for biomedical applications	PRIVATE (Brenta S.r.l.) € 45000
OTTINI RICCARDO (anni 2016-2017 durata 24 mesi)	CHIM/02	Study of the interactions between liquid steel and tinned refractories	PRIVATE (Acciaierie Venete) € 3000 + € 30000
CESELIN GIORGIA (2016)	CHIM/02	Spectroscopy and computational techniques for astrophysics, atmospheric and radio astronomy research	PRIN € 27372
KARIMIAN NAJMEH (2016)	CHIM/01	Development of molecularly imprinted polymers based on Au nanoelectrode ensembles for electrochemical determination of Perfluorooctane sulfonate (PFOS)	PRIVATE BIOFIELD € 24482
MENEGAZZO FEDERICA (anni 2016 2017 durata 24 mesi)	CHIM/04	Development of heterogeneous catalysts for the biorefinery of the future	PUBLIC INSTM € 23462 +23462
GASPARETTO GIULIA (2017)	CHIM/04	Green Organic Agents for Sustainable Tanneries	EUROPEAN PROJECT LIFE GOAST € 23462
SKRBIC TATJANA (2017)	FIS/03	Dynamics simulation of collision processes between glass vials	PRIVATE NUOVA OMPI € 26140
SPONCHIA GABRIELE (anni 2017 2018 durata 24 mesi)	CHIM/02	Design of synthesis models and scale-up simulations of organic and inorganic nanomaterials for new pharmaceutical formulations of products with antibacterial and antibiotic, anti-inflammatory, anti-tumor activities	PRIVATE BRENTA S.R.L. € 26000 + € 30000
GHEDINI ELENA (2017)	CHIM/04	Development of nanostructured metal catalysts	PRIVATE CASALE S.A. € 24000
PIETROBON LUCA (anni 2017 - 2018) durata 24 mesi)	CHIM/04	Synthesis of new polymeric materials to be used as consolidated and environmentally sustainable protective for the architectural restoration of cultural heritage	NATIONAL PROJECT SMART CITIES € 24000 + € 24000

AMBROSI EMMANUELE KIZITO (anni 2016 - 2017 - 2018 durata 36 mesi)	CHIM/02	Biomolecules for active targeting in teranostic devices	DSMN € 30000 + € 30000
ZUIN ALESSANDRA (2017)	CHIM/03	Study of the properties of the canapule for a biomaterial with high comfort for the building industry	FSE € 24000
BRAGA TOMMASO (2017)	FIS/03	MD simulation of vials on accumulation table with inelastic collisions	FSE € 24000
EMANUELE AMADIO (2017)	CHIM/06	Extractions with dense CO ₂ of natural products for applications in the cosmetic sector Preparation of high protection sun filters	FSE € 24000
LEONARDO LANFREDI (2017)	CHIM/02	Preparation of high protection sun filter	€ 24000
TANDUO ENRICA (2017)	CHIM/04	VeNICE: natural and innovative formulas for effective cosmetics in Veneto	FSE € 24000
TIEULI SEBASTIANO (2017)	CHIM/04	ELPIS - Enhancement of Lignocellulose Processing for Innovation and Sustainability	FSE € 24000
CAMPAGNOL DAVIDE (2017)	BIO/11	Development of biomolecular kits for monitoring PFAS and pesticides in agro-food products	FSE € 24000
CLAUDIO COSTANTINO (2017)	CHIM/01	Development of electrochemical sensors for monitoring PFAS and pesticides in agro-food products	FSE € 24000
BASSANI MARCO (2018)	CHIM/06	Regio- and stereo-selective fluorination of tensioned aromatic compounds	PRIVATE GALENTIS € 26000
TIEULI SEBASTIANO (2018)	CHIM/04	Characterization of leather shaving products through chemical - instrumental analysis	EUROPEAN PROJECT LIFE GOAST € 23786 + € 23786
GHEDINI ELENA (2018)	CHIM/04	HEterogeneous Robust Catalysts to Upgrade Low valuE biomass Stream (Hercules)	NATIONALE PROJECT PRIN 2015 € 26000
CONCA SILVIA (2018)	CHIM/04	Feasibility study for the recovery and recycling of synthetic waste material and population of an innovative digital database	POR - FESR PROJECT RIR – SARR € 23786
BARDELLA NOEMI (2018)	CHIM/04	Evaluation of possible recovery methods for construction waste, plastics or asphalts and population of an innovative digital database	POR - FESR PROJECT RIR – SARR € 23786
ENRICHI FRANCESCO (2018)	FIS/01	Treatment of artistic or design artefacts with synthesis	FSE € 23786

