



Università
Ca' Foscari
Venezia

Presidio della Qualità
di Ateneo

2018 Annual Research Report Department of Molecular Sciences and Nanosystems

Reference period 2015-2017

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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.

Department Development Plan: Analysis and development perspectives of the DSMN: December 2017.

The following general topics, in agreement with the strategic plan of Ca' Foscari, describe the specific and inter-disciplinary research activities of the Department.

Topic 1: Nanomaterials, nano-bio materials and organometallic compounds for biomedical, sensor, environmental and technological applications;

Topic 2: Green Industry and Chemicals, New Industrial and Environmental Chemistry;

Topic 3: New Technologies, Materials and Analytical Method for Cultural Heritage Applications.

The objectives of the department are:

- To use in the best way the wide turnover of the retirements in order to select, from Italian and foreign Universities, new personnel with a very high scientific profile able to develop new projects in the framework of the strategy of the department.

See also

1. Piano Triennale DSMN 2016/2018, 2) its update, and 3) Analisi di sviluppo del DSMN December 2017.
 1. (http://www.unive.it/pag/fileadmin/user_upload/dipartimenti/DSMN/documenti/AQ_dipartimento/piani_e_regolamenti/doc_prog/Piano_triennale_DSMN.pdf);
 2. [http://www.unive.it/pag/fileadmin/user_upload/dipartimenti/DSMN/documenti/AQ_dipartimento/piani_e_regolamenti/doc_prog/Piano di Sviluppo di Dipartimento 2016-2018 aggiornamento 2018.pdf](http://www.unive.it/pag/fileadmin/user_upload/dipartimenti/DSMN/documenti/AQ_dipartimento/piani_e_regolamenti/doc_prog/Piano_di_Sviluppo_di_Dipartimento_2016-2018_aggiornamento_2018.pdf)
 3. ([http://www.unive.it/pag/fileadmin/user_upload/dipartimenti/DSMN/documenti/AQ_dipartimento/piani_e_regolamenti/doc_prog/Analisi di sviluppo del DSMN dicembre 2017 presentato senato 27.09.2017.pdf](http://www.unive.it/pag/fileadmin/user_upload/dipartimenti/DSMN/documenti/AQ_dipartimento/piani_e_regolamenti/doc_prog/Analisi_di_sviluppo_del_DSMN_dicembre_2017_presentato_senato_27.09.2017.pdf))

- To increase the numbers and the quality of the international papers on “hot” subjects and in Journals with very high Impact factor positioned on the top (10%) of the Subject Category.
- To attract a larger number of foreign students for applying at the PhD programs in a) Chemistry b) Science and Technology of Bio and Nanomaterials.
- To support and to increase post doc positions on topics of high scientific profile and important technological aspects in order to insert young researchers in the productive world.
- To increase research and innovative programs with regional Companies.
- To participate to international or national calls on different projects increasing the number of foreign partnership.

In the 2017 and for the next three years, in order to achieve the objectives, Ca' Foscari has planned to invest 3 millions of euro for the labs of Molecular Biology, Biochemistry and to renew old instrumentations.

The measurable indicators are reported below:

Indicator objective 1. To evaluate the new recruits considering the bibliometric indexes, the subject and the number of their papers, in agreement with the plan of action of the Department. (See also Piano Triennale: Indicatori di qualità della ricerca e dell'ambiente di ricerca in particolare VQR, e attrattività dell'ambiente di Ricerca descritti ai Punti 1 e 4 dell'aggiornamento 2018).

Indicator objective 2. Since many years, the Department evaluates (ADIR funds) the number and the quality of the papers published in international Journals. In particular, the funds are related to the position of the relative journals in the corresponding subject category (Scopus and or WOS). For the details see also the ADIR guidelines and Piano Triennale: Azioni da intraprendere: 1.1:” Ricerca coordinata” punto B e 1.4: “Valutazione della ricerca” Obiettivi per il triennio punto 1.5: “produzione complessiva della ricerca”.

Indicator objective 3. To increase the additional funds that Ca' Foscari allocates for PhD programs with the larger numbers of foreign students. In the past, the PhD in Chemistry has been often awarded with additional scholarships. The PhD in Science and Technology of Bio and Nanomaterials, activated in 2018, has been completely supported by private funds. Our PhD courses will be promoted on different foreign networks and Universities

Indicator objective 4. Two papers a year for the post doc positions on topics of high scientific profile. For the post doc related to the technological aspects, the number of the positions supported by companies will be evaluated.

Indicator objective 5. Numbers of MoU with Regional Companies that provides funds for at least 3 years for Post doc or PhD positions aimed to share research projects and patents.

Indicator objective 6. Number of new partnerships with foreign research Institutions. Number of national and international projects funded. Our Department will allocate additional funds for the groups involved in new international networks and projects.

PART II: Human resources and Scientific production

Section A – Human resources

Subsection A.1 – Research personnel

Faculty

Year ¹	Full Professors	Associate Professors	Researchers	Fixed-Term Researcher <i>[Ricercatori t-det]</i>
2017	7	19	10	5
2016	9	21	11	3
2015	10	23	12	2

Research Grant Holders and PhD students

Year ¹	Research Grant Holders	PhD students
2017	17	19
2016	10	20
2015	13	21

During the three years the number teachers has reduced significantly but the number of doctoral scholarships has remained almost constant while the number of research grants has increased a lot.

