

# Analysis of research programmes at Babeş-Bolyai University in terms of publications and dissemination to society

-self-assessment report drafted by the Operational College of the Scientific Council and OMTTC-

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## **A. Defining UBB research programmes**

Academic research at Babeş-Bolyai University (UBB) is conducted in line with the tenets of academic autonomy and academic freedom. Pursuant to National Education Law no. 1/2011 and the other laws regulating university activity, teaching staff conduct research activities as part of their regular workload. Under the same regulations, teaching positions are determined by teaching workload and not by a defined scientific research direction. These factors leave a significant degree of freedom and diversity in the lines of research pursued by academics - all the more so since, except for questions of work safety, ethics or legality, these directions may not be censored administratively.

Leaving aside the freedom mentioned above, the funding schemes do allow selective support for certain research directions. External funding (national, international programmes, collaborations with the socio-economic sector) is generally directed towards specific projects or groups and, if it sets out a unified research programme, it does so on a larger scale and not as UBB research programmes. On the other hand, in-house UBB funding and accreditation schemes make it possible to set up distinct research programmes. Most of these are focused on UBB-accredited Research Units (RU) and the STAR-UBB Institute.

This report reviews the research programmes defined by the UBB RU. It is not meant to be an overview of the scientific research conducted at UBB in general but is primarily aimed at analysing the effectiveness of institutional research programmes in terms of scientific publications and transfer to society. The report is therefore not a comprehensive review of all scientific research topics at UBB nor of all the outputs. Selection of the issues covered is based on the framework of RU programmes.

RU have had a longer institutional tradition, but have been defined in their current format since 2013 (UBB Senate Decision 404/SEN/03.12.2012 and related documents, according to <https://cercetare.ubbcluj.ro/ro/cercetarea-la-ubb/unitati-de-cercetare/>).

## **B. Accreditation criteria for RU**

The RU Accreditation Regulation, adopted in 2013, requires applicant units to review a complex and comprehensive set of metrics, to be quantified in a sum score. Under this procedure (resumed here in detail from its original source - the Senate Decision) each research unit selects one of the three fields (**I, II, III**) against which it wishes to be assessed. Faculties may decide to add additional criteria (a maximum of two criteria per set), duly justified by the particular nature of the research in the respective faculty; the scores allocated to these additional criteria may not exceed the average value of the individual scores for that set. The RU applying for accreditation completes a portfolio that includes, depending on the field (I, II or III), the following:

### **FIELD I (*HARD SCIENCES, ENGINEERING AND BIOMEDICAL SCIENCES*)**

#### **1. Information identifying the research unit (*institute, centre, laboratory or research group*)**

- 1.1. Name:
- 1.2. Legal status:
- 1.3. Act of Establishment:
- 1.4. Registration number in the Prospective Contractors Registry:
- 1.5. Director:
- 1.6. Address:
- 1.7. Telephone, fax, website, email:

#### **2. Field of expertise**

- 2.1. According to the UNESCO classification:
- 2.2. According to the CAEN classification:

#### **3. Research unit status**

- 3.1. Research unit mission, lines of research, development, innovation. Outputs of excellence in carrying out their mission (maximum 2000 characters):
- 3.2. Valorisation of research, development, innovation results and their level of acknowledgement (maximum 1000 characters)<sup>1</sup>:

<sup>1</sup> As an example, the level of recognition of research unit outputs may include data pertaining to:  
- ranking of researchers (i.e. most cited, Hirsch index above a certain threshold, etc.);  
- total number of citations of articles and number of citations of articles during the evaluation period (possibly “who cited” and in which journal, papers cited more than 100 times, papers cited for more than 20 years, etc.);

- results of national/international evaluations/rankings of the research unit.

3.3. Financial standing - financial resources:

3.4. Research staff, by teaching or research ranks (CS - CS I or equivalent teaching position):

3.5. Total number of staff in the research unit ( $N_c$ ):

**4. Performance criteria in scientific research (during 2008-2012) (40%)**

Sr. No.	Criterion	n	Single score	Score granted
1.	A book published by a prestigious foreign publisher <sup>2</sup>		$20 \times (N_{ic}/N_a)$	$\Sigma 5$
2.	A monograph published by a prestigious foreign publisher <sup>2</sup>		$15 \times (N_{ic}/N_a)$	$\Sigma 5$
3.	An article published in a <i>Web of Science</i> rated journal (Thomson Reuters) <sup>3</sup>		$(10 + FI) \times (N_{ic}/N_a)$ <sup>4</sup>	$\Sigma 5$
4.	A paper presented in an international scientific event, published in full in a volume or journal listed by <i>Web of Science</i> (Thomson Reuters)		$(10 + FI) \times (N_{ic}/N_a)$ <sup>4</sup>	$\Sigma 5$
5.	A paper presented in an international scientific event, published in full in a volume by a prestigious foreign publisher, including electronically		$2 \times (N_{ic}/N_a)$	$\Sigma 5$
6.	A chapter in a treaty, book or monograph published by a prestigious foreign publisher <sup>2,4</sup>		$13 \times (N_{ic}/N_a) \times (N_p/N_{tp})$	$\Sigma 5$
7.	Number of citations according to <i>Web of Science</i> (Thomson Reuters)		1/citation	$\Sigma 5$
8.	Cumulative impact factor according to <i>Web of Science</i> (Thomson Reuters) <sup>3</sup>	-	$\Sigma (FI \times (N_{ic}/N_a))$	$\Sigma 5$
9.	A book published by a prestigious domestic publisher <sup>6</sup>		$7 \times (N_{ic}/N_a)$	$\Sigma 5$
10.	An article published in a CNCS-recognised journal (B+) or indexed in an international database (BDI)		$1 \times (N_{ic}/N_a)$	$\Sigma 5$
11.	A guest speaker/lecture/keynote address at an international scientific event		10	
12.	A guest speaker/lecture/keynote address at a national scientific event		5	
13.	An oral presentation delivered to an international scientific event		$5 \times (N_{ic}/N_a)$	$\Sigma 5$
14.	An oral presentation delivered to a national scientific event		$2 \times (N_{ic}/N_a)$	$\Sigma 5$
<b>Total score performance criteria in scientific research</b>				

n = number of programmes, treaties, books, monographs, papers, etc.

<sup>2</sup> The following foreign publishers will be considered: Academic Press, Appleton & Lange, Birkhauser, Blackwell, Cambridge University Press, CRC Press, Elsevier, Garland Publishing, Kluwer Academic Publishers, McGraw-Hill, Mosby, Nova Science Publishers, Oxford University Press, QMP, Springer Verlag, Thieme, Willey-Liss, Williams and Wilkins,

World Scientific Publishing, other equally prestigious foreign publishers.

<sup>3</sup> For each article the impact factor (IF) of the journal divided by the total number of authors ( $N_a$ ) and multiplied by the number of authors in the evaluated research unit ( $N_{ic}$ ) will be considered. The impact factor is published annually by the *Web of Knowledge, Journal Citation Report* (Thomson Reuters), and, when calculating it, the value corresponding to the year of publication of the article will be used.

<sup>4</sup> n = number of programmes, treaties, books, monographs, papers, citations, etc.; IF = impact factor;  $N_{ic}$  = number of authors in the research unit;  $N_a$  = total number of authors;  $N_p$  = number of chapter pages;  $N_{tp}$  = total number of volume pages.

<sup>5</sup> The total score will be the sum of the single scores obtained by calculation.

<sup>6</sup> Scientific books by authors on record at the National Library will also be counted.

**5. Ability to attract research funds (during 2008-2012, only amounts accruing to the research unit will be counted) (20%)**

Sr. No.	Criterion	n	Single score	Score granted
1.	A grant the research unit has won from international organisations	5,000 - 10,000 EUR	2	
		10,001 - 50,000 EUR	4	
		50,001 - 200,000 EUR	6	
		200,001 - 1,000,000 EUR	8	
		over 1,000,000 EUR <sup>1</sup>	10	
2.	A grant the research unit has won from national organisations	under 10,000 RON	1	
		10,001 - 100,000 RON	2	
		100,001 - 500,000 RON	3	
		over 500,000 RON	4	
3.	An extra-budgetary agreement concluded by the research unit with international or national organisations	under 5,000 RON	0.5	
		5,001 - 10,000 RON	1	
		10,001 - 100,000 RON	2	
		over 100,000 RON	3	
4.	A scientific event (congress, conference, symposium) or international summer school organised by the research unit		10	
5.	A scientific event (congress, conference, symposium) or national summer school organised by the research unit		5	
<b>Total score for attracting research funds</b>				

**6. Capacity to develop services, technologies, products (during 2008-2012) (10%)**

Sr. No.	Criterion	n	Single score	Score granted
1.	A patent application filed	internationally	5	
		nationally	2	
2.	A patent granted	internationally	10	
		nationally	5	
3.	A patent implemented	internationally	20	
		nationally	10	
4.	A patent cited in <i>Web of Science</i> (Thomson Reuters)		5	

5.	Products and technologies resulting from research activities through approvals or proprietary innovations (sold output, amounts received)		10	
6.	An accredited research and development laboratory		10	
7.	Impact studies and services commissioned by a client		5	
	<b>Total score development services ltd.</b>			

**7. Ability to train young researchers (during 2008-2012) (10%)**

Sr. No.	Criterion	n	Single score	Score granted
1.	A doctoral supervisor active in the research unit		20	
2.	A doctoral student active in the research unit		10	
3.	A postdoctoral fellow active in the research unit		20	
4.	A researcher employed in the research unit who defended their doctoral dissertation within the period submitted for evaluation		20	
5.	Membership of researchers in doctoral student advisory committees		5	
6.	Ratio number of young doctors $N_{td}$ (under 10 years of thesis defence date) / total number of researchers $N_c$		$100 \times N_{td} / N_c$	
	<b>Total score for ability to train top young researchers</b>			

**8. Scientific achievements (entire period of activity) (20%)**

Sr. No.	Criterion	n	Single score	Score granted
1.	A member in the editorial board of a national/international journal ( <i>Web of Science</i> , Thomson Reuters or BDI indexed) or in the editorial board of prestigious international publishers <sup>2</sup>		30	
2.	A member in the executive board of a specialised international organisation		20	

3.	A researcher in the research unit who is member of the Romanian Academy or other national academies		50	
4.	A researcher with a Hirsch index over 8		30	
5.	An honorary member ( <i>fellow, senior</i> ) of a recognised national/international scientific association		20	
6.	An award of the Romanian Academy		30	
7.	An award (accolade) granted by an international scientific society through a selection process		20	
8.	Guest editor of a national/international journal ( <i>Web of Science, Thomson Reuters or BDI indexed</i> ) <sup>2</sup>		15	
9.	Scientific reviewer of a national/international journal (listed by <i>Web of Science, Thomson Reuters or BDI indexed</i> ) <sup>2</sup>		5	
10.	An award (distinction) granted by a national scientific society through a selection process		5	
11.	A researcher in the research unit who is member of doctoral dissertations evaluation committees		5	
<b>Total score for scientific standing</b>				