		techniques of thin nanostructured layers for the modification of the properties of the surfaces (gloss, roughness, color, opacity, hardness, stability, ...)	€ 24000
LORENZO BRANZI (2018)	CHIM/02	Characterization of piezoelectric polymeric nanocomposites for the generation of electric energy from movement	FSE € 24000
MIOLO MATTIA (2018)	CHIM/02	Polymeric fabrics shielding low frequency electromagnetic radiation: chemical-physical characterization of materials and screening tests in the laboratory	FSE € 24000
CAMPALANI CARLOTTA (2018)	CHIM/06	Green extractions with supercritical CO ₂ of processing waste from the confectionery sector	FSE € 24000
MANUEL MENEGHETTI (2018)	CHIM/03	Development of DSSC photovoltaic cells for the production of electricity by recovering the by-products deriving from the wine processing activities	FSE € 24000

TAB XVI: Subsection B.2 – Post-doc scholarships

Post-doc scholar	SSD (if available)	Research Topic	Funding sources
BACK MICHELE (2017)	CHIM/02	Study of new surface treatment processes using plasma technologies and their computerization	FSE € 12000
OLIVO ALBERTO (2017)	CHIM/04	Development of a photocatalytic process for CO ₂ reduction	PUBLIC INSTMI € 2800
LEONETTI BENEDETTA (2018)	CHIM/02	Development of new protocols to convey molecules with antimicrobial properties in the treatment of biofilms with the aim of overcoming the defense mechanisms manifested by these to traditional treatments	PRIVATE BRENTA SRL € 4861
GHENO GIULIA (2018)	CHIM/03	Study of the chemical-physical stability of innovative	MARGINI DSMN € 4756

		materials for applications in the field of conservation of cultural heritage and data processing	
CAILOTTO SIMONE (2018)	CHIM/06	Production and characterization of fluorescent materials starting from agro-industrial biomass called carbon quantum dots (CQDs)	PRIVATE FAVINI € 4500

(source: department data)

Section C – Other departmental actions for research support

Linee guida per la compilazione

In questa sezione vanno segnalati, ad esempio:

- (co-)finanziamenti per iscrizione a convegni, organizzazione di convegni, *proof-reading*, pubblicazioni su riviste ad alto impatto, *open access*, partecipazione a bandi europei ed internazionali;
- azioni di supporto alla ricerca che non prevedano la distribuzione di risorse a soggetti o a gruppi di ricerca specifici. Ad esempio: *Research Day*, Serie di *Working Papers*, Comunicazione della ricerca prodotta, seminari di Dipartimento, altri eventi.

	EU/ H2020	PRIN/ SIR/FIRB	ERC	MARIE CURIE	ATENEO /SPIN	LIFE/ INTRG	FSE	RIR	MAECI GALILEO	OTHERS
2016	2	0	0	5	10	1	6	0	0	0
2017	3	0	0	4	0	1	14	3	4+1	4
2018	1	15	0	4	6	5	9	0	2	6

Table XVII: number of presented projects within the period 2016-2018 divided by major typology.

(source: department data)

The above Table1 reports the number of presented projects within the period 2016-2018 divided by major typology, where we note an increasing trend both in terms of absolute number (from 24 in 2016 to 48 in 2018) and in focus of funding objectives. In 2018 one may notice an increasing attention toward (e.g. PRIN), as well as bilateral projects that testifies the departmental effort toward the international outreach (e.g. LIFE/INTRG, OTHER all international project).

Our Department is committed to take advantage of all possibilities of partnership and networking offered by various external sources. This includes the University Visiting Scholar Fellowship, as well as the Erasmus+

short term mobility program that our Department has established with Kyoto Institute of Technology (Japan), with University of Sydney (Australia), with Bar-Ilan University (Israel), and with INRS in Montreal (Canada). Several exchanges of DSMN members, post-docs and PhD students have already been taken place, and others are on their way.