Section B - Scientific production (2015-2017)

Subsection B.1 – Overall scientific production²

Total scientific production

Publishing year	Journal articles	Book Parts	Books	Conference Proceedings	Patents	Other	TOT
2017	101	3	1	3	2	0	110
2016	103	12	0	1	4	0	120
2015	104	9	0	6	3	0	122
TOT	308	24	1	10	9	0	352

¹ Detected at 31 December of every year

² Source: University Repository ARCA (<https://arca.unive.it/>). Only publication with a ISBN/ISSN or DOI code have been considered. Book editing activities have been excluded.

Indexed publications

Category	2015	2016	2017	TOT
Indexed in WoS/Scopus	109	106	92	307
Articles in top 10% WoS/Scopus Journals	62	45	40	147
Articles in ANVUR "Class A" Journals	12	7	12	31
TOT	183	158	144	485

Other indicators of interest of the Department (Optional)

The Department is aiming to further increase the total number of scientific publications, while at the same time striving to improve the quality of the products and also taking care of the type of journals for publication, selecting those with a higher impact factor.

An indicator of great interest used by the DSMN to monitor and incentive the number and quality of publications and which takes into account the above parameters 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 to be presented 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 Web of Science (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 researchers.

The quantity and quality of scientific production, measured on the basis of the ADIR funds criteria, show that in the three-year period 2015-2017 the fraction of researchers who achieved a score above 1200, indicative of a level of excellence at national and international level, has raised from 29% to 34%.

The DSMN intends to continue to use, as a monitoring and incentive tool, the annual ADIR funding, since this strategy appears to be rewarding: the number of pro-capite publications is increasing over the years, both in absolute terms and in terms of the fraction of peer-reviewed publications indexed in either Scopus or WoS. In fact, this indicator takes into account both the number and the quality of the publications. This ensures that these funds are invested on researchers who guarantee an optimal return in terms of publications and patents.

A further monitoring indicator identified by the DSMN is the evaluation, with bibliometric criteria, of the publications of the new recruited researchers and the number of publications related to the new interdisciplinary research lines.

As an additional indicator, the 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 VQR which will focus on the 2015-2019 period.

Role at Ca' Foscari	Number	ARCA products	Indexed in WoS /	Top 10% WOS/Scopus	ANVUR Class A
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			Scopus	Journals	Journals
Full Professor	7	94	78	44	12
Associate Professor	19	199	177	74	13
Researcher	10	102	86	33	4
Fixed-Term Researchers [Ricercatori t-det]	5	65	59	40	7
TOT	41	460	400	191	36

N.b: the publications with more authors internal to the Department and belonging to different positions, have been counted for each respective category (year 2017)

Subsection B.2 - Scientific production of newly recruited and promoted researchers

Newly recruited researchers

Entry role at Ca' Foscari	Number	ARCA products	Indexed in WoS / Scopus	Top 10% WOS/Scopus Journals	ANVUR Class A Journals
Full Professor	0	0	0	0	0
Associate Professor	0	0	0	0	0
Fixed-Term Researchers [Ricercatori t-det]	4	52	49	34	7
TOT	4	52	49	34	7

Promoted researchers

Acquired role	Number	ARCA products	Indexed in WoS / Scopus	Top 10% WOS/Scopus Journals	ANVUR Class A Journals
Full Professor	3	49	41	31	5
Associate Professor	4	59	50	25	6
Fixed-Term Researchers [Ricercatori t-det]	1	13	10	6	0
TOT	8	121	101	62	11

Subsection B.3 - Researchers with no scientific production³

Researchers with no scientific production

Full Professors	Associate Professors	Researchers	Fixed-Term Researchers [Ricercatori t-det]
0	0	0	0

³ Researchers with no scientific publication in the three years period (source: University Repository ARCA)

Researchers with no scientific production recruited/promoted in the three-year period 2015-2017

Full Professors	Associate Professors	Researchers	Fixed-Term Researchers <i>[Ricercatori t-det]</i>
0	0	0	0

Comments concerning the critical issues

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 reducing inefficient components (also favoured by retirements) combined with the ADIR funds on a meritocratic basis have led measurable positive results.

In fact, what it emerges is that no researcher has a scientific production of zero over the three-years period 2015-17.

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.

State-of-the-art Rsearch requires funding, and fund rising activities have been increasingly gaining importance in the last decade, especially for scientific departments as DSMN. This issue has then become a central focus of the DSMN departmental policy in term of seeking funding support from external sources, notably EU funding. Thanks to a recent re-organization of the secretary office, the number of submitted projects have been monitored starting from 2013.