<b>Total score criteria for scientific prestige, fundraising, development output, training young people and scientific standing</b>	
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**Note.** *The evaluation committee may award an additional 15% of the total score for outstanding achievements, for example:*

- *images from a scientific article featured on the cover of a Web of Science (Thomson Reuters) rated journal;*
- *scientific article cited 100 times (or more), excluding self-citation, over the time period considered;*  
*Any additional score will be justified by the evaluation committee.*

## **FIELD II (SOCIAL AND HUMAN SCIENCES)**

### **1. Research unit authentication details (institute, centre, laboratory or research group)**

- 1.1. Name:
- 1.2. Legal status:
- 1.3. Act of Establishment:
- 1.4. Director:
- 1.5. Address:
- 1.6. Telephone, fax, website, email:

### **2. Field of specialisation research unit**

- 2.1. According to the UNESCO classification:
- 2.2. According to the CAEN classification:

### 3. Research unit status

- 3.1. The scientific mission of the research unit and the driving research lines. Delivering excellence in achievement of scientific objectives (maximum 2,000 characters):
- 3.2. How the results obtained through the research programme are capitalised and their degree of recognition (maximum 1,000 characters):
- 1 As an example, the level of recognition of research unit outputs may include data pertaining to:
- results of national/international evaluations/rankings of the research unit.
- 3.3. Financial standing of the research unit - financial resources:
- 3.4. Research staff, by teaching and research ranks (CS-CS1 or equivalent teaching position):
- 3.5. Total number of staff in the research unit ( $N_c$ ):

### 4. Performance criteria in scientific research (during 2008-2012) (40%)

Sr. No.	Criterion	n	Single score	Score granted
1.	Participation in a national research programme (archaeological, etc.)		$20 \times N_{ic}/N_a$	$\Sigma 5$
2.	Participation in a domestic exhibition and/or international exhibition with heritage exhibits		$15 \times N_{ic}/N_a$	$\Sigma 5$
3.	Management and conservation of a cultural and/or scientific collection of national and/or international importance		$20 \times N_{ic}/N_a$	$\Sigma 5$
4.	A specialised book published by an established international publisher (authored book, academic critical edition, critical edition of an unpublished text with spelling interpretation, a translation from classical languages) <sup>2</sup>		$20 \times N_{ic}/N_a$	$\Sigma 5$
5.	A monograph published by a prestigious foreign publisher <sup>2</sup>		$15 \times N_{ic}/N_a$	$\Sigma 5$
6.	A work of reference (collective) published by an established international publisher (dictionary, lexicon, encyclopaedia, atlas, sourcebook, working tool) <sup>2</sup>		$20 \times N_{ic}/N_a$	$\Sigma 5$
7.	A translation of a specialised book, published by the Romanian Academy or by an established publisher in the country, including an introductory essay <sup>2</sup>		$15 \times N_{ic}/N_a$	$\Sigma 5$
8.	A chapter from a specialised book published by an established international publisher		$15 \times N_{ic}/N_a \times N_p/N_{tp}$	$\Sigma 5$
9.	An article published in a leading international peer-reviewed journal (ISI, Erih or acknowledged in the field of humanities)		$(10+FI) \times N_{ic}/N_a$	$\Sigma 5$



10.	A paper presented in an international scientific event, published in full in a <i>Web of Science</i> (Thomson Reuters) listed volume or journal		$(10 + FI) \times (N_{ic}/N_a)4$	$\Sigma 5$
11.	A paper presented in an international scientific event, published in full in a volume by an international publisher		$2 \times N_{ic}/N_a$	$\Sigma 5$
12.	Number of citations according to <i>Web of Science</i> (Thomson Reuters)		1/citation	$\Sigma 5$
13.	Cumulative impact factor according to <i>Web of Science</i> (Thomson Reuters) <sup>3</sup>	-	$\Sigma (FI \times (N_{ic}/N_a))$	$\Sigma 5$
14.	A monograph published by a prestigious home publisher		$7 \times N_{ic}/N_a$	$\Sigma 5$
15.	An article published in a nationally recognized peer-reviewed journal (rated B+ or B) or indexed in an international database (BDI)		$2 \times N_{ic}/N_a$	$\Sigma 5$
16.	A review published in a leading international peer-reviewed journal (ISI, Erih or acknowledged in the field of humanities)		$2 \times N_{ic}/N_a$	$\Sigma 5$
17.	A review published in a nationally recognized peer-reviewed journal (rated B+ or B) or indexed in an international database (BDI)		$1 \times N_{ic}/N_a$	$\Sigma 5$
18.	A scientific study or report relevant to the research programme, published online or in electronic form		$2 \times N_{ic}/N_a$	$\Sigma 5$
19.	A guest speaker/lecture/keynote address in an international scientific event		10	$\Sigma 5$
20.	A guest speaker/lecture/keynote address in a national scientific event		5	$\Sigma 5$
21.	An oral presentation to an international scientific event		$5 \times N_{ic}/N_a$	$\Sigma 5$
22.	An oral presentation to an national scientific event		$2 \times N_{ic}/N_a$	$\Sigma 5$
23.	Research unit publication of a specialised journal		20	$\Sigma 5$
	<b>Overall performance score in scientific research</b>			

n = number of programmes, treaties, books, monographs, papers, etc.

<sup>2</sup> For works published in several volumes, the single score is multiplied accordingly.

N<sub>a</sub> - total number of authors, N<sub>ic</sub> - number of authors in the research unit

$N_p$  - number of pages of chapter,  $N_{ip}$  - total number of pages

The list of established publishers in the country and abroad, as well as the list of acknowledged journals in the humanities (other than those validated by CNCS listings) will be determined by consensus by the representatives of the specialised research units at UBB.

**4. Ability to attract research funds** (during 2008-2012, only amounts accruing to the research unit will be counted) (20%)

Sr. No.	Criterion	n	Single score	Score granted
1.	A grant the research unit has won from international organisations	5,000 - 10,000 EUR	2	
		10,001 - 50,000 EUR	4	
		50,001 - 200,000 EUR	6	
		200,001 - 1,000,000 EUR	8	
		over 1,000,000 EUR <sup>1</sup>	10	
2.	A grant the research unit has won from national organisations	under 10,000 RON	1	
		10,001 - 100,000 RON	2	
		100,001 - 500,000 RON	3	
		over 500,000 RON	4	
3.	An extra-budgetary agreement concluded by the research unit with international or national organisations	under 5,000 RON	0.5	
		5,001 - 10,000 RON	1	
		10,001 - 100,000 RON	2	
		over 100,000 RON	3	
4.	A scientific event (congress, conference, symposium) or international summer school organised by the research unit		10	
5.	A national scientific event (congress, conference, symposium, summer school) organised by the research unit		5	
<b>Total score for attracting research funds</b>				

**6. Capacity to develop services, technologies, products** (during 2008-2012) (10%)

Sr. No.	Criterion	n	Single score	Score granted
1.	Drafting an expert report commissioned by relevant state authorities or by a non-governmental organisation		20	
2.	Advice on specialist issues commissioned by official institutions, including written reports		10	
3.	Impact studies and services commissioned by a client		10	
<b>Total score for ability to develop services, technologies, products</b>				

**7. Ability to train young researchers (during 2008-2012) (10%)**

Sr. No.	Criterion	n	Single score	Score granted
1.	A doctoral supervisor active in the research unit		20	
2.	A doctoral student active in the research unit		10	
3.	A postdoctoral fellow active in the research unit		20	
4.	A researcher employed in the research unit who defended their doctoral dissertation within the period submitted for evaluation		20	
5.	Membership of researchers in doctoral student advisory committees		5	
6.	Ratio number of young doctors $N_{td}$ (under 10 years of thesis defence date) / total number of researchers $N_c$		$100 \times N_{td} / N_c$	
	<b>Total score for ability to train top young researchers</b>			

**8. Scientific achievements (entire period of activity) (20%)**

Sr. No.	Criterion	n	Single score	Score granted
1.	A researcher in the research unit who is a member on the editorial boards of international scientific journals		30	
2.	A research unit researcher, member in editorial boards of scientific journals of the Romanian Academy or journals in the country recognised in the research field.		20	
3.	A researcher in the research unit who is a member of the Romanian Academy or other national academies		50	
4.	A member of the research unit holding an honorary doctorate		20	
5.	A member of the research unit who is an honorary member of a national/international scientific society		20	
6.	A researcher in the research unit who is a member of the management of international scientific organisations		20	
7.	A researcher in the research unit who is a member of expert organisations or associations abroad		20	
8.	A researcher with a Hirsch index over 4		20	

9.	A researcher in the research unit who is a member of the management of expert national organisations or associations		10	
10.	An award of the Romanian Academy		30	
11.	An award (accolade) granted by an international scientific society following a selection process		20	
12.	Guest editor of a national/international journal ( <i>Web of Science</i> , Thomson Reuters or BDI indexed) <sup>2</sup>		15	
13.	Scientific reviewer of a national/international journal ( <i>Web of Science</i> , Thomson Reuters or BDI indexed) <sup>2</sup>		5	
14.	An award (accolade) granted by a national scientific society following a selection process		5	
15.	A research unit expert who is a member of doctoral dissertations evaluation committees		5	
	<b>Total score for scientific standing</b>			

<b>Total score for scientific performance, ability to attract research funding, ability to train excellent young researchers and scientific prestige</b>	
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**Note.** *The evaluation committee may award an additional 10% of the total score for outstanding achievements, for example:*

- *images from a scientific article featured on the cover of a Web of Science (Thomson Reuters) rated journal;*
- *scientific article cited 100 times (or more), excluding self-citation, over the time period considered;*  
*Any additional score will be justified by the evaluation committee.*

### **FIELD III (ECONOMICS)**

#### **1. Information identifying the research unit (institute, centre, laboratory or research group)**

- 1.1. Name:
- 1.2. Legal status:
- 1.3. Act of Establishment:
- 1.4. Registration number in the Prospective Contractors Registry:
- 1.5. Director:
- 1.6. Address:
- 1.7. Telephone, fax, website, email:

#### **2. Field of expertise**

- 2.1. According to the UNESCO classification:

2.2. According to the CAEN classification:

### 3. Research unit status

3.1. Research unit mission, lines of research, development, innovation. Delivering excellence in carrying out their mission (maximum 2000 characters):

3.2. Valorisation of research, development, innovation results and their level of acknowledgement (maximum 1000 characters)<sup>1</sup>:

<sup>1</sup> As an example, the level of recognition of research unit outputs may include data pertaining to:

- ranking of researchers (i.e. most cited, Hirsch index above a certain threshold, etc.);
- total number of citations of articles and number of citations of articles during the evaluation period (possibly “who cited” and in which journal, papers cited more than 100 times, papers cited for more than 20 years, etc.);
- results of national/international evaluations/rankings of the research unit.