Another opportunity is offered by the University Research for Global Challenges program that is supporting the association to European Research Networks. Our University is a partner of the [SoftComp](#) network that is supporting short term visits between two partners, as well as the free use of first-class infrastructural research facilities that can be triggering future collaboration within EU projects.

Conferences and seminars

The DSMN department is very active in organizing conferences and seminars. Over the years there has been a growth in these events. A list of conferences is given in [Appendix 1](#) to this document.

Co-funded events

A list of events funded by the DSMN is shown in [Appendix 2](#)

Section D – Other incentives

Linee guida per la compilazione

Indicare menzioni, premi alla ricerca, altre forme di incentivazione e premialità per attività di ricerca non incluse nelle sezioni precedenti.

Additional strategies have been taken to promote excellence in research, notably to stimulate publication in top 10% tiers international journals that appears the only quantitative indicator that can be monitored with a minor effort.

As a further evidence of the effort put in improving the quality of the publication of the faculty members, the Research Committee every year awards a member of the department for the best publication as corresponding author.

A word of caution is in order at this point. Due to budget constraints, the possibility of supporting many proposed initiatives has been lacking. This can be fully appreciated by looking at the details of the Departmental budget. The total Departmental income (FUDD) markedly decreases from 345k€ in 2016, to 311k€ of 2017, to 279k€ of 2018, out of which roughly half had already constrained allocation, and with the remaining part supporting the running teaching activities and the ADIR. No freely available funding were then left available for strategic decisions.

Section E – Internationalization actions

Linee guida per la compilazione

Indicare eventuali regolamenti dipartimentali di assegnazione delle risorse per finanziamento/concessione di mobilità internazionale *inbound* and *outbound* (ad esempio mettendo un link al regolamento considerato), quali sono stati i risultati delle assegnazioni e i criteri di valutazione degli stessi.

https://eacea.ec.europa.eu/erasmus-plus_en

Subsection E.1 – Incoming and outgoing scholars and professors

Istruzioni per la compilazione:

- *Visiting scholars Seminar activities*: il [Regolamento di Ateneo](#) prevede che i Visiting scholar, oltre all'attività di ricerca, possano tenere anche attività di tipo seminariale. In alternativa indicare "None";
- *Visiting professors Teaching activities*: Indicare gli insegnamenti tenuti dal Visiting professor, inclusi quelli di dottorato;
- *Funding Sources*: ad esempio: Department, Prin, H2020;
- *Outgoing professors/scholars Type of mobility / Type and duration of leave*: indicare ad es.: Sabbatical leave – 1yr, Dual appointment - permanent, Research leave – 3m (congedo per motivi di ricerca). Non riportare semplici missioni.

The Ca' Foscari University of Venice promotes and encourages the hosting of both Visiting Professors and Visiting Scholars to promote the visibility of the University at the international level. This has also been a major focus of the Department through the exchange mobility (both incoming and outgoing) of highly qualified foreign and Italian scholars and experts, with excellent scientific and professional CV. In both cases, activities are based on specific international agreements between universities or scientific institutions and Ca' Foscari. Specific activities for Visiting Professors and Visiting Scholar included:

- teaching and/or seminar activities within a university course;
- research and teaching activity.

The Department has fully taken advantage of these opportunity and has been very active in proposing and planning international mobility at all levels (junior and senior). In some cases, the visiting professors and scholars have also been involved in Panel Committees for PhD and Master thesis evaluation assessments.

A list of Visiting Professors or Scholars is given in [Appendix 3](#) to this document

Subsection E.2 – Other actions or internationalization incentives

New cooperation agreements between DSMN and three foreign universities and a research center have been signed over the past three years. Three of these agreements concern Latin America, i.e. two universities and an university-level research institute, while the other concerns an Asian university. These agreements will allow interaction between teachers and students of DSMN with their peers from the institutions involved. DSMN promotes the internationalization by new opportunities in education and research by welcoming teachers and students from abroad and supporting the mobility abroad of its teachers, researchers and students. The cooperation agreements between DSMN and foreign universities are:

1. **Institute of Chemistry (IQ) – São Paulo State University (UNESP), Araraquara, Brazil**
14/03/2017
prof. P. Ugo
2. **University of Caxias do Sul, Brazil**
13/04/2017
prof. L.M. Moretto
3. **CIDETEQ, México**
29/06/2017
Dr. A.M. Stortini
4. **Kyoto Institute of Technology, Japan**
17/01/2017
prof. A. Benedetti

In Table XX is reported the time duration of the agreements between DSMN and overseas institutions in terms of staff exchange, study degree and staff category. These agreements will reinforce the politic of DSMN, and consequently of UNIVE, in terms of internationalization, which is an important criterion for the grow and reinforcement of Ca' Foscari. The possibility to offer good quality scientific courses in English and updates of scientific contents is an attractive aspect for UNIVE and the foreign institution. A further aspect regards the opportunity for construction and/or implementation of scientific networks and consortiums which is important for funding and good quality.

TAB XVII: Overseas agreement between DSMN and foreign universities and institutes (*source: department data/*)

Country	University	DSMN Supervisor	Start dd/mm/yyyy	End dd/mm/yyyy	QS	THE	Staff exchange	NOTE DA REVISIONE R.B.	Study degree	Staff category	MATTER TO WHICH THE AGREEMENT IS LIMITED	NOTE
Australia	University of Sydney	Prof. Perosa Alvise	01/04/2013	01/04/2023	50	56	2 students per semester or 1 per academic year		Bachelor/master/PhD	Professor		
Korea	KOREATECH	Prof. Achille Giacometti	25/05/2016	24/05/2021	/	/	2 students per semester		Bachelor	Professor/Technical staff		
Japan	Kyoto Institute of Technology	Prof. Alvise Benedetti	11/01/2018	10/01/2023	/	/	6 students per semester or 3 per academic year	from 19/20				

Erasmus mobility has involved and will involve outgoing and ingoing students (TAB XXI). Across Erasmus mobility, DSMN and UNIVE promote the European mobility of bachelor's, master's and PhD students. As expected, the principal discipline involved is Chemistry, even if Biology is also considered. This remarks the fact that DSMN is open to interactions with other scientific disciplines as well as is also focused to improve the own courses. Last recruitments on DSMN demonstrate the interest of this department to offer new training courses in disciplines connected with chemistry, paying attention to the professional needs and scientific skills necessary to face the current challenges.

TAB XIX: Erasmus Agreement (*source: department data/*)

Coordinator DSMN E+ CF	Erasmus code	Host University	Host Department	Students per month	Codice ISCED		Validity
Benedetti Alvise	LT VILNIUS01	Vilnius University	Department of Inorganic Chemistry	2 x 6, 1 BD e 1 MD	0531	Chemistry	2015/2021
Benedetti Alvise	TR ANKARA01	Ankara University	Faculty of Natural Sciences	2 x 6, MD e PhD	0531	Chemistry	2014/2021
Benedetti Alvise	TR ISTANBU07	Yildiz Teknik University	Faculty of Arts and Sciences - Department of Chemistry	2 x 5	0531	Chemistry	2014/2021
Canton Patrizia	B NAMUR01	FUNDP - University of Namur	Faculty of Science	2 x 5, MD e PhD	0531	Chemistry	2014/2021
Canton Patrizia	D BERLIN01	Freie Universitaet Berlin	Department of Chemistry	1 x 5	0531	Chemistry	2014/2021
Canton Patrizia	E BARCELO02	Universitat Autònoma de Barcelona	Facultat de Ciències	2 x 5, BD e MD	0531	Chemistry	2014/2021
Fiorani Giulia	E TARRAGO01	Universitat Rovira i Virgili	Faculty of Chemistry	1 x 6, BD	0531	Chemistry	2014/2021
Pietropolli Charmet Andrea	F AVIGNON01	Université d'Avignon et des Pays de Vaucluse	Faculté des Sciences - SVT/Biologie/Agrosciences	1 x 10, MD	0531	Chemistry	2014/2021
Fiorani Giulia	G THESSAL01	Aristotle University of Thessaloniki	School of Chemistry	2 X 5, BD	0531	Chemistry	2014/2021
Canton Patrizia	SF KOKKOLA05	Centria University of Applied Sciences		2 x 5, 1BD e 1MD	0531	Chemistry	2019/2021
Canton Patrizia	UK BELFAST01	Queen's University of Belfast	School of Chemistry and Chemical Engineering	1 x 10	0531	Chemistry	2014/2021
Moretti Elisa	E VIGO01	Universidade de Vigo	Faculty of Chemistry	2 x 6	0531	Chemistry	2014/2021
Trave Enrico	P AVEIRO01	Universidade de Aveiro	Department of Biology	2 x 6, MD e PhD	0511	Biology	2014/2021
Giacometti Achille	SI NOVA-GO01	University of Nova Goriza	Faculty of Environmental Sciences	5 x 6, MD	0531	Chemistry	2015/2021
Selva Maurizio	E CORDOBA01	University of Cordoba	Faculty of Science	4 x 5, 2 BD e MD	0531	Chemistry	BRAND NEW
Moretto Ligia Maria	F BORDEAU58	Université de Bordeaux	Dept. of Chemistry	2 x 6, MD e PhD	0531	Chemistry	2014/2021
Polo Federico	UK SOUTHAM01	University of Southampton	Department of Chemistry	1 x 6, PhD	0531	Chemistry	2014/2021