	EU/ H202 0	PRIN/ SIR/FIR B	ER C	MARI E CURIE	ATENE O /SPIN	LIFE/ INTR G	FS E	RI R	MAECI GALILE O	OTHER S
2015	3	10	1	8	3	2	0	0	0	3
2016	2	0	0	5	10	1	6	0	0	0
2017	3	0	0	4	0	1	14	3	4+1	4

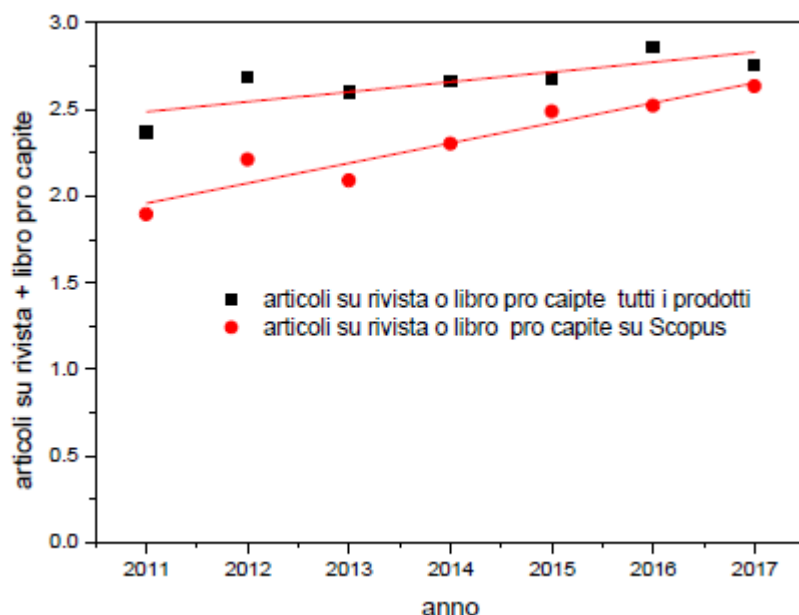
The above Table reports the number of presented projects within the period 2015-2017 divided by major tyology, where we note an increasing trend both in terms of absolute number and in focus of funding objectives. While in 2013 most of the efforts was devoted toward national (e.g. PRIN) and internal (e.g. Progetti di Ateneo) fundings, in 2017 one may notice an increasing attention toward FSE, as well as bilateral projects that testifies the departmental effort toward the international outreach, notwithstanding the decrease of the number of members affiliated to the Department.

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 over the years, both in absolute terms and in terms of the fraction of peer-reviewed publications indexed in either Scopus or WoS. As detailed in Part II Section B, the total number of publications has been slightly decreasing from 2015 to 2017, but the permanent staff members have been decreasing more, so the pro-capite number of publications has been increasing within the same period. Remarkably, the latter tends to be nearly 100% as illustrated by the plot below.



Section B – Funding for Research Grants and Short-term Research Fellowships

Linee guida per la compilazione

Indicare eventuali regolamenti/criteri dipartimentali di assegnazione delle risorse per assegni (Research grant positions) e borse di ricerca (Short-term Research Fellowships). 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 post-doctoral fellowship 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 lines devised in general university scheme.

Subsection B.1 – Research Grant Holders

Funding sources	SSD	Number of Research positions	Importo delle convenzioni
2015 - progetti finanziati (Prin 2010 +interreg Ita Slo T2C)	CHIM/01	1	
2015 - finanziamenti esterni enti di ricerca	CHIM/04	1	14581.03 INSTM
2015 - finanziamenti esterni Privati	CHIM/06	2	FIS 54.000 contributo alla ricerca
2015 - finanziamenti progetti	CHIM/02	2	

finanziati (PRIN 2012 + progetti strategici)			
2016 - progetti finanziati (LIFE 2015) + finanziamento esterno ente di ricerca	CHIM/04	2	INSTM 7344.03
2016 - finanziamenti esterni privati + Progetto finanziato PRIN 2012	CHIM/02	3	Acciaierie Venete 30.000 + Brenta 45.000
2016 - finanziamenti esterni privati	CHIM/01	1	BIOFIELD 25582.63
2017 - Progetti finanziati (LiFE 2015+Life 2016+Smart Cities)+ finanziamenti esterni enti di ricerca+finanziamenti esterni privati	CHIM/04	5	CASALE 35000+ INSTM 17199.49
2017 - finanziamenti esterni privati	CHIM/02	3	BRENTA 76000
2017 - finanziamenti esterni privati	FIS/03	1	NUOVA OMPI 33200

Research Fellowships (FSE)

Funding Sources	Number of Projects Submitted	Financing	number of projects financed	Typology	Number of Research Fellowships	SSD
2015-FSE	Non c'è stato il bando					
2016-FSE	5	99769,5	4		4	Chim02; Chim04; Chim04;Chim06
2017-FSE	13	197829,46	6	1 TIPOLOGIA A; 3 TIPOLOGIA B; 2 TIPOLOGIA C	8	Chim01; Chim02; Chim03; Chim04, Chim04;Chim06; Fis03; Bio10.

It can be noted that in the period 2015-2017 the number of European Social Fund scholarships increased, particularly in 2017 out of 13 projects won by the University six were headed by the DSMN department, which was able to fund as many as 8 research grants.