3.3. Financial standing - financial resources:

3.4. Research staff, by teaching and research ranks (CS - CS I or equivalent teaching position):

3.5. Total number of staff in the research unit ( $N_c$ ):

### 4. Performance criteria in scientific research (during 2008-2012) (40%)

Sr. No.	Criterion	n	Single score	Score granted
1.	A book published by a prestigious foreign publisher <sup>2</sup>		$20 \times (N_{ic}/N_a)$	$\Sigma 5$
2.	A monograph published by a prestigious foreign publisher <sup>2</sup>		$15 \times (N_{ic}/N_a)$	$\Sigma 5$
3.	An article published in a <i>Web of Science</i> rated journal (Thomson Reuters) <sup>3</sup>		$(10 + FI) \times (N_{ic}/N_a)$	$\Sigma 5$
4.	An article published in a journal listed in an international database (RePeC, DOAJ, EPSCO, IndexCopernicus, Scopus, ScienceDirect, Wiley-Blackwell Full Collection, SpringerLink, Emerald, Inderscience, etc.)		$5 \times (N_{ic}/N_a)$	$\Sigma 5$
5.	An article published on the website of the European Commission, ILO, OCDE, Eurofound		$5 \times (N_{ic}/N_a)$	$\Sigma 5$
6.	A paper presented in an international scientific event, published in full in a volume or journal listed by <i>Web of Science</i> (Thomson Reuters)		$(10 + FI) \times (N_{ic}/N_a)$ <sup>4</sup>	$\Sigma 5$
7.	A paper presented in an international scientific event, published in full in a volume edited by a prestigious international publisher, also in electronic form		$2 \times (N_{ic}/N_a)$	$\Sigma 5$
8.	A chapter in a treaty, book or monograph published by a prestigious foreign publisher <sup>2</sup>		$13 \times (N_{ic}/N_a) \times (N_p/N_{tp})$	$\Sigma 5$
9.	Number of citations according to <i>Web of Science</i> (Thomson Reuters)		1/citation	
10.	Number of citations in journals listed in an international database (RePeC, DOAJ, EPSCO, IndexCopernicus, Scopus, ScienceDirect, Wiley-Blackwell Full Collection, SpringerLink, Emerald, Inderscience, etc.)		0.2/citation	$\Sigma 5$
11.	Cumulative impact factor according to <i>Web of Science</i> (Thomson Reuters) <sup>3</sup>	-	$\Sigma (FI \times (N_{ic}/N_a))$	$\Sigma 5$
12.	A book published by a prestigious national publisher <sup>7</sup>		$7 \times (N_{ic}/N_a)$	$\Sigma 5$

13.	An article published in a CNCS-recognised journal (B+) or indexed in an international database (BDI)		$1 \times (N_{ic}/N_a)$	$\Sigma 5$
14.	A guest speaker/lecture/keynote address at an international scientific event		10	$\Sigma 5$
15.	A guest speaker/lecture/keynote address at a national scientific event		5	$\Sigma 5$
16.	An oral presentation delivered to an international scientific event		$5 \times (N_{ic}/N_a)$	$\Sigma 5$
17.	An oral presentation delivered to a national scientific event		$2 \times (N_{ic}/N_a)$	$\Sigma 5$
<b>Total score performance criteria in scientific research</b>				

n = number of programmes, treaties, books, monographs, papers, etc.

<sup>2</sup> The following foreign publishers will be considered: Academic Press, Appleton & Lange, Birkhauser, Blackwell, Cambridge University Press, CRC Press, Elsevier, Garland Publishing, Kluwer Academic Publishers, PUF, FrMcGraw-Hill, Mosby, Nova Science Publishers, Oxford University Press, QMP, Springer Verlag, Thieme, Willey-Liss, Williams and Wilkins, World Scientific Publishing.

<sup>3</sup> For each article the impact factor (IF) of the journal divided by the total number of authors ( $N_a$ ) and multiplied by the number of authors in the evaluated research unit ( $N_{ic}$ ) will be considered. The impact factor is published annually by the *Web of Knowledge, Journal Citation Report* (Thomson Reuters), and, when calculating it, the value corresponding to the year of publication of the article will be used.

<sup>4</sup> n = number of programmes, treaties, books, monographs, papers, citations, etc.; IF = impact factor;  $N_{ic}$  = number of authors in the research unit;  $N_a$  = total number of authors;  $N_p$  = number of chapter pages;  $N_{tp}$  = total number of volume pages.

<sup>5</sup> The total score will be the sum of the single scores obtained by calculation.

<sup>6</sup> The deliverables for the field of Economics are methodologies, econometric models, etc, and the single score will be 30.

<sup>7</sup> Scientific books by authors on record at the National Library will also be counted.

**5. Ability to attract research funds (during 2008-2012, only amounts accruing to the research unit will be counted) (20%)**

Sr. No.	Criterion n	n	Single score	Score granted
1.	A grant the research unit has won from international organisations	5,000 - 10,000 EUR	10	
		10,001 - 50,000 EUR	15	
		50,001 - 200,000 EUR	20	
		200,001 - 1,000,000 EUR	25	
		over 1,000,000 EUR <sup>1</sup>	30	
2.	A grant the research unit has won from national organisations	under 10,000 RON	5	
		10,001 - 100,000 RON	10	
		100,001 - 500,000 RON	12	
		over 500,000 RON	15	
3.	An extra-budgetary agreement concluded by the research unit with international or national organisations	under 5,000 RON	10	
		5,001 - 10,000 RON	12	
		10,001 - 100,000 RON	15	
		over 100,000 RON	20	

4.	A scientific event (congress, conference, symposium) or international summer school organised by the research unit		20	
5.	A scientific event (congress, conference, symposium) or national summer school organised by the research unit		10	
<b>Total score for attracting research funds</b>				

#### 6. Capacity to develop services, technologies, products (during 2008-2012) (10%)

Sr. No.	Criterion	n	Single score	Score granted
1.	A patent application filed	internationally	5	
		nationally	2	
2.	A patent granted	internationally	10	
		nationally	5	
3.	A patent implemented	internationally	20	
		nationally	10	
4.	A patent cited in <i>Web of Science</i> (Thomson Reuters)		5	
5.	Products and technologies resulting from research activities through approvals or proprietary innovations (sold output, amounts received) <sup>6</sup>		20	
6.	Impact studies and services commissioned by a client		5	
7.	Research conducted upon request/consultancy provided to state institutions/authorities		20	
<b>Total score development services ltd.</b>				

#### 7. Ability to train young researchers (during 2008-2012) (10%)

Sr. No.	Criterion	n	Single score	Score granted
1.	A doctoral supervisor active in the research unit		20	
2.	A doctoral student		10	
3.	A postdoctoral researcher		20	
4.	A researcher employed in the research unit who defended their doctoral dissertation within the assessed period		10	
5.	Membership of researcher in doctoral student advisory committees		5	
6.	Ratio number of young doctors $N_{td}$ (under 10 years of thesis defence date) / total number of researchers $N_c$		$100 \times N_{td}/N_c$	
<b>Total score for training young researchers</b>				

**8. Scientific achievements** (entire period of activity) (20%)

Sr. No.	Criterion	n	Single score	Score granted
1.	A member in the editorial board of a national/international journal ( <i>Web of Science</i> , Thomson Reuters or BDI indexed) or in the editorial board of a reputable international publisher <sup>2</sup>		30	
2.	A member in the board of an international organisation in a research field.		20	
3.	A researcher in the research unit who is member of the Romanian Academy or other national academies		50	
4.	A researcher with a Hirsch index over 4		20	
5.	An honorary member ( <i>fellow, senior</i> ) of a recognised national/international scientific association		20	
6.	An award of the Romanian Academy		30	
7.	An accolade/award granted by government institutions/authorities (Order of Cultural Merit, etc.)		30	
8.	An award (accolade) granted by a national scientific society following a selection process		10	
9.	An award (accolade) granted by an international scientific society through a selection process		30	
10.	Certificates of excellence awarded by national and international scientific bodies		20	
11.	Guest editor of a national/international journal (listed by <i>Web of Science</i> , Thomson Reuters or BDI indexed) <sup>2</sup>		15	
12.	Scientific reviewer for a national/international journal ( <i>Web of Science</i> , Thomson Reuters or BDI indexed) <sup>2</sup>		5	
13.	A researcher in the research unit who is member of doctoral dissertations evaluation committees		5	
<b>Total score for scientific standing</b>				

<b>Total score criteria for scientific prestige, fundraising, development output, training young people and scientific standing</b>	
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**Note.** The evaluation committee may award an additional 10% of the total score for outstanding achievements, for example:

- images from a scientific article featured on the cover of a *Web of Science* (Thomson Reuters) rated journal;
- scientific article cited 100 times (or more), excluding self-citation, over the time period considered; Any additional score will be duly justified by the evaluation committee.



Following assessment of the applications submitted in 2013, all the applicant RU were approved. Most of the files submitted subsequently were also approved - some however with a mention of local faculty accreditation. As there was no predefined need to delineate specific accreditation categories (“category A/B/C”, “of excellence”, etc.), the evaluators did not provide such details in most cases.

- More than 700 permanent teaching and research staff were registered in the evaluated RU; the quota of tenured researchers is marginal in this total number - around 60, of which more than half are assigned to one institute - the Institute of Chemistry. The implication, ~half of the UBB staff are not involved in substantive and/or organised research activities (noting that a relatively small number of teams have opted out of the evaluation process on principle grounds).
- The highest scores were obtained by institute-type structures
- Criteria 4-8 contribute relatively heterogeneously to the total scores. Thus, criterion 4 correlates well with the total score ( $R^2=0.9711$ ), while criterion 6 is on the opposite side. It can be argued that criteria 5 and 6 in particular are superfluous in terms of the small contribution they make by comparison with 4.
- The score generally correlates with the size of the RU (for  $N_c$ ,  $R^2$  is 0.64; for the number of permanent employees it is 0.12). The score per employee varies between 10 and 170 - i.e. in a similar way to the total score; the average is about 70. For centres with very high scores the best correlation is however observed not with  $N_c$  but with the number of papers indexed by Thomson-Reuters (ISI); overall the correlation with this parameter is better than with  $N_c$  -  $R^2 = 0.80$ .
- There is a significant heterogeneity of RU in terms of the scoring source across criterion 4. In some cases a substantial percentage comes from books, conferences or journals with very high local impact - sometimes no larger than the authors’ own faculty.
- Whilst not explicitly included in the Senate criteria, the  $N(\text{ISI})/N(\text{employee})$  indicator is the main contributor towards establishing UBB’s position in the Shanghai rankings. UBB would require an average of about 4 papers per employee per year to enter the top 500 universities in the ARWU/Shanghai ranking.

However, only five UBB RU exceed the 3.5 threshold. Overall, the median value of this indicator across all the RU reported at this time is 0.7, suggesting that the objective of ranking among the top 500 universities in the world according to ARWU is extremely difficult to attain

without Science/Nature papers. On the other hand, this line of approach, while valid for Commission I related fields, has little to do with the relevant Commission II+III (social-humanities and economics) outputs. For the latter there are other avenues of measuring impact - some numerical, such as Times Higher education or QT, and others qualitative, which need further elaboration. Requiring the social and human sciences to make a significant contribution to a Shanghai objective or to focus preferentially on this objective in assessing performance was found to be counter-productive, just as it would be counter-productive to ask the hard sciences to ignore such an objective.