PART IV: Assessment

Section A – External evaluation of Research activity

Subsection A.1 - Evaluation Unit

Evaluation provided by the Ca' Foscari Evaluation Unit (*Nucleo di Valutazione*)

Linee guida per la compilazione

Riportare giudizio del Nucleo di Valutazione. Indicare i verbali o le relazioni del Nucleo di Valutazione dove sono formulati i giudizi.

Evaluation Unit expressed an opinion on the research of the DSMN in the following documents:

1. Annual Report (2019) <https://www.unive.it/pag/11175/>
2. Minutes of the Hearing conducted jointly by Evaluation Unit and Presidio on 17/11/2017 (**Appendix 4**)

Review of the Department policies in the light of the Ca' Foscari Advisory Board comments on the "2018 Annual Research Report on Research activities"

Linee guida per la compilazione

Riflessione auto-valutativa del Dipartimento in relazione al giudizio del Nucleo di Valutazione e dei commenti dell'Advisory board di Ateneo relativi alla relazione dipartimentale di monitoraggio 2018 dell'attività di ricerca, **fornendo una risposta puntuale alle criticità sollevate dall'AB** e mettendo in campo delle azioni correttive, qualora il Dipartimento lo ritenga opportuno.

The Department fully acknowledges the criticisms and suggestions raised by the Advisory Board (AB) in connection with our previous 2018 Report.

Below, each criticism and suggestion will be reviewed and the Departmental corrective/improvement actions to comply with them will be discussed.

1. Department vision

The AB highlights the lack of a visionary plan and a long-term goal. In addition, it underlines how the numerous research activities pursued within our department, though potentially interesting and relevant, are not "under a common Departmental umbrella". The absence of a clear organization and a unified vision

of objectives, materials and methods worries AB more than the limited scientific productivity of some sectors. Nevertheless, the AB notes that within the department exist areas of research "characterized by significant academic quality". We are grateful to the AB for these comments and for raising these important points. As a matter-of-fact, Section A of this year Report was carefully planned to address these points. The opening of new research areas, the strive toward multidisciplinary fields, as well as the new recruitment plan, were all parts of the Departmental long-term plan. A significant retirement rate, the lack of specific dedicated resources for new experimental facilities, as well as the strong budget constraints inherited by previous administration, were all critical issues that the present administration had to cope with. The reinforces department collaboration with the recently established "Research Institutes for Global Challenges" will guarantee the interdisciplinarity and coordinate the research by fostering the collaborations among researchers with different skills within and outside the University.

2. Strategic lines

The Advisory Board highlights how some of the strategic areas indicated by the department are not present within the research lines of the different groups. For example, it is not clear which research group from our department could contribute to the Program for the Environment and Climate Actions (Life). The AB demands that the Department pays more attention to the definition of the strategic lines and formalizes better the contents using a simpler terminology. On the other hand, the AB praises the launch of the new doctoral course on nanomaterials for biomedical applications, an active and dynamic research area. The Department fully acknowledges the need of identifying key challenges for the next few years. Toward this goal, the Department has recently defined new strategies that are in line with the objectives of: *i*) the University's strategic plan, *ii*) the Italian nation (e.g. Development and Enhancement of National Technological Clusters) and *iii*) the Horizon 2020 Program (e.g. energy, health, nanotechnologies and advanced materials, biotechnologies), as well as the national one "PNR2015-2020".