Subsection B.2 – Short term Research Fellowships

Funding sources	SSD (if available)	Number of Short-term Research Fellowships	Importo €
2017 - progetti finanziati (FSE altro soggetto)	CHIM/02	1	
2017- finanziamento esterno ente di ricerca	CHI/04	1	INSTM 2.800

The table below (sub-section B.2) shows the external funds for the year 2017 in support of research grants. It is interesting to note that our department has supported two "researchers" who have been guests of the department for a period (one year) in 2014 and (two months) in 2015.

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.

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.

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 are currently under discussion 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.

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.

University agreements involving DSMN:

During this period, the department is involved in the following agreements signed by the University for the international mobility (Programma Erasmus+, Staff Mobility for Teaching Assignment (STA): <https://www.unive.it/pag/12601/>):

1. University of Sydney, Australia, responsible Prof. Alvise Perosa, valid from 01/04/2013 to 01/04/2023;
2. KOREATECH, Korea, responsible Prof. Achille Giacometti, valid from 25/05/2016 to 24/05/2021.

Department agreements overseas

In the year 2017 the department has signed four new agreements for the exchange of professors, researchers and PhD students with the University of Araraquara (Sao Paulo, Brazil); the University of Caxias do Sul (Brasil); the CIDETEQ - Centro de Investigación y Desarrollo Tecnológico en Electroquímica (Mexico).

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.

Visiting scholars

Period	17 -21/4/ 2017
Name	Prof. DODZI Zigah
Home institution	Université Bordeaux, France
Research area	Electrochemistry
Seminar activities	Electrochemistry: an advanced tool for chemistry from the macroscale to the nanoscale"
Funding Sources	Erasmus +

Period	15/3/2015 to 15/5/2015
Name	PRICHODKO Aleksandra
Home institution	University of Vilnius, Lituania
Research area	Chemistry. Project: Optical and nanostructural study of nanostructured calcium hydroxyapatites doped with lanthanides and prepared by sol-gel method
Seminar activities	None.
Funding Sources	Erasmus +

Period	1/11/2014 to 31/10/2015 (304 days)
Name	Prof. HAIM Tobias

Home institution	Nuclear Research Center Negev, Israel
Research area	Analytical Chemistry
Seminar activities	None.
Funding Sources	Department (visiting guest)

Visiting professors

Period	16/06/2017 - 22/06/2017
Name	Prof. YUEN Alexander
Home institution	University of Sydney, Australia
Scientific area	Organic Chemistry
Teaching activities	PhD course - From Plant to Plant – hydrothermal upgrading and hydrotreating of Algae for drop-in fuels
Funding Sources	ICM 2015

Period	10/04/2017 - 18/04/2017
Name	Prof. MASTERS Anthony
Home institution	University of Sydney, Australia
Scientific area	Organic Chemistry
Teaching activities	PhD course - Decorating the room at the bottom, designer nanomaterials for catalytic renewables conversions
Funding Sources	ICM 2015

Period	26/11/2016 to 15/12/2016
Name	Prof. PEZZOTTI Giuseppe
Home institution	KIT, Kyoto
Scientific area	Materials Sciences
Teaching activities	Course 30 h: Advanced analytical techniques for biomaterials for biomedical application
Funding Sources	Ateneo ICM 2015

Outbound scholars and professors

Name	Prof. UGO Paolo
Scientific area	Analytical Chemistry
Host institution	University of Southampton, England
Type and duration of mobility	Erasmus + 2017, 1 week

Name	Prof. SELVA Maurizio
Scientific area	Organic Chemistry
Host institution	Kyoto University, Japan
Type and duration of mobility	Overseas 9-17/12/2017

Name	Prof. PEROSA Alvise
Scientific area	Organic Chemistry

Host institution	University of Sidney, Australia
Type and duration of mobility	Overseas - ICM 07/08/2017 - 16/08/2017

Name	Prof. MORETTO Ligia Maria
Scientific area	Analytical Chemistry
Host institution	Federal University of Rio Grande do Sul, Brazil
Type and duration of mobility	Overseas 2017 - 2 months

Name	Prof.ssa CANTON Patrizia
Scientific area	Physical Chemistry
Host institution	INRS - Montreal
Type and duration of mobility	ICM 15/07/2017 - 06/08/2017

Name	Prof. PIETROPOLLI CHARMET Andrea
Scientific area	Physical Chemistry
Host institution	INRS - Montreal
Type and duration of mobility	ICM 15/07/2017 - 06/08/2017

Name	Prof. CATTARUZZA Elti
Scientific area	Physics
Host institution	Institute Lane-Langevin, Grenoble, France
Type and duration of mobility	Research invited 2-14/07/2017

Name	ANGELINI Alessandro
Scientific area	Biochimica - Sviluppo di un sistema combinatoria per la determinazione dell'affinità di anticorpi isolati da singola cellula di tipo B
Host institution	Rockefeller University di New York - Prof. G.D. Victoria
Type and duration of mobility	invited 1 Maggio 2017 fino al 31 Dicembre 2017

Name	Prof. BENEDETTI Alvise
Scientific area	Physical Chemistry
Host institution	KIT, Japan
Type and duration of mobility	ICM 07/09/2017 - 27/09/2016

Name	Prof. PEROSA Alvise
Scientific area	Organic Chemistry
Host institution	University of Sidney, Australia
Type and duration of mobility	ICM 27/09/2016 - 07/10/2016