- For Commission I, the correlation between criterion 4 and the overall score is excellent ( $R^2 = 0.99$ ), suggesting a possible redundancy of the other four criteria (5, 6, 7, 8); in this respect, note also the fair correlation of criteria 7 and 8 with the overall score (and implicitly with criterion 4), but also the remarkably low values that are not correlated at all with the overall score for criterion 6. The latter may require further discussion: it concerns the ability to develop services and technologies, hence applied research - a priority component at national and European level but one where the UBB RU do not seem to excel.
- In Commission I the number of ISI papers also correlates very well, indicating a possible redundancy of the other sub-criteria in point 4. The correlation with the total number of members or the number of permanent staff is poor. Totalling methods (simple total vs. weighted total) yield data that correlate very well with each other.
- For Commission II+III, there is a somewhat weaker correlation with criterion 4 ( $R^2$  drops to 0.85), while criterion 8 scores almost equally high (both in terms of absolute score values and correlation,  $R^2 = 0.72$ ). Correlations with the number of members, number of permanent employees or number of Thomson-Reuters papers are non-significant.
- The above analysis shows that for Commission I the sole number of Thomson-Reuters papers alone was sufficiently informative; almost the whole remainder of the file was redundant. On the other hand, if this criterion is satisfactory by Shanghai standards, it runs the risk of incentivising capping in low-impact journals, and should therefore not be excessively relied upon.

## **C. Units of excellence**

The UBB Scientific Council (SC) has recommended that ‘excellence’ status be awarded to some of the

accredited RU according to the following criteria:

The Scientific Council recommends that a special status be awarded to the RU listed in Table 1, based on the following criteria:

1. Obtaining a high score (among the top 5 in each of the two Commissions) in the evaluation of the RU carried out at the request of the UBB Senate
2. The availability of members (more than one, preferably including the director) whose contributions to the internationalisation of research, through books, articles and citations, are outstanding, as listed in the tables and charts included as addenda.

Point 2 above was implemented by:

- membership in a National Academy (Romanian Academy or equivalent)
- other major honours awarded by highly prestigious professional bodies than that of the UBB itself and recognised internationally
- among the top 10 in the country per field according to the Ad Astra database, where the number of papers is significantly higher than 5
- authored book in ~100 or more WorldCat libraries (excludes 'e-books' and 'Proceedings', individual chapters)
- has a paper in Science or Nature
- over 100 all-time ISI publications
- over 400 all-time citations
- among the top 10 in the country by subject area as defined in Sci-Val or ISI, according to the statistics for the past 5 years in the categories of number of papers (where this is substantially over 5), or, where this indicator is unusable, citations or h-index (where this is substantially over 3)
- among the top 10 for all UBB in the citations category (where this is substantially over 5), h-index (where this is substantially over 3), or number of publications (where this is substantially over 5), either all-time, over the last 5 years or over the last 10 years
- contributions to the UBB h-index
- has Field-Weighted Citation Impact of ~2.5 or higher

The proposed list using the criteria was submitted to the UBB Administrative Council for approval and fine-tuning according to institutional priorities. It is outlined in greater detail in the following sections.

## **D. Re-accreditation and oversight of RU**

### **1. Re-accreditation**

In view of the above set of reasons, the RU re-accreditation procedure, adopted by HCA 11,133/13.06.2016, focused on more flexible elements with a clearer qualitative focus. The ‘laboratory’ (or ‘research collective’) type of RDI units, defined according to HCA 10.556/28.04.2014 as having less than 15 members who are researchers, teaching staff or doctoral students, on a ‘tenure-track’ basis or ‘affiliate’ or ‘collaborative’ basis) are accredited at faculty level using specific criteria approved by the Faculty Council, and the list of accredited RDI units is submitted to the SC through the UBB Scientific Research Management Centre (CMCS) for registration. The list is regularly updated when there are any changes.

For re-accreditation purposes only one administrative document is required - an application to the SC containing:

- a. Indicating the updated web page within the ubbcluj.ro domain;
- b. Option as to whether the RDI unit is designed as a smart specialisation unit (usually discipline-focused) or a complex unit (usually multi-, inter- or cross-disciplinary).
- c. Details will be provided both as an Addendum to the application and on the website:
  1. Staff list (also the staff establishment plan of the RDI unit according to the template in the Addendum) and the organisational/management structure of the RDI unit;
  2. Research topics;
  3. Research infrastructure;
  4. Innovative services offered to the community (if applicable);
  5. Ongoing projects;
  6. Representative scientific contributions (i.e. publications, patents) (at least ten, reported separately from any comprehensive list of contributions).

- d. The RDI unit name must conform to the standards defined by UBB norms ('collective', 'laboratory', 'centre' or 'institute'). It is recommended that the term 'excellence' is not used in the names of research units.

The 'laboratory' (or 'research collective') type RDI units with less than 15 members (meaning researchers, teaching staff or doctoral students) are accredited at faculty level (departmental, inter-departmental or independent of departments/faculty level), based on explicit criteria approved by the Faculty Council, and the list of accredited ones is submitted to the SC through the CMCS.

## 2. Oversight

Monitoring the activity of RU is threefold.

The first avenue involves ongoing interactions with the Scientific Council and the Vice-Rector's Office responsible for scientific research, where feedback is provided on various funding opportunities.

The second avenue involves the re-accreditation process, which is carried out every 4 years, as detailed above.

The third avenue implies the assessment of strategic infrastructure elements recorded by the RU in the dedicated university directory, rUBB (<https://cercetare.ubbcluj.ro/ro/cercetarea-la-ubb/infrastructura-de-cercetare/>). This process is conducted annually according to a procedure approved by HCA 11134/13.06.2016 ([https://cercetare.ubbcluj.ro/wp-content/uploads/2018/05/Hotarare-cu-privire-la-Infrastructura-Strategica-de-Cercetare-a-UBB\\_CA\\_13.06.2016.pdf](https://cercetare.ubbcluj.ro/wp-content/uploads/2018/05/Hotarare-cu-privire-la-Infrastructura-Strategica-de-Cercetare-a-UBB_CA_13.06.2016.pdf)).

Indirectly, the work of RU members is also assessed in the Rector's annual report, as well as in the annual evaluations mandated by the line Ministry through bodies such as the CNFIS, aimed at establishing university funding.

## E. Ongoing assessment criteria

Normally, in the assessment of projects or personal files, the UBB Scientific Council will aim, except when explicitly stipulated otherwise, to award three types of ratings:

- a. Of significant/extensive impact\* by international standards (IE)
  - b. Of significant impact at South-East European/regional level (IR)
  - c. Does not yet meet the 'exceptional' criterion (potential impact, IP)
- 

Indicative examples explaining the criteria for awarding these ratings are the achievements listed below, i.e. the expected results of the assessed grant. The criteria will be applied liberally by the reviewers so as to avoid any abuse of scientometrics, whether in a positive or negative way.

**Relevant/extensive impact\* by international (IE) standards: *mutatis mutandis*, candidates with this rating should stand a reasonable chance of being short-listed for a teaching position at any leading university in the world**

i) **books** in at least 100 WorldCat indexed libraries ([www.worldcat.org](http://www.worldcat.org), with the exception of conference proceedings). The number of authors or the publisher's prestige may weigh significantly in the decision of the evaluator as to whether or not to award.

ii) an average of one **article as corresponding author** per year in a journal in the 'red' zone, as defined by the most recent UEFISCDI guidelines, in the past 5-10 years of activity. First author status is equivalent to 2/3 of a corresponding author status. **Book chapters** that are in at least 100 libraries, and **patents** from EU/US/Japan or similar markets are also counted here.

iii) Science/Nature article;

iv) more than 200 **citations** ('times cited') in international databases (Scopus, Thomson-Reuters, or comparable prestige) - or an average of more than 40/year for young people with less than 5 years of activity

v) more than 50 papers according to Scopus/ISI/ERIH - or an average of more than 5/year for young people with

under 10 years of activity

vi) **any other supporting data** that the outputs, ideas and concepts of the applicant are widely

recognised and employed at

top-level in the field and/or on society at large, with major impact (including national and local impact achievements); possible examples may be **major translations** into Romanian, books or book chapters with a demonstrated significant national **impact** or whose impact is reflected in **major catalogues** other than WorldCat, **articles in journals which have a major impact but are not yet included or recognised as such in the UEFISCDI colour coding, awards from a national Academy** (not in the field), and others.

**b Of significant impact at South-East European/regional level: *mutatis mutandis*, candidates with this rating should stand a reasonable chance of being short-listed for a teaching position at any leading university in the South-Eastern Europe**

i) an average of one corresponding author article per year in journals in the “**yellow**” zone according to UEFISCDI, or one article in the red zone (any author), over the last 5-10 years; this equals book chapters in more than 20 catalogues, and national patents

ii) more than 100 citations in international databases (same as in point a) or an average of more than 20/year for young people with less than 5 years of activity

iii) books in at least 20 international catalogues according to WorldCat, published in the last two years

iv) any other **relevant evidence** that the outputs, ideas and concepts of the candidate are recognised and employed in the field; and/or benefits society in general, with above average impact; possible examples might include relevant translations into Romanian, books or book chapters with an overarching national impact or whose impact is shown by other major catalogues than WorldCat, articles in journals with a major impact but not yet listed in the CNCS colour classification, awards from at least national scientific associations in general fields (i.e. Sociology), and others;

*\*'Relevant impact' is defined as output with a visibility and reach similar to the leading work in the field in the geographical area of that category. For the purpose of the above categories, a project with a strong local or national specificity will be of high enough impact in these areas so that it will subsequently be echoed internationally. From this point of view, what can be considered criteria in itself is not the method and actual area of dissemination of results - but the quality of the output and its impact in the scientific community and beyond. There is no need to add more than one criterion/condition.*

## **F. RU support programmes at UBB**

At UBB, the RU are supported by three pillars:

- 1.** Grants to support rUBB strategic infrastructure. The UBB research, development and innovation units have a modern infrastructure and equipment, mostly procured through institutionally run projects and capitalised in the economic sector. The Strategic Research Infrastructure of Babeş-Bolyai University - rUBB Platform - belongs to the UBB Institute for Advanced Studies in Science and Technology (STAR-UBB Institute) and is managed by the UBB Scientific Council. rUBB items are entered at the initiative/request of the RU that manages them and are selected in terms of scientific and/or social impact, user group, accessibility by members of the community and engagement in teaching activities. As of 2016, through STAR-UBB, UBB has awarded grants to support rUBB by in-house competition managed by the Scientific Council.
- 2.** STAR-UBB Fellowship Programmes - similarly awarded to rUBB Strategic Infrastructure Fellowships
- 3.** Administrative support from the Administrative Council for large RU reporting directly to the Rector's office - STAR-UBB, ICI-BNS, ICCRR, CSP. This support took the form of (a) access to financial resources from sources such as the Institutional Development Fund and Supplementary Funding from the line Ministry, allocated among faculties and institutes; (b) integration of a number of researchers into the scheme of differentiated trajectories by temporarily providing funding for work contracts during the periods funded by external grants; (c) approval of recruitment competitions for new researchers, where warranted by their previous achievements following the evaluations carried out by the SC.