Specifically, the Department has organized itself to tackle three major challenges

- 1: **Nanomaterials for Nanomedicine:** Nanomaterials, nano-biomaterials, self-aggregating systems and organometallic compounds for biomedical, sensorial, environmental and technological applications;
- 2: **Sustainable and Green Chemistry:** Green industries and chemicals; new chemistry for industry and the environment;
- 3: **Cultural Heritage 4.0:** New technologies, materials and analytical methods for cultural heritage

This choice has been patterned after the University strategy of focussing on a limited number of big challenges. Nanomaterials for Nanomedicine, Cultural Heritage 4.0, and Sustainable and Green Chemistry, are highly interdisciplinary topics, reflect the heterogeneity of the scientific disciplines present within the department, and have international consensus for being a challenge for the next decade. All three topics build on the existing knowledge as well as the expected expertise stemming from the new recruited Faculty staff. The strategic partnership with the National Cancer Institute (Centro di Riferimento Oncologico, CRO) in Aviano (Italy) and the Kyoto Institute of Technology (KIT) in Japan are clearly instrumental for point 1, in order to have a clinical partner. A significant investment (roughly 3M€) has been done for setting up a first rate Laboratory in Biochemistry and Molecular Biology, and to acquire a modern facility for electron microscopy in order to be internationally competitive on point 1. Point 2 has been a traditional area where a significant experience has been built over the past year, with more than one group being at the forefront of international research in this field. Point 3 has also being a traditional topic for our Department, but the strategic partnership that the University has developed with IIT has brought this endeavour to the next level.

Along these research lines, new teaching initiatives have also been launched, among which is worth mentioning the already mentioned BS program in Physical Engineering that is expected to be the first seed for the establishment of a new Engineering research area that was absent before.

3. Department staff

The Advisory Board is aware of the reduction of the department's staff during the reference period and how this may have impacted negatively on the scientific productivity. The AB requests that a detailed plan addressing the hiring of future staff in terms of number, degree of hiring and areas of research should be drawn up. The AB also demands that the department should plan opportunities of co-financing (e.g. in the case of ERC winners) and define start-up packages (additional funds and equipment) for newly recruited members.

The department has recently devoted a considerable attention to the recruitment of new faculties with specific backgrounds, mostly from abroad. In particular, three new young faculties (tenure-track assistant professor) have been hired in the field of biological science. In the context of the launch of the new bachelor's degree program in 'Physical Engineering', the Department, has recently opened two positions (a tenure-track assistant professor and a full professor) in the research areas of Mathematical analysis and Material science and technology. Importantly, an ERC starting grantee in the field of Physics has also been recruited in 2016. Given the limited financial resource provided to the department (<100.00 euro/year) we are currently unable to plan opportunities of co-financing as well as start-up packages for newly recruited members in addition to those already offered by the University to all new recruited staff. Moreover, the recruitment of additional members is currently affected by the limited spaces and infrastructures available at the host site. To encourage recruitment, efforts will be made to setting up new research laboratories with adequate equipment to be assigned to any new appointed staff.

4. Productivity and quality of the scientific research of the department

The Advisory Board highlights how in the recent years there has been a steady decline in the scientific production of the Department and underlines how this decline is in contrast with the other departments at Ca' Foscari. The AB is aware of the reduction of the department's staff and acknowledges the high dynamism and competitiveness of the scientific area compared to other research areas in Ca' Foscari. However, the AB points out, the overall quality of scientific products and productivity is quite low and should be addressed as soon as possible. In this regard, the AB criticizes the excessive emphasis put on the number of published scientific works while no additional information is reported on the quality and the international impact of the scientific works. For example, the AB requires that in addition to the absolute number of publications, the number of citations per component of the department or per article should be taken into account. In addition, the AB demands that other impact measures should be taken into account (e.g., invited keynote presentation, licenses, startups, policy contributions etc).