Name	Prof. SELVA Maurizio
Scientific area	Organic Chemistry
Host institution	Kyoto University, Japan
Type and duration of mobility	Overseas 06–16 settembre 2016

Name	Prof. CATTARUZZA Elti
Scientific area	Physics
Host institution	Grenoble Synchrotrone
Type and duration of mobility	Research 7-11/12/2016

Name	Prof. CATTARUZZA Elti
Scientific area	Physics
Host institution	Grenoble Synchrotrone
Type and duration of mobility	Research 7-14/07/2015

Name	Prof. MORETTI Elisa
Scientific area	Material Sciences
Host institution	University of Malaga - Spain
Type and duration of mobility	Research 20/05 to 07/06/2015

Name	Prof. UGO Paolo
Scientific area	Analytical Chemistry
Host institution	University of Malmo, Sweden
Type and duration of mobility	Research 04-19/06/2015

Subsection E.2 – Other actions or internationalization incentives

The department encourage the participation of technicians (Lab manager) to international activities. The participation can be funded by Erasmus+ grants, and can be obtained from both partners, so inbound and outbound activities are possible.

In the period 2015-2017 the following outbound activities were performed:

Name	BETTIOL Cinzia
Scientific area	Analytical chemistry - lab manager
Host institution	George State University, USA
Type and duration of mobility	Erasmus + 11-17/11/2017

Name	Davide Cristofori
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Scientific area	Electronic microscopy - lab manager
Host institution	KIT, Japan
Type and duration of mobility	14/05/2017 - 04/06/2017 ICM

In the period 2015-2017 the following inbound activities were performed:

Name	BRAYBON Elen
Scientific area	Chemistry lab manager
Home institution	University of Sydney, Australia
Type and duration of mobility	ICM 2015 19-24/06/2017

Name	THOMPSON Gemma
Scientific area	Chemistry - lab manager
Home institution	University of Sydney, Australia
Type and duration of mobility	ICM 2015 19-24/06/2017

PART IV: Assessment

Section A – External evaluation of Research activity

Subsection A.1 - Assessment board

Assessment board evaluation (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.

On November 17th, 2017, the Department of Molecular Sciences and Nanosystems was audited in the presence of the Board of Evaluation and the University Quality Presidium. The meeting was held in a positive and collaborative atmosphere. The Board of Evaluation focused on the importance of enhancing and documenting the initiatives of the University, the Department and the course of studies in terms of Quality Assurance (AQ). The Board also reminded the Department to take care of critical issues and recalled the importance of properly formalizing the AQ documents, supplementing the analyses with data.

Below there are reported the critical issues that emerged during the meeting and the judgment of the Board of Evaluation:

1. Teaching sustainability (R1.C.3)

The Board of Evaluation acknowledged the fact that the introduction of the programmed number in some course of studies resulted in: *i*) an improvement in the performance of the students and *ii*) a higher percentage of students who continued in the second year. However, the Board highlighted the existence of other issues such as the low rate of students who pass certain exams (e.g. Mathematics). Regarding the DID indicator (ratio between potential teaching and delivered teaching), the Board suggested to start a reflection about: *i*) the ratio between students and lecturers, and *ii*) the attractiveness of some degree courses provided by the Department. The Board proposed to consider also the peculiarities of the scientific disciplines and the needs of suitable laboratories.

2. Self-assessment and evaluation: to attention of the Department (R2.B.1)

The Board of Evaluation suggested to better formalizing the contents of the AQ documents, especially those in the cyclical review, including also the numerical indicators.

3. Provision and qualification of teaching staff (R3.C.1)

The Board of Evaluation suggested taking into account the qualification of the lecturers of the master's degrees. It also recommended considering possible initiatives aimed at improving the teaching skills of the lecturers.

4. Staff provision, facilities and services in support of the teaching (R3.C.2)

The Board of Evaluation highlighted the situation of the classrooms and, based on the reported issues, recommended considering actions that can be carried out at the Department level (e.g. review of the class schedules).

5. Definition of the strategic lines (R4.B.1)

The Board of Evaluation acknowledged the relevance and the good quality of the research initiatives proposed by the Department. However, it suggested further enhancing the connection between the definition of the strategies and the Department development plans that envisages three main research areas: nano-biotechnology, green chemistry and cultural heritage. The Board

underlined the fact that all these areas allowed the Department to establish an intense exchange with the surrounding territory.

Following, the Board urged the Department to reflect upon the fact that it did not obtain an ISPD suitable to be admitted to the ranking of the Departments of Excellence. In line with this, the Board recognized that the University has in any case asked the Department for a document similar to that required by the ministerial procedure.

6. Evaluation of results and interventions for improvement (R4.B.2)

The Board of Evaluation emphasized the presence of well-defined initiatives and objectives, which are based on a quantitative examine of the data made in view of the future VQR. However, the Board suggested paying attention to the coherence among the different AQ documents, which must be perceived as helpful instruments within the Department.