## G. List of RU and their affiliations

The UBB accredited RU are listed in the Table below. During 2020 a re-accreditation procedure is scheduled - while the accreditation of new RU is an open process with no deadline.

Sr.No.	Name of research unit	Type of unit	Research unit director/supervisor	Research unit affiliation
1	Institute for Interdisciplinary Research in Bio-Nanosciences*	complex / innovative services	Professor Simon Simion, PhD	Vice-Rector's Office in charge of scientific research
2	Raluca Ripan Institute for Research in Chemistry - ICCRR	smart specialisation / innovative services	Second degree researcher (CSII) Pojar-Feneşan Maria	Vice-Rector's Office in charge of scientific research
3	Research Institute for Sustainability and Disaster Management based on High Performance Computing - ISUMADECIP	complex / innovative services	Professor Ozunu Alexandru, PhD	Faculty of Environmental Science and Engineering
4	Institute for European Research*	complex / innovative services	Professor Păun Nicolae, PhD	Faculty of European Studies
5	"Ioan Ursu" Physics Institute*	complex / innovative services	Professor Pop Aurel, PhD	Faculty of Physics
6	International Institute for Advanced Studies in Psychotherapy and Applied Mental Health*	complex / innovative services	Professor Anca Dobrea, PhD	Faculty of Psychology and Education Sciences
7	Nicolae Bocuşan Institute of Ecclesiastical History	complex	Second degree researcher (CSII) Cârja Cecilia	Faculty of History and Philosophy
8	Institute of National History - Historical Anthropology Seminar	complex	Professor Nicoară Toader, PhD	Faculty of History and Philosophy
9	Institute for Oral History	Smart specialisation*	Professor Radosav Doru, PhD	Faculty of History and Philosophy

10	Institute for Central European Studies	complex / services	Professor Ghitta Ovidiu, PhD	Faculty of History and Philosophy
11	Institute for Classical Studies	complex	Professor Bărbulescu Mihai, PhD	Faculty of History and Philosophy
12	Centre for Systems Biology, Biodiversity and Bioresources (3B)*	complex	Associate professor Keresztes Lujza, PhD	Faculty of Biology and Geology
13	Biocatalysis and Biotransformation Research Centre	smart specialisation* / services	Professor Irimie Florin Dan, PhD	Faculty of Chemistry and Chemical Engineering
14	Centre for Hazard and Risk Research	complex / services	Professor Petrea Dănuț, PhD	Faculty of Geography
15	Centre for Interdisciplinary Research in Physical Education and Sport	complex / innovative services	Professor Ciocoi-Pop Rareș, PhD	Faculty of Physical Education and Sport
16	Business Information Systems Research Centre	Smart specialisation*	Professor Gheorghe Silaghi, PhD	Faculty of Economics and Business Administration
17	Research Centre in Electrochemistry and Unconventional Materials - (CCEMN)	complex / services	Professor Mureșan Liana, PhD	Faculty of Chemistry and Chemical Engineering
18	Integrated Geological Research Centre*	complex / innovative services	Professor Filipescu Sorin, PhD	Faculty of Biology and Geology
19	Music Research, Training and Consultancy Centre	complex	Associate professor Peter Eva, PhD	Faculty of Reformed Theology
20	Vlad Mugur Centre for Research and Creation in Theatre, Film, and Media	complex	Professor Gologan Daniela, PhD	Faculty of Theatre and Film

21	Research Centre for Sustainable Development	complex	Professor Benedek Jozsef, PhD	Faculty of Geography
22	Applied Computational Intelligence Research Centre	smart specialisation	Professor Pop Horia, PhD	Faculty of Mathematics and Computer Science
23	Research Centre on Fundamental and Applied Heterochemistry (METALOMICA)*	complex / services	Professor Silaghi-Dumitrescu Luminița, PhD	Faculty of Chemistry and Chemical Engineering
24	Research Centre in Computer Assisted Chemical Engineering*	complex / services	Professor Agachi Șerban, PhD	Faculty of Chemistry and Chemical Engineering
25	Research Centre in Physical Chemistry	complex / innovative services	Professor Tomoaia-Cotișel Maria, PhD	Faculty of Chemistry and Chemical Engineering
26	Research Centre in Public Administration*	complex / innovative services	Associate professor Antonie Raluca, PhD	Faculty of Political, Administrative and Communication Sciences
27	Research Centre of Applied Analysis *	smart specialisation	Professor Precup Radu, PhD	Faculty of Mathematics and Computer Science
28	Research Centre for the Study of the Contemporary British Novel (CCRBC)	smart specialisation*	Professor Berce Sanda, PhD	Faculty of Letters
29	PHANTASMA Centre for Imagination Studies*	complex	Professor Braga Corin, PhD	Faculty of Letters
30	Centre for Research on Settlements and Urbanism	smart specialisation* / services	Associate professor Vasile Zotic, PhD	Faculty of Geography
31	Research Centre Ioan Lupaș*	smart specialisation	Pr.Professor Chirilă Ioan, PhD	Faculty of Orthodox Theology

32	Research Centre - Software Engineering	smart specialisation	Associate professor Motogna Simona, PhD	Faculty of Mathematics and Computer Science
33	Research Centre - Groups, Algebras and Applications	smart specialisation	Professor Mărcuș Andrei, PhD	Faculty of Mathematics and Computer Science
34	Supramolecular Organic and Organometallic Chemistry Centre – CCSOOM*	complex / innovative services	Professor Silvestru Cristian, PhD	Faculty of Chemistry and Chemical Engineering
35	Ekphrasis Centre	complex / innovative services	Professor Pop Doru, PhD	Vice-Rector's Office in charge of scientific research
36	Applied Philosophy Centre*	complex / innovative services	Professor Veress Carol, PhD	Faculty of History and Philosophy
37	Centre for Ancient and Medieval Philosophy	complex	Associate professor Baumgarten Alexander, PhD	Faculty of History and Philosophy
38	Centre for Regional Geography	smart specialisation/ services	Associate professor Rusu Raularian, PhD	Faculty of Geography
39	Centre for Language Industries	smart specialisation* / services	Professor Toader Mihaela, PhD	Faculty of Letters
40	Centre for the History of Books and Texts (CODEX)	smart specialisation	Associate professor Papahagi Adrian, PhD	Faculty of Letters
41	Centre for Romance Linguistics and Discourse Analysis (CLRAD)	complex	Professor Florea Ligia, PhD	Faculty of Letters
42	Electron Microscopy Centre	smart specialisation* / innovative services	Lecturer Lucian Barbu-Tudoran, PhD	Vice-Rector's Office in charge of scientific research
43	Centre of Pragmatics for Communication (CPC)	complex	Professor Oltean Ștefan, PhD	Faculty of Letters

44	Centre for Health Policies and Public Health	complex / innovative services	Professor Cherecheș Răzvan, PhD	Faculty of Political, Administrative and Communication Sciences
45	Centre for Population Studies*	complex	Professor Bolovan Ioan, PhD	Vice-Rector's Office in charge of scientific research
46	Centre for the Study of Democracy (CSD)	complex / innovative services	Professor Bădescu Gabriel, PhD	Faculty of Political, Administrative and Communication Sciences
47	Centre for the Study of Complexity	complex	Associate professor Lung Rodica, PhD	Vice-Rector's Office in charge of scientific research
48	Romanian Centre for Comparative Migration Studies (CSCM)	complex / innovative services	Second degree researcher (CSII) Anghel Remus	Faculty of Sociology and Social Work
49	Centre for Biblical Studies		Assistant professor Furtună Marius, PhD	Vice-Rector's Office in charge of scientific research
50	Centre for Roman Studies	smart specialisation*	Professor Piso Ioan, PhD	Faculty of History and Philosophy
51	Centre for the Study of Francophone Belgian Literature (CELBLF)	complex / services	Professor Pop Rodica, PhD	Faculty of Letters
52	Centre for Middle East and Mediterranean Studies	complex	Professor Diaconescu Alexandru, PhD	Faculty of History and Philosophy
53	Transylvania Digital Humanities Centre (DigiHUBB)	smart specialisation* / services	Assistant professor Moldovan Corina, PhD	Vice-Rector's Office in charge of scientific research
54	Work and Organizational Psychology Research Centre WOP-RC	smart specialisation*	Professor Curșeu Petru Lucian, PhD	Faculty of Psychology and Education Sciences

55	Research Centre in Strategic and Operational Marketing of Goods, Services and Territories – The Marketing Centre	smart specialisation*	Assistant professor Cocean Radu, PhD	Faculty of Economics and Business Administration
56	Centre for Applied Environmental Research - CERAM	smart specialisation*	Professor engineer Baciú Călin Laurențiu, PhD	Faculty of Environmental Science and Engineering
57	TRANS.SCRIPT – Centre for Diplomatic and Medieval Documentary Palaeography	smart specialisation*	Assistant professor Dincă Adinel, PhD	Vice-Rector's Office in charge of scientific research
58	ANALYTICA Centre	smart specialisation*	Professor Frențiu Tiberiu, PhD	Faculty of Chemistry and Chemical Engineering
59	Institute for Research, Development and Innovation in Applied Natural Sciences (ICDI-SNA)	smart specialisation	Associate professor Baia Lucian, PhD	Vice-Rector's Office in charge of scientific research
60	Media Systems and Languages Research Centre	complex*	Associate professor Tibori-Szabo Zoltan, PhD	Faculty of Political, Administrative and Communication Sciences
61	Centre for Patristic Studies and Ancient Christian Literature	complex	Associate professor Tat Alin Sebastian, PhD	Vice-Rector's Office in charge of scientific research
62	The Interdisciplinary Centre for Data Science	complex	Associate professor Norbert Petrovici, PhD	Vice-Rector's Office in charge of scientific research
63	Centre for Business Promotion and Regional Development	smart specialisation	Professor Răzvan Liviu Nistor, PhD	Vice-Rector's Office in charge of scientific research
64	Centre for Research and Prevention of Family and Societal Violence	complex	Associate professor Imola Antal, PhD	Faculty of Sociology and Social Work

## **H. Qualitative analysis of RU in reference to financial support; reflections on RU programme efficiency at UBB**

### **1. RU research programmes and their significant outputs**

The following sections outline the lines of research/programmes carried out by RU at UBB, citing some representative results. For assessing the impact of journals, the Scimago database was used, which covers all fields of research - unlike other options such as Web of Science. This option is justified by the use of Scimago in the evaluation of UBB Competitiveness Support Grants for Humanities and Arts. Also, we note that the IF and AIS bibliometric parameters derived from Web of Science data differ from each other and vary from year to year; the use of a more permissive database (Scopus - Scimago) allows to smooth out these oscillations, as long as it is used in a conservative way. Hence, significant RU contributions are further detailed based on the data submitted to the UBB administrative offices in the latest re-accreditation process and in view of the 'world-class' objective of UBB. At this point, we note that all accredited RU have publications that play a part in ranking UBB in international academic rankings - such as publications indexed in various databases, including those in upper quartiles, but also books, conferences and other high-impact outputs. In the following analysis, the focus is on the contributions linked most directly to EU competitiveness and/or the concept of 'world-class' - i.e. mainly books published by the most exclusive and high-impact publishers (including national ones where relevant) and articles in top quartile (Q1) journals in their fields. A re-accreditation process for the RU is currently ongoing and the report will be updated upon completion of this process.