We have already addressed these important points in Part II Section A-B, as well as Part III, Sections A-D. The department acknowledges that the productivity is still declining (number of articles published per year 183 in 2016, 163 in 2017 and 157 in 2018). However, despite a significant drop (10%) in the number of researchers in the 2016-2018 period the Department's total production has not changed substantially and a clear improvement in the quality of the publications has been observed with a percentage between 30% and 36% of the scientific works published in the Top 10% Journals (Scientific Journal Rankings, Top 10 SJR%). Importantly a slight increase in the total number of publications per faculty member (see table XII) and for the Field Weighted Citation Impact index has been observed (1.14 in 2016 to 1.35 in 2018) indicating an improvement of the impact of the research of the department. To further increase the total number of

publications, while at the same time striving to improve the quality of the scientific products (higher impact factor Journals), the department awards a prize to the first or last author of the best publication of each year.

5. Competitive funding

The Advisory Board appreciates the improvements as regards the ability of the department to attract external funding (funding per staff member is strongly increasing). However, the AB emphasises that the external funding and the number of doctoral fellowships are still very low and demands that immediate actions should be taken in this direction. We have already followed this recommendation in the past year. Indeed, as reported below in section IVB, the overall external funding collected by all the members of the department showed a marked increase with 68500 euro in 2016 to 164200 euro in 2018. To encourage fund raising activities of internal members, the Department has decided to support the participation of the researchers in international research projects by co-financing research doctorate grants. To further improve the attractiveness and increase the number of doctoral fellowships available, the Ca' Foscari university has planned to provide additional research funds to those researchers responsible for project proposals submitted on competitive call which, despite not having obtained funding, achieved a score in the final evaluation exceeding the minimum approval threshold. Rewards will instead be given to those researchers in charge of a proposal that has been financed. The winners of an award can opt for a salary top-up or for an incentive as research funds, with the possibility of sharing it with the other members of the research group who contributed to the development of the proposal. Few faculty members have already benefitted from this possibility.

6. Use of departmental funds to encourage the productivity and the quality of the research

The Advisory Board appreciates the introduction of a dedicated departmental award as an incentive mechanism to enhance the productivity and the quality of the research but complains about the lack of information regarding the mechanisms and the economic entity of the award itself. The AB proposes other actions to stimulate the productivity and the quality of the research such as: advancements of career, workload balancing, allocation of department funds to meriting researches that aim at starting a new line of research, access to doctoral scholarships and research leave.

The department acknowledges the lack of information regarding the mechanisms and the economic entity of the award. The award (~2000 euro) is given to a researcher who has published a high impact factor publication and for which her/his contribution was significant (first or last author). As discussed in Part III Section D, strong limitations on the freely available Departmental funding sadly prevented additional actions to be considered.

Section B – Self-evaluation of Research activity

Subsection B.1 - Indicators

Linee guida per la compilazione

Riportare eventuali indicatori (e i loro valori) che vengono utilizzati in fase di autovalutazione differenti da quelli già presentati nella Parte II. Ad esempio, gli indicatori considerati nei piani di sviluppo triennali dei dipartimenti e criteri specifici (anche quantitativi) di valutazione.

To better evaluate the amount and quality of the scientific production and the fund-raising ability of the department, it proves convenient to discuss a series of parameters normalized by the number of faculty members. Specifically, below are reported a table with the total number of publications per faculty member, the same eliminating multiple authorship and the number of high quality publications (top 10% Scopus/WoS, class A papers ANVUR) per faculty member again attributing each paper to one author and the Field Weighted Citation Impact index.

TAB XX: number of publications per faculty member

Year	n° faculty members	n° citation/ publication	n° citation/ faculty member	n° papers/ faculty member	Field Weighted Citation Impact index
2018	42	4.3	13.6	3.5	1.34
2017	41	7.9	20.6	3.5	1.14
2016	44	10	24.2	3.4	1.09

Other two tables show the external fund-raising ability per faculty member while a final table reports the normalized number of research grant holders and PhD students.

TAB XXI: external fund-raising ability per faculty member

Year	n° faculty members	Euro / n° faculty members
2018	42	31986
2017	41	4005
2016	44	2453

TAB XXII: number of research grant per faculty member

Year	n° faculty members	n° research grants/ n° faculty members	n° PhD students/ n° faculty members
2018	42	0.33	0.64
2017	41	0.41	0.46
2016	44	0.23	0.45

Subsection B.2 – Review of the Departmental Research activity (analysis of results) and improvement actions

In the period considered for the evaluation, first of all it should be noted that all the faculty members published at least one work in the 2016-2018 period, therefore no inactive members are present in the department. Even though this is clearly not a proxy of quality, this value will be monitored in the upcoming 2015-2019 national VQR evaluation. An action devoted to the involvement of all the faculty members in the research activities has been carried out leading to this positive result.