7. Definition and publicization of the criteria adopted to distribute the resources (R4.B.3)

The Board of Evaluation acknowledged the fact that in recent years the Department has suffered a decrease in the number of lectures, with consequent difficulties in covering the educational offer. However, the Board emphasized the importance of explaining the criteria and the motivations underlying the Department's choices. Regarding the third mission, the Board stated that the department, in the self-assessment report, declared the establishment of a new delegate without specifying the guidelines used to. The Board suggested to better enhancing the different activities that the Department has in these areas.

8. Staff provision, facilities and services in support of the research (R4.B.4)

The Board of Evaluation acknowledged that the connections existing with companies have allowed the Department to purchase dedicated scientific equipment (e.g. microscopy laboratory). The Board recommended promoting these actions in the Department's documentation. Taking into account the intense exchanges that the Department has with several companies, the Board required the meetings to be formalized, especially in relation to the consultation of the social partners for teaching/didactic.

Review of the Department policies in the light of the Assessment board evaluation

Linee guida per la compilazione

Riflessione auto-valutativa del Dipartimento in relazione al giudizio del Nucleo di Valutazione. Indicare azioni intraprese e indicare i verbali o altri documenti del Dipartimento dove vengono decise le azioni di miglioramento

The Department has evaluated the critical issues that emerged during the meeting with the Board of Evaluation and the University Quality Presidium, and in response to these, it decided to undertake the following improvement actions.

1. Teaching sustainability (R1.C.3)

The Department currently offers an amount of teaching that is higher than the quantity that can be afforded, attributing 120 hours to full and associated professors and 60 hours to researchers. The DSMN covers about 144% of the teaching distributed between two bachelor and two master

degree courses, and in a smaller percentage to courses of other departments. The courses offered by the DSMN are: *i*) one bachelor and *ii*) one master degree in the area of chemistry, *iii*) one bachelor degree in "Technologies for conservation and restoration" and *iv*) one master degree in "Sciences and Technologies of Bio and Nanomaterials". This is in collaboration with the University of Verona and the teaching load is shared between the two universities. Concerning the degree in "Technologies for conservation and restoration", which has been assigned to the DSMN upon the cessation of the interdepartmental school), part of the teaching load is covered by external lectures and replacements and in part by lectures of both DAIS and DSMN departments. Part of the extra hours provided by the DSMN is due to the need to perform several laboratory shifts, often in co-presence (about 7%), while the DSMN contribution to the degree in "Technologies for conservation and restoration" accounts for a further 8%. The excessive teaching load is largely due to the great reduction of teaching staff: from 55 in 2013 to 40 lectures of today. Thanks to the recruitment policy recently implemented, in the next few months the number of teaching staff will reach 45 units. This increase will lower the burdening, but an overall analysis on the teaching provided by the department is crucial and has already begun.

2. Self-assessment and evaluation: to attention of the Department (R2.B.1)

The DSMN has defined the executives of the quality assurance procedure that, in addition to the institutional bodies in charge, also included a delegate for the teaching and a delegate to the third mission. The complete organization chart of the department's AQ structure, inclusive of the names and the roles of the teaching staff, administrative staff and students involved in each CdS, is visible at DSMN website. The department recognizes that one of the major difficulties in implementing AQ has been the low participation of the student component, as evidenced both in the minutes of the CdD and in the annual reports of the CPDS. With these objective difficulties, the meetings of the designated bodies, such as the review groups and CPDS, have been limited and the resulting actions have been therefore inadequate. To overcome this issue, in 2017, the Department undertook a new information and awareness-raising strategy for the students that allowed not only the recruitment of the 6 student members distributed among 4 CdS for the AQ, but also their active participation as shown in the minutes of the last sessions of the CPDS.

3. Provision and qualification of teaching staff (R3.C.1)

In the R1.C.3 section, the Department elucidated that the teaching staff is numerically undersized in relation to the needs of the CdS belonging to the department. This is exacerbated by the fact that the three-year "Technologies for conservation and restoration" course is still managed by the DSMN. Even if this course is provided for over 40% of teaching with assignments and substitutes on research areas (SSDs) for the most part present within the department, the lecturers are not enough to support the entire teaching load. Only a couple of courses require skills not existing in the department and thus require external assignments. In the department there are no teachers for mathematics courses, but the situation is partly in the process of being resolved with the recruitment of a new MAT05 researcher. The teaching activities of the basic courses are coherent with the SSDs pertaining to the lecturers. However, the scientific skills of the latter in the relevant SSD are valued mainly in the most advanced courses (Master's Degree Programs). Less than 10% of the courses are supported by lecturers from different areas. Given the number of students enrolled in the degree courses offered by the DSMN, the ratio between the teachers and the students for all courses is not a critical issue.