### **2. Research units of excellence**

#### **PUBLIC ADMINISTRATION**

The **Centre for Research in Public Administration (CCAP)** develops key research areas such as the reform of public administration, free access to information of public interest, quality improvement

of public administration educational programmes, alternative justice methods, public participation and evaluation of public programmes. Most representative publications are with local publishers and journals, but also include books from prestigious publishers (e.g. Springer).

## **BIOLOGY**

The **Centre for Systems Biology, Biodiversity and Bioresources (3B)** aims to understand and describe the molecular phenomena and mechanisms underlying the functions of living organisms, from the cellular system to the individual, with the aim of identifying possible causes of pathological conditions and providing possible solutions to improve health. Furthermore, the identification and description of biodiversity components mainly found in Romania and its European vicinity (Central and South-Eastern Europe) as well as the underlying factors that may influence the distribution, composition and availability of wild species in the light of climate change, respectively in order to provide durable and sustainable solutions for the management of protected areas. Bioprospecting of habitats, known taxa, consortia of organisms or of synthetic compounds for the controlled production of bioresources (metabolites with potential industrial, biomedical, etc. use), understanding and optimising their synthesis pathways, and possible effects on cellular and individual levels in experimental models *in vitro* (microorganisms, plants and animals) and *in vivo* (plant and animal model organisms). Representative contributions can be found largely in the Q1 areas of their fields (e.g., Fungal Biology, PloS One, Cancer Letters) and in books from top publishers (e.g. Springer).

## **BIO-NANOSCIENCE**

The **Institute for Interdisciplinary Experimental Research in Bio-Nanoscience** provides services and conducts work in such fields as animal molecular and cell biology, bioarchaeology, nanomedicine, environmental molecular biology, plant molecular biology and physiology, molecular microbiology, insects (evolution, ecosystems, behavioural biology), genetic engineering, synthesis and structural characterisation of biocompatible materials with nanostructured surfaces, study of processes occurring on the interface between nanostructured materials and biological fluids enriched with biomolecules, glassy and glass-ceramic materials, research on the interaction between biomolecules and nanocrystals, oxidative materials in photocatalysis processes for environmental remediation, nanomanipulation of biomolecules using atomic force microscopy, nanosystems based on plasmonic nanoparticles bio-functionalised with specific biomolecules, drug molecules or (and) reporter molecules for biomedical applications in the field of nanomedicine, especially in the treatment of



cancer (nano-chemotherapy, photodynamic nano-therapy, plasmon resonance hyperthermia, multimodal therapy, molecular diagnostics and imaging, etc.). ), development of plasmonic nano(bio)sensors and nanodevices based on (periodically) nanostructured metal films or colloidal nanoparticles for detection and identification of biomarkers or (bio)chemical agents by spectroscopic methods, fast, reliable and inexpensive nanofabrication and nanostructuring procedures, validation of confocal microscopy (Raman and time-resolved fluorescence) as complementary methods in (nano)toxicity analysis and in medical diagnostics at cellular and tissue level, conjugated polymers, graphene and nanocomposites for optoelectronics and biosensing, computational chemistry and structural studies, luminescence and/or radioisotope dating, study of luminescent dosimetric properties of new and/or unconventional materials, environmental and medical dosimetry, environmental radioecological monitoring through natural and artificial radioactivity studies, soil erosion monitoring, integrated geological studies, genetic counselling, electrochemical remediation and waste recovery processes. Relevant publications feature in leading Q1 journals such as Nature, Nanotechnology, ACS Applied Materials & Interfaces, ACS Applied Materials and Interfaces.

## **CHEMISTRY**

### **Supramolecular, Organic and Organometallic Chemistry**

The Supramolecular Organic and Organometallic Chemistry Centre (CCSOOM) operates and offers services with internationally relevant expertise in the field of supramolecular chemistry (host-guest systems, self-assembled organic or organometallic components), dynamic constitutional libraries and adaptive precursors, heterocyclic chemistry, smart materials with applications such as optoelectronics, stereochemistry, organometallic tectons, coordination and organometallic syntheses with practical applications (e.g., catalysis, magnetism), biologically active compounds, theoretical chemistry. Representative contributions include articles published in top Q1 journals such as Chemical Communications, Inorganic Chemistry, Journal of the American Chemical Association, Coordination Chemistry Reviews, Dalton Transactions.

### **Synthetic and applied chemistry in the field of biology**

**Research Centre on Fundamental and Applied Heterochemistry (Metalomica)** conducts research and provides services in the areas of 1. synthesis of new coordination and organometallic compounds with potential biological action; 2. studies of metal coordination chemistry under biologically relevant conditions; 3.

the application of computational chemistry and modelling the structure and behaviour of biologically active compounds of metals under conditions as close as possible to those in the living organism, the study of the structure-activity relationship; 4. the study of metalloenzymes (mechanisms of action, the study of oxidative and nitrosative stress reactivity); 5. the study of cytotoxicity and genotoxicity of newly synthesized substances, the identification of those that induce apoptosis, have antiproliferative and antimetabolic properties; 6. Design of genome-wide phenomena following the exposure of cells to these substances and their regulatory effect on biosynthesis. Representative publications of the centre are in journals such as Coordination Chemistry Reviews, Chemical Communications, Chemistry-A European Journal, Biomacromolecules Corrosion Science, Inorganic Chemistry, Physical Chemistry Chemical Physics, Organometallics, Dalton Transactions, Dyes and Pigments (all in Q1 and several among the first in this category).

## **PHILOSOPHY**

The **Centre for Applied Philosophy (CFA)** serves society and conducts research in areas such as modern and postmodern cultural practices, cultural policies, cultural values, cultural globalisation and intercultural relations, communication in postmodern societies, tradition and historicity in contemporary culture, practical applications of aesthetics, professional responsibility and practices, ethical tools, institutions, and practices, medical ethics and research ethics, medical philosophy and anthropology, hermeneutics of culture and communication. Representative publications feature predominantly in local journals and publishers.

## **PHYSICS**

The **Ioan Ursu Institute of Physics** provides services and conducts research in complex fields covering condensed matter physics and advanced materials physics, biomolecular and nuclear physics, computational physics and astrophysics. Representative publications feature in top-ranked journals in their relevant Q1 subject areas - Nature Communications, Science, Proceedings of the National Academy of Sciences of the United States of America, Neuron and others.

## **GEOLOGY**

The **Centre for Integrated Geological Research (CIGR)** seeks to coordinate geological scientific research in the subfields associated with geology, with interdisciplinary applications carried out primarily in fields of hard and natural sciences. Research in the field of geology of magmatic,

metamorphic and sedimentary structures in Romania and abroad is conducted in the context of the genesis, historical evolution and geotectonic framework, providing applications of fundamental knowledge, discovery and effective management of mineral resources, environmental knowledge and protection. Research topics include micropalaeontology, biostratigraphy, palaeoecology, palaeogeography and sedimentology of sedimentary formations, isotopic geochronology, geochemistry of the environment, sediments and mineral waters, origin, composition and evolution of continental crust and pre-alpine units, petrography and mineralogy of non-metallic and metalliferous rocks and minerals, physical and mechanical properties of geomaterials, metallogeny, economic geology, speleology/carstology, karst geomorphology, subsurface topography, applications in environmental protection, applied mineralogy (ceramics, cement/binding agents, glass, abrasives, refractories), mineralogical petrographic applications in archaeology, study of climate change and effects of anthropogenic activity. Some of the most relevant publications include articles in major journals such as *Precambrian Research*, *Cretaceous Research*, *Quaternary Science Reviews*, *Geochimica et Cosmochimica Acta*, *Marine Micropaleontology*, *Chemosphere*, *American Mineralogist*, *Journal of Quaternary Science*, as well as books from prestigious publishers (e.g. Springer). All of the above-mentioned journals are ranked Q1 in scientometric ratings. CCGI also provides services for the community in terms of sample analysis, geological mapping and consultancy on prospecting, exhibitions, or training activities.

## **BUSINESS INFORMATION SYSTEMS**

The **Business Information Systems Research Centre** operates in the fields of collaborative distributed systems (resource management in heterogeneous distributed systems, task scheduling in heterogeneous distributed systems, dependability and security in distributed systems, high performance computing, volunteer computing, collaborative multi-agent systems, service level agreements, automatic service contract negotiation techniques, big data analysis and processing in distributed systems, social cloud) and knowledge management in business processes (modelling of business processes and information flows, knowledge and content representation and management, semantic Web, Linked Data, business process optimisation - Process Mining, study of human-computer interaction, speech recognition systems for the Romanian language, study of educational processes and e-learning). Representative publications feature both in books published by leading publishers (e.g. Springer) and in peer-reviewed journals, many of them in Q1 (e.g. *Information Systems*, *Future Generation Computer Systems*).

## **CHEMICAL ENGINEERING**

The **Research Centre in Computer Assisted Chemical Engineering** conducts research and provides services to the community and socio-economic sector in areas such as mass, heat and momentum transfer enhancement, energy conversion systems, clean coal technologies, renewable energy sources, carbon capture and storage, environmental protection (air purification and water treatment), risk assessment and safety of industrial systems), nanomaterials and biomaterials, biomedicine, food, agriculture, biotechnologies, design and implementation of industrial energy monitoring and management systems, design and management of computer-aided chemical processes, development of modern tools for e-learning, distance education and implementation of the tele-laboratory concept. The centre features among its representative contributions articles in the Journal of Cleaner Production, Fuel and other journals, including publications in the Q1 rankings. They also list key reference books from prestigious publishers (e.g. Springer), articles in engineering conference proceedings, patents.

## **LITERATURE**

The Phantasma Centre for Imagination Studies focuses on the analysis of literary and artistic imagery through methods such as psychocriticism, mythocriticism, archetypology, imagology, which provide a hermeneutic of cultural imagery from an immanent perspective, seeking to combine these methods with a participatory approach in order to identify the core of the fascination that feeds the constellations of artistic images. It also analyses the social and political imagination, with a focus on analysing how images operate at the level of social groups and the collective unconscious, with possible implications for a series of subliminal, ideological, political manipulations, etc. Relevant publications include a substantial number of books published by elite publishers in France and abroad, such as Classiques Garnier, L'Harmattan and Polirom.

## **MATHEMATICS**

The research topics of the **Centre for Applied Analysis** include nonlinear analysis, differential equations, optimisation, complex analysis, numerical analysis, approximation theory, theoretical mechanics. Relevant publications fall largely in the Q1 area within the field (e.g. Nonlinear Analysis - Theory, Methods & Applications, Journal of Differential Equations, Mathematische Annalen).