The overall number of publications showed a decrease from 183 to 157 products in the three year period (in particular for book chapters and patents), which only marginally reflects the small decrease of faculty members.

For normalized data, the total number of Scopus papers present in the ARCA database per faculty member shows basically a constant value over the years, from 3.4 papers/faculty member in 2016 to 3.5 papers/faculty member in 2017 and 2018.

Moreover, the quality of the research products evaluated considering the Field Weighted Citation Impact index shows a substantial increase from 1.14 in 2016 to 1.35 in 2018 indicating an improvement of the impact of the research of the DSMN. This effect occurred even though DSMN had a small contraction of the number of faculty members in the same period that caused in some specific disciplines an increase of the teaching activities for the remaining members and this contributed to the overall workload.

Additional data analysis concerning the scientific productivity with respect to the role covered by the faculty members (subsection B.3), clearly underlines that full professors and fixed-term researchers are responsible both for a large number of citations and papers per faculty member as well as for the number of citations per paper. Moreover, fixed-term researchers contribute substantially to the top 10 citation percentile. This analysis underlines a marked difference between fixed-term and traditional researchers, raising the necessity to spur all researchers but fixed-term to improve both the number and quality of their publications. An action therefore urges to address this point. One possible strategy that is being considered hinges upon the assignment of small extra funding for collaborative projects involving less productive researchers together with more productive faculty members, with positive effects for both of them and for the overall scientific production of DSMN.

The scientific production of DSM is also unequivocally affected by the aging of the scientific instrumentation, especially the more expensive and sophisticated ones like SEM, TEM and partially NMR. For all the period of time under investigation (2016-2018) the entire department did not have high quality and high resolution mass spectrometry instrumentation like MALDI, ESI, TOF as specifically raised also in the previous report. It is worth to note that, thanks to a local financing programme (progetto Città di Venezia) as well as a special funding program for large instrumentation decided by the university as a response to the request of the department, the lack of competitiveness due to outdated instrumentation will certainly be overcome in the next years (the first MS instrumentation were installed in mid-2019 and larger instrumentation are going to be acquired in 2020). It is likely to expect that in few years the scientific productivity of all faculty members will improve, also thanks to new internal collaborations with the recently hired staff, with positive effects on number and quality of the publications.

In the time period 2016-2018 it is also worth to note that a huge amount of work has been dedicated to the re-modeling of the courses offered by DSMN (new degree in English and new PhD programme in Bio and Nanomaterials) that involved many faculty members that are part of the teaching and research commissions,

PhD programme and others. DMSN was also interviewed during a CEV evaluation and for the preparation of this event, several faculty members were fully involved for several weeks. This caused an overload of work for a large number of faculty members that had unequivocally a detrimental effect on scientific productivity. The normalized value of research grant holders per faculty member shows a large fluctuation from 0.23 in 2016, to 0.41 in 2017 to 0.33 in 2018. This parameter is largely sensitive to local and national funding programme and because of this it can largely fluctuate over time. On the contrary, thanks to the institution of the new PhD programme in Science and Technology of Bio and Nanomaterials, the overall number of PhD students per faculty member substantially increased from 0.45 in 2016 to 0.64 in 2018 (first year of the new PhD programme). In the next years this value is likely expected to increase, aiming to an average number of total PhD students of 30 for the DSMN.

The overall external funding collected by all the members of the department showed a marked increase with 68500 euro in 2016 to 1343400 euro in 2018, increasing of more than one order of magnitude the external funding (see subsections B.1 and B.2 of the present document). The results is partially due to fundings of newly recruited faculty members, but the overall effort put by all the department is even more evident normalizing the external funding by the number of members, with 1450 euro/ faculty member in 2016 and up to almost 32000 euro/ faculty member in 2018. This effect is due to an increasing trend both in terms of absolute number and size of funding targets (See table concerning external funding projects in section C).