4. Staff provision, facilities and services in support of the teaching (R3.C.2)

Thanks to the help of the technical staff, the organization of the didactic laboratories is coherent with the objectives of the training offer. The equipment and the materials are sufficient. However, the small size of the laboratories require the adoption of multiple shifts for the most crowded courses with consequences on the organization of the timetable. The lack of spaces is a problem that also concerns the classrooms for lectures (ALF) and the study rooms (AS). ALF, although equipped with blackboard, computer, screen, projector, etc., are sometimes inadequate to an optimal schedule of the lessons, while the AS, as reported by the same students, are chronically in default. Only few study rooms are available and they can be booked at the Scientific Area Library (BAS). The BAS library has a very large heritage including, among other things, most textbooks accessible to students for consultation and lending, and a wide choice of digital resources such as electronic journals, e-books and online databases, available to students following a training course of 25 hours offered by BAS. The use of ALF, didactic laboratories, and BAS is appropriate as these spaces are located in adjacent buildings. In addition to the orientation / internship / placement services undertaken by the University, we offer: i) sensitization activities at the higher institutes of the territory and in projects of school / work alternation; ii) exhibitions of the teaching offer to the enrolments by the co-ordinators of the CdS and student representatives; iii) tutoring activities (75 hours / year for study plans, exams, etc.) to freshmen by selected students; iv) "Moratti" tutoring to assist students in the laboratory; v) tailored tutoring for courses of mathematics, general chemistry and physics aimed at limiting the abandonment of studies.

5. Definition of the strategic lines (R4.B.1)

The DSMN has always collaborated with local and national companies allowing the acquisition of important instrumentation as well as the funding of research grants and doctoral scholarships. The research is mainly focused on the strategic areas envisaged by the Horizon2020 (Energy, Health, Nanotechnologies Advanced Materials, Biotechnologies) and the Life (Program for the Environment and Climate Actions) programs. In order to increase the scientific productivity in one of these strategic areas, the next academic year will see the launch of an innovative cross-sector PhD course on nanomaterials for biomedical applications in collaboration with the CRO of Aviano. This novel high-level training doctoral program has been well seen by some companies that decided to fund scholarships and launch industrial doctorates. Together with ARic, we are defining a collaboration protocol that specifically defines all aspects of the university-company relationship, including the management of industrial property. The SUA-RD 14-17 highlights objectives and indicators, consistent with the PSA, which summarize the research policy and the Department's third mission. As indicated in SUA RD and PTD, the reduction in personnel had a negative impact on the number of publications of the DSMN, even if in the last six years the number of publications per capita has constantly increased.

6. Evaluation of results and interventions for improvement (R4.B.2)

In the section B.2 (Quality Assurance Policy of the Department, SUA RD 2014-17), the activities of the department with the contribution of the Research Committee (CR) are defined. In particular, the Department aims to improve the quality of scientific products by considering journals that are characterized by high impact factors. As an incentive tool to achieve these objectives, the Department has decided to use the fund (ADIR) that annually allocates for research. The distribution criteria are based both on the quality and on the number of publications. As a result, poorly active researchers receive limited research funding. This guarantees an optimal return in

terms of publications and patents. The progressive and constant increase in productivity per capita in recent years is an indication of the effectiveness of the policy adopted by the department combined to a careful turn-over policy. The Research Committee periodically monitors the results, proposing improvement solutions to increase their quality. In particular, work is being undertaken to monitor publications in view of the new VQR which will focus on the 2015-2019 period.

7. Definition and publicization of the criteria adopted to distribute the resources (R4.B.3)

The regulation for the distribution is proposed every year by the Research Commission and later approved by the Departmental Council. The regulation is rewarding so the lecturers who have the best indicators will be favoured in order to optimize the investment of research funds in terms of publications and patents. Given the limited budget of the Department, there are no additional incentives or awards. The directions of this policy consistently follow the University's strategic program. As far as the third mission is concerned, there is no regulation and therefore no evaluations are foreseen. Furthermore, since the theme is not homogeneous: not all the research areas of the lectures lend themselves equally to the development of activities of interest for companies and / or institutions of the territory. The Department has recently established the delegate for the third mission that will monitor this activity and manage the relationship with the RIR (Regional Innovative Networks). The RIR is the structure through which the Veneto region manages the European funds to be used to promote the interaction between the productive system and the University.

8. Staff provision, facilities and services in support of the research (R4.B.4)

The technical (PT) and administrative (PA) personnel have their own objectives and those assigned by the University. Both objectives are subjected to annual evaluation. The composition of the sectors and the activities of the PT and the PA are published on the department website. The PhD course in Chemistry was activated in 2014 in collaboration with the University of Trieste (administrative office). In the Venetian headquarters, the course is based at the DSMN. From 2018 the new doctorate will also be based in the DSMN. The laboratories of the research groups of the Department are equipped for the training of PhD students allowing access to instrumentation for the characterization of organic and inorganic materials, for electrochemical measurements, chromatography analyses, mass analyses, NMR spectrometry, FT-IR and UV-Vis, electron microscopy (TEM and SEM), etc., as well as reactors and fully-equipped analysers for catalytic reactions. The digital heritage of BAS is accessible to all students and doctoral candidates. In the research laboratories, all the students have access to both local and external networks necessary for the control of the analytical instrumentation and for bibliographic investigations. Finally, the DSMN has made available facilities, equipment, and personnel for the creation of educational activities through videoconference in order to facilitate the students and the teachers thus limiting the related mobility costs.