## **EXPERIMENTAL PSYCHOLOGY**

The **International Institute for Advanced Studies in Psychotherapy and Applied Mental Health** conducts fundamental/basic/exploratory research (identifying the psychological mechanisms involved in psychological disorders. Our framework is that of ‘clinical cognitive (neuro)sciences’), translational research (tapping into the mechanisms involved in mental disorders - identified by us or by other research groups - to develop new psychological treatments. Our working paradigm is ‘clinical science’), and applied research - testing innovative and novel clinical protocols in controlled clinical trials. Analysis will be conducted on a multi-level basis: (1) efficacy and effectiveness outcomes, (2) theory/mechanisms of change and (3) cost-benefit analysis. Advanced robotic, virtual reality, online, telecommunication and computer-based technologies are used as part of these protocols. The major paradigm is that of personalised evidence-based psychological treatments. The institute also conducts development-innovation research - it pursues research that investigates how innovative treatments are assimilated as standards of good practice and the barriers impeding their dissemination. The working paradigm is ‘scientist-practitioner’. Most relevant publications feature in books from prestigious publishers (e.g., Springer, Routledge, Oxford University Press, Polirom) and in Q1-only journals (e.g., Journal of Clinical Oncology, JAMA Psychiatry, The American Journal of Psychiatry, Clinical Psychology Review).

## **EUROPEAN STUDIES**

The Institute for European Studies addresses topics such as the modernisation of Romanian society and the EU, competitiveness in the EU, the impact of market liberalisation for Romania, European identity, shaping the new Europe, disintegration vs. Integration in Eastern Europe. The Institute’s emblematic contributions include its services to the socio-economic sector, its engagement in public life and the media, as well as volumes published by national and international publishers (e.g. L’Harmattan).

## **POPULATION STUDIES**

The **Centre for Population Studies** focuses on demography and sociology of population, historical demography, history and sociology of childhood, historical socio-anthropology. Some specific research topics are: demography of Romania, intergenerational relations, transnational families, construction and management of historical databases, history of the Transylvanian family in the 19th century, classification of historical occupations, propaganda and communication during the First World War,

ecclesiastical-political relations, state and society, socio-professional groups in Transylvania, medieval and early modern history of Transylvania, administrative and ecclesiastical structures, legislative organisation, demographic structures and processes, cultural, material and immaterial heritage, formation, operation and ideology of political elites in Transylvania and Banat (1867-1930). Relevant publications include books published by local and international publishers, as well as journals, of which several are at the forefront of their field.

## **THEOLOGY**

The **Ioan Lupaş Research Centre** focuses on community and religious activities of noteworthy impact, besides which it contributes a number of publications to local publishers and journals.

### **3. Other accredited RU**

#### **INSTITUTE FOR RESEARCH-DEVELOPMENT-INNOVATION IN APPLIED NATURAL SCIENCES**

(**ICDI-SNA**) is specialised in organic and organometallic synthesis and structural analysis, advanced materials and applied technologies, biomolecular modelling and computational spectroscopy, applied Raman spectroscopy and community services, applied clinical psychology, biotechnologies, applied microbiology, chemical engineering - flame spraying, *Drosophila* and insect genetics. Representative contributions have not yet been evaluated, as the Institute is newly established.

#### **LIBERAL ARTS AND CREATIVE TECHNOLOGIES**

The Ekphrasis Centre for Transdisciplinary Research, Liberal Arts and Creative Technologies seeks to engage in research as well as creative activities in the field of all creative technologies, combining various forms of knowledge, from art and literature studies to interactive media studies and online media sciences, from psychology and political studies to video production or 3D image production, from mobile communication systems to web service, animation or computer graphics, from traditional journalism to storytelling in interactive and non-traditional environments. Representative contributions include artistic creation and (by default) transfer to the community, as well as contributions to publishers and journals, including some with international reach.

## **BIOLOGY**

The **Electron Microscopy Centre (CME)** provides services and conducts research in the fields of life sciences (including structural biology), earth and materials sciences, microelectronics, product quality analysis. CME's representative publications feature in journals such as European Journal of Pharmaceutics and Biopharmaceutics, Physical Review Letters, Journal of Controlled Release, Pancreatology, Experimental Dermatology, Physical Chemistry Chemical Physics, Journal of Invertebrate Pathology, Journal of Insect Conservation - 80% in the first quartile (Q1) category.

## **CHEMISTRY**

**Biocatalysis and Biotransformation Research Centre (CCBB)** conducts research and provides services for the development of advanced technologies using biocatalysts to generate highly useful organic compounds most efficiently. Published articles feature in leading journals (Q1 and even ranking among the top in this category) such as Angewandte Chemie International Edition, Tetrahedron: Asymmetry, and ChemCatChem.

**Research Centre in Electrochemistry and Unconventional Materials (CCEMN)** focuses on applied research and services in areas such as electrode materials (modified electrodes, organic and inorganic aerogels) with electrocatalytic and photo(electro)catalytic properties (including depollution), electrochemical sensors/biosensors, electrodeposition of metals and composites, inorganic electrosynthesis, corrosion and corrosion protection, nanostructured (bio)composites with applications in medicine, recovery and recycling of metals from waste electrical and electronic equipment, electrochemical methods for the investigation of electrode processes, design and development of computer-controlled electronic equipment for the control of electrochemical processes. Representative publications feature in journals such as ACS Catalysis, Journal of Electroanalytical Chemistry, Waste Management and others - approximately 50% in the Q1 category.

**Raluca Ripan Institute for Research in Chemistry (ICRR)** offers services, production and research in the fields of chromatographic materials/methods to determine organic pollutants in various matrices, environmental quality control and assessment, eco-friendly recovery of precious metals from waste, treatment of waste water and exhaust gas, pheromone based products for ecosystem protection,

technologies and products for dental applications, technologies and products for medical applications, chemical investigation methods in pharmaceutical biomedicine and forensic medicine, technologies and methods for food safety, chromatographic methods for food quality control, technologies for eco-friendly production of materials with special properties, non-conventional biotechniques for pest control in vegetable, viticulture and fruit farming. Representative publications include national patents, but also journal articles, a small proportion of which rank in the Q1 category (e.g. Food Chemistry).

**Research Centre in Physical Chemistry** conducts research at the interface between Physical Chemistry, Biophysics, Colloidal and Interfacial Chemistry, NanoMedicine, Molecular, Colloidal and Cellular Medicine, NanoBiotechnology, NanoBioMaterials, Tissue Engineering. Representative publications feature in leading journals, ranked just under 50% in the Q1 category (e.g. Colloids and Surfaces B Biointerfaces, Journal of Applied Polymer Science) but contributions also include invention patents and books published by major publishers.

**Research Centre for Advanced Chemical Analysis, Instrumentation and Chemometrics (ANALYTICA)** focuses on the development of analytical methods by optical spectrometry using microplasma sources, analytical instrumentation for environmental and food quality control, chemometric methods for the evaluation of analytical and bioanalytical data, development of green sample preparation methods and chromatographic analytical procedures for the investigation of pharmaceuticals, phytopharmaceuticals, food and environmental samples, fingerprinting, authentication and quality control of food products, information and consultancy services for business and industry on environmental monitoring and protection and food safety. Representative contributions include mainly publications in the Q1 category in their fields (e.g. RSC Advances, Food Chemistry, MATCH).

## **COMMUNICATION**

**Media Systems and Languages Research Centre (CCSLM)** focuses on structures and systems in digital media, visual communication in digital media, computer-mediated communication and consumption practices, tools and techniques in digital media, media history, journalism and public communication, audience consumption and reception of journalistic content, virtual communities and participatory journalism, professional practices in media production, European media legislation, media impact on human psyche, media literacy/media analysis, developments in contemporary journalism education. Representative contributions include articles published in Q1 journals.



## **ECONOMICS**

**Research Centre in Strategic and Operational Marketing of Goods, Services and Territories - 'The Marketing Centre'** provides consultancy/services and conducts research in the fields of marketing related to growth markets, third sector, territory/place, industrial/inter-organisational, consumer goods, public sector, politics, academia, non-profit, neuromarketing. Representative publications feature in international journals.

The **Centre for Business Promotion and Regional Development (CPADR)** focuses on developing the conceptual, theoretical and methodological framework for business management and regional development, providing tools for the development of private initiative: consultancy services and training programmes, conducting financial analysis and market studies, promoting SMEs in the framework of the EU regional development programme, providing assistance and expertise in regional development programmes to boost economic, technical and scientific cooperation with regions in the European Union. Representative publications feature in international journals.

## **PHYSICAL EDUCATION AND SPORT**

The Centre for Interdisciplinary Research in Physical Education and Sport studies movement analysis and psychomotricity, the relationship between motor activities and quality of life in different categories of population, various training methods affecting the capacity for physical effort, psychosocial behaviour in sporting groups. It also provides services for the community. Relevant publications of the centre feature in journals such as the European Physical Education Review, Journal of Neurolinguistics and others (20% of them in the Q1 category within the relevant professional area).

## **PHILOSOPHY**

The **Centre for Ancient and Medieval Philosophy** focuses its research on medieval Latin commentaries on Peter Lombard's Book of Sentences (critical editions and studies of manuscripts and incunables), medieval Latin commentaries on the *Liber de causis* (Book of causes) (critical editions and studies of manuscripts), political philosophy in Antiquity and the Middle Ages, critical translations into Romanian of fundamental texts of ancient and medieval philosophy, Digital Humanities for medieval philosophical texts. Relevant publications are available from top-tier publishers in the country and abroad (e.g. Brepols, Polirrom).

## **GEOGRAPHY**

The **Centre for Regional Geography** provides services to the community and conducts research related to spatial planning and development, local and regional development, development of spatial plans, development strategies for various territorial levels, regional analysis of country and county territorial units, analysis of cultural landscapes. Relevant contributions include planning and/or urban development plans for key municipalities/regions in Romania, as well as articles in professional journals and books - most of them with a local focus/approach.

The **Centre for Hazard and Risk Research** deals with natural and man-made hazards and risks (in the fields of physical and technical geography) and geomorphology (dynamic geomorphology; engineering and experimental geomorphology); anthropogenic geomorphology; fluvial geomorphology), hydrology, hydrometry, hydraulics, limnology, meteorology, climatology, dendrochronology (dendrogeomorphology, dendroclimatology), pedology, geomatics, remote sensing, topography, cartography. Relevant publications feature in books from prestigious publishers (e.g. Springer) and articles in scientific journals, some of them in Q1 category (e.g. Quaternary International, Natural Hazards).

The **Research Centre for Sustainable Development** addresses topics such as climate change and green energy, sustainable transport, sustainable development assessment methodologies and systems, regional development, urban planning and sustainable urban development. Relevant outputs include services to the community and public institutions as well as publications in peer-reviewed journals, including two major journals (Nature Communications, Accident Analysis and Prevention).