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, rapporti quali:

- Numero pubblicazioni ISSN-ISBN / Numero Docenti;
- Numero di Working Papers presentati in ciascun anno / Numero di Working Papers; pubblicati su rivista in ciascun anno;
- Fondi Europei complessivi / Numero Docenti;
- Numero assegni di Ricerca / Numero Docenti;
- Numero dottorandi / Numero Docenti;

oppure, criteri specifici (anche qualitativi) di valutazione

To better evaluate the scientific production and the fund-raising ability of the department, it is better to discuss a series of parameters normalized by the number of faculty members. Specifically, below are reported a table with the total number of publication per DSMN member, the same eliminating multiple authorship and the number to high quality publications (top 10% ScopusWoS, class A papers ANVUR) per DSMN member again attributing each paper to one author (Table 1).

Table 1

Year	n° DSMN members	n° papers/ DSMN member	n° papers eliminating multiple authorship/ DSMN member
2017	41	3.5	2.5
2016	44	3.6	2.7
2015	47	3.9	2.6

Other two tables show the external fund-raising ability per DSMN member while a final table reports the normalized number of research grant holders and PhD students (Tables 2 and 3).

Table 2

Year	n° DSMN. members	Euro / n° DSMN member
2017	41	4005
2016	44	2453
2015	47	1459

Table 3

2017	41	0.41	0.46
2016	44	0.23	0.45
2015	47	0.28	0.45

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

Linee guida per la compilazione

La riflessione auto-valutativa del Dipartimento va posta in relazione a quanto riportato nelle Parti I, II e III della presente relazione. E' opportuno specificare le criticità ma anche i punti di forza o semplicemente gli aspetti su cui non si ritiene di dovere intervenire in modo specifico perché, ad esempio, i risultati raggiunti sono già in linea con le linee di sviluppo del Dipartimento.

La riflessione dovrebbe comprendere un'analisi dell'andamento degli indicatori della Parte II negli ultimi (almeno) tre anni e del livello di raggiungimento degli obiettivi triennali del Dipartimento.

In the period considered for the evaluation, first of all it should be noted that all the DSMN members published at least one work in the 2015-2017 period, therefore no inactive members are present and this point, which is also important for the next national VQR evaluation, does not require any specific future action.

The total number of WoS/Scopus papers present in the ARCA database normalized for the number of faculty member (Table 1) shows a slight decreased over the years, from 3.9 papers/DSMN member in 2015 to 3.6 papers/DSMN member in 2017. Nevertheless, if the same data are analyzed attributing each paper to only one author, therefore eliminating multiple authorship, and normalizing by the number of DSMN members the data observed are basically constant in the period 2015-2017, while a better positive trend is observed considering a larger time range, as reported in the figure at the end of section A. The reduction of the number of faculty members caused a decrease of the internal collaborations and this explains most of the trend observed for columns three and four of the first Table.

The data above reported should also be analyzed considering that the drastic decrease of the number of the DSMN members is also responsible for a marked increase of the teaching activities of the remaining members and this contributed to the overall work loading. It should also be considered that many DSMN members are also deeply involved in a series of administrative issues like being part of teaching and research commissions, PhD programmes and others, or specific activities like the CEV evaluation that recently involved the DSMN, for which several DSMN members dedicated several weeks of work for the preparation of the meeting with the external reviewers and the preparation of the requested documentation.

The scientific production is also unequivocally affected by the aging of the scientific instrumentation, especially the more expensive and sophisticated ones like SEM, TEM and partially NMR that are nowadays routinely employed for the characterization of the new chemical entities and materials developed by the faculty members. It has to be underlined that the department still lacks high resolution mass spectrometry instrumentation like MALDI, ESI, TOF and that these will be acquired only from 2019. Starting from 2017 the department raised the problem and more recently the university board decided to support the department with a special funding program for large instrumentation and to establish a molecular biology and biochemistry labs. In short times this will certainly spur the collaboration of the DSMN members involved in the field with positive effects on publications.

The overall external funding collected by all the members of the department showed a marked increase with 68500 euro in 2015 and 164200 euro in 2017, thus more than doubling the external funding (see subsections B.1 and B.2 of the present document). The effort put by the DSMN

members to collect external funding is even more evident normalizing the external funding by the number of members, with 1450 euro/ DSMN member in 2015 and up to 4000 euro/DSMN member in 2017, a value which is almost three times higher in just a few years. This is further proved by the marked increase of research grant holders/DSMN members from 0.28 in 2015 to 0.41 in 2017, further underlying the effort put by the DSMN members to sustain their research from external sources.

It is also worth noting that the external financial support has been delivered by a series of chemical and technological companies of the area of influence of the University, thus demonstrating a solid and fruitful connection of the department with the productive neighboring area in the entire Veneto region, spanning from Vicenza, to Treviso and Venezia. The consolidating trend is also observed analyzing the number of PhD students, particularly considering the ratio between the number of PhD students/DSMN member that remained constant from 0.45 in 2015 to 0.46 in 2017.

Overall, the DSMN started an important funding campaign that successfully allowed to more than double the external financial resources to support the research. This occurred even though a large increase of the teaching and administrative activities somehow limited the effort put in the research. The recent acquisitions of new DSMN members has been focused also on selecting outstanding scientists with good publication records, aiming at promoting their interaction and future scientific collaborations with all the members of the department in order to mutually sustain the quality of the scientific production.