The **Centre for Research on Settlements and Urbanism** covers theoretical and methodological approaches in the analysis of human settlements (location and spatial distribution, identity and typology of settlements, polarisation zones, settlement systems, geodemographic changes in the post-communist period, regional geodemographic disparities), urban and spatial planning (architecture and urban design, urban planning, internal structure and functional zoning, technical infrastructure, public transportation and urban circulation, models of sustainable planning of suburban and peri-urban spaces, models of integrated development of geographical space, spatial organisation and spatial planning in areas with fragile geographical environments, strategies for sustainable development of critical geographical areas, current issues and trends in spatial planning, theories and

models for sustainable development, demographic and socio-economic spatial assessment, planning of technical infrastructure, natural resources - assessment, use and impact, geographical risk in spatial planning, landscape planning, agriculture, forestry, alternative land use, mining areas, tourism planning, GIS applications in spatial planning, alternative energy sources and spatial development), urban and rural development (including structural changes in spatial technical infrastructure development and urban development, hypertrophy of urban areas in Romania and structural changes in the national settlement system, socio-economically disadvantaged areas), and interdisciplinary research topics (cultural heritage of rural communities and forms of heritage preservation and management, tourism development and planning issues, Natura 2000 ecological network - territorial development and implementation theory and methodology). Relevant outputs include services to local authorities and the socio-economic environment, as well as articles in scientific journals - mostly local.

## **COMPUTER SCIENCE**

The **Software Engineering Centre** focuses on software systems modelling, model analysis and verification, testing, quality and evolution of software systems. Relevant contributions feature largely in leading conference proceedings and journals, some in the Q1 category (e.g. Neurocomputing).

The **Applied Computational Intelligence Group** investigates the complexity of real-world problems, complex software systems that continuously adapt to a dynamic real-world environment, the use of computational intelligence techniques in the development of specific applications, the design, application and development of computational paradigms inspired by biological, social and linguistic fields, fuzzy systems, neural networks, cognitive systems, nature-inspired systems and hybrid intelligent systems in which all these paradigms are contained, intelligent data analysis methods, formal concept analysis, applications of computational intelligence in bioinformatics, application of machine learning techniques in software engineering, computational linguistics, quantitative and qualitative text analysis methods, intelligent medical data management and analysis, search-based software engineering, intelligent medical data management and analysis, machine learning methods and applications. Relevant publications feature in Q1 journals (e.g. MATCH, Journal of Optimization Theory and Applications, Neurocomputing) and in established conference proceedings in the field.

## **HISTORY**

The **Institute for Classical Studies** focuses on the history and archaeology of Roman Dacia,

population and society, ancient spirituality, military history and archaeology, funerary archaeology, Roman roads, ancient topography, numismatics, civil and military architecture of Roman Dacia, landscape archaeology, modern methods and techniques in archaeology, ancient geography. Relevant publications feature in local and international journals.

The **Nicolae Bocşan Institute of Ecclesiastical History** studies ecclesiastical history in its multiple aspects: organisation, religious life, confessional schools, personalities, state-church relations, interfaith relations, relating to all historical denominations in Romania and Central and Eastern Europe. Relevant publications feature predominantly in local journals and publishers.

The **Institute for Central European Studies** focuses on the history of elites in the 14th-20th centuries, religious literature in the medieval, pre-modern and early modern periods, denominational identities in the medieval, pre-modern and modern eras, faith and devotion in the medieval urban area, mobility, travel, tourism in the 18th-20th centuries, oral culture and written culture from medieval to modern times, art and society in Transylvania in the 16th-20th centuries, cultural history of the First World War. Relevant publications include both local and international publishers (e.g. Brepols, Ashgate, L'Harmattan).

The **Historical Anthropology Seminar** focuses on theoretical and methodological issues of historical anthropology, specific topics relating to mindsets, imaginary, violence, kinship, family, history of the human body, food, clothing, fashion, leisure, religious anthropology, celebrations, memory, outsiders, attitudes towards death, cultural history of the Great War, etc. Relevant publications include the journal published by the Centre.

The **Centre for Roman Studies** is a smart specialisation unit focusing on classical studies, digital epigraphy, archaeological research (invasive and non-invasive). Relevant publications feature mainly with leading international publishers. (e.g., Routledge, Archaeopress).

The **Oral History Institute** covers topics such as anti-communist resistance, history of the communist regime, history of ethnic minorities (Roma, Armenians, Czechs, Jews, Transylvanian Saxons, Swabians), history of borders and border crossers, history of the Second World War, history of various denominations in Romania (e.g., Seventh Day Adventist Church in Romania during the communist period, Baptist Church, Burning Bush Movement, Orthodox Church, Greek Catholic Church), communist repression (Periprava, Aiud), local history (Cluj-Napoca, Alba Iulia, Blaj, Ada-

Kaleh Island), the history of collectivisation, the history of school and university. With a few exceptions, representative publications feature largely in local publishers and journals.

The **Centre for Middle East and Mediterranean Studies** explores the historical, political, cultural, religious and economic aspects of the Middle East and the Mediterranean region from antiquity to the present time. Representative publications range from translations of major works to original publications, a number of which with leading publishers (e.g. Polirom).

**TRANS.SCRIPT.** The Centre for Diplomatic and Latin Paleography explores the cultural heritage handed down in written form throughout Transylvania in the Middle Ages and at the turn of modernity, closely related to historical developments throughout Romania and Central and South-Eastern Europe. This cultural heritage is studied through an applied approach, questioning the morphological evolution of Latin graphic forms that have evolved over more than a millennium. Representative contributions can be found among the leading publishers (e.g. the Romanian Academy Publishing House).

## **LITERATURE**

The **Research Centre for the Study of the Contemporary British Novel (CCRBC)** focuses on the exploration of the narrative imaginary of contemporary British novel viewed from a double perspective (cognitive and communicative), as well as the far-reaching transformations in the role of literature in recent decades, from the aesthetic and cognitive function, to that of communication and social interaction, the offshoots of narrative interplay, moving from the level of inter-subjectivity depicted in the novel, expanding to the exploration of the discursive contention between literature and other forms of communication, such as the visual arts, media or information technology (electronic communication). Representative publications feature prominently in local publishers and journals.

The **Centre for Romance Linguistics and Discourse Analysis (CLRAD)** conducts research in Romance linguistics (contrastive analysis of French, Romanian, Italian, Spanish; syntax, semantics and lexicology studies of Romance languages; research in the history of language and linguistics) and discourse analysis (linguistic and pragmatic analysis of journalistic discourse; argumentative discourse, electoral debates and television talk shows; spoken French analysis; enunciative pragmatic analysis of literature). Representative publications have been published by national and international publishers.

The **Centre for Pragmatics of Communication (CPC)** covers the research areas of monolingual and multilingual communication, didactic and scientific communication, research in the field of discourse analysis (media, political discourse), pragmatics of spoken language, pragmatics of Internet language (the language used by young people on forums), theoretical studies in pragmatics (philosophy, language, diachronic, cultural, comparative pragmatics, language acts and macropragmatics, cognitive theories with pragmatic, semantic and syntactic implications, communicative competence in the context of technological development in communication, language and identity, linguistic biographies. Representative publications feature predominantly in local journals and publishers.

The **Centre for the History of Books and Texts (CODEX)** explores the history of medieval manuscript books in general and of Transylvania in the 11-16th centuries in particular. Relevant publications have been published by major publishers in the field (e.g. Romanian Academy Publishing House, Polirom, Brepols) and in international journals.

The **Centre for the Study of Francophone Belgian Literature (cELBLF)** addresses Romanian-Belgian intercultural relations, the periphery-centre relationship in the French-speaking context, the Belgian school of the strange (text-image relationship), inter-generational relations (sociological, psycholinguistic, anthropological, historical perspectives, Romanian and French-speaking author-artists, bilingualism and cultural mixing, the border paradigm in the French-speaking world. Relevant contributions focus on the involvement in society by organising cultural events, but also include books and articles, including international ones.

The **Centre for Language Industries (CIL)** provides services and conducts research in areas such as professional multilingual communication in the business and economic environment, professional language teaching and practice, teaching translation and conference interpreting, language industries (research, documentation, technology and cognitive transfer in the field of language engineering (translation studies, terminology, conference interpreting, assisted translation, linguistic and cultural mediation, localisation and subtitling). Relevant publications feature in local journals and publishers.

The **DigiHUB Centre** focuses on the field of digital humanities. Relevant contributions include activities involving interaction with the socio-economic environment, as well as publications in local journals/publishers.

## **MATHEMATICS**

The **Centre for the Study of Complexity** applies game theory methods, computational intelligence techniques, knowledge extraction from data, social interaction modelling, behavioural and computational economics. Representative publications fall largely in the Q1 category and feature in major computer science conference proceedings (e.g. Scientometrics, PloS One, Soft Computing).

The **Research Centre Groups, Algebras and Applications** covers the fields of category theory and homological algebra, abelian groups and modules, universal algebras and multialgebras, representations of finite groups and finite dimensional algebras, applications of algebraic code theory. Representative publications feature almost exclusively in Q1 category journals (e.g., Bulletin of the London Mathematical Society, Journal of Algebra, Journal of Pure and Applied Algebra).

## **ENVIRONMENT**

The **Research Institute for Sustainability and Disaster Management based on High Performance Computing - ISUMADECIP** provides consulting and conducts research in fields such as sustainability, sustainable environmental protection, disaster management, prevention and mitigation of environmental, technological and NATECH hazards, high performance computing, quantitative risk analysis, computer-aided chemical engineering, remote sensing and atmospheric monitoring and GIS, environmental education - emergency preparedness, assessing the environmental impact of risk factors, integrated environmental management systems, contaminated sites, waste management and bioremediation technologies, development of basic information networks for communication and disaster relief, statistical modelling of large databases, numerical and statistical simulations, model optimisation, predictive studies and forecasts, training programmes, workshops and seminars for teachers, students, researchers, practitioners and administrators in the field of disaster management, environmental impact assessment studies, environmental assessments. Most representative contributions are in the Q1 categories of their fields (e.g. Atmospheric Chemistry and Physics, Waste Management, Environmental Science and Policy).

The **Centre for Applied Environmental Research/ CERAM** provides services to the community and conducts research on a range of topics including systematic measurements of radon in indoor air, soil and water in all areas of Romania, monitoring the concentration of radon, thoron and other chemical pollutants affecting human health in indoor air (active and passive, contemporary and retrospective methods), risk mapping of residential/occupational exposure to radon, radon measurements in caves and underground environments, studies on radon as a seismic precursor, assessment of annual effective dose and quantification of population exposure risk, investigation of greenhouse gas emissions from natural and anthropogenic sources, innovative systems for municipal waste management, assessment of pollution in industrial and urban areas. Relevant contributions include community services, patents, books published by major publishers (e.g. Springer), articles published in leading journals (e.g. Nature, Biogeosciences).

## **MUSIC**

**Music Research, Training and Consultancy Centre (MUSICA)** focuses on research topics covering the evolution of melody and rhythm from a musical stylistic and aesthetic perspective, the role of Romantic forms of musical expression in shaping a particular compositional trend or style, the rhetoric of late European Romantic music, composition trends in contemporary Hungarian choral works, comparative analysis of reformed hymn books published in Transylvania, analysis of choral works inspired by liturgical hymn tunes, development of Hungarian folk instruments in the 18th-20th centuries, folklore arrangements in the works of Hungarian composers from Transylvania, stylistic-aesthetic features of Verdi's work against the background of paradigmatic female characters, female solo prayer in Romantic opera, the 'castrati' phenomenon in the 16th-18th centuries, the musical instruments of antiquity as echoed in the Old Testament (especially in the Psalms), the evolution of musical wind instruments (woodwind, brass) in the 17th-19th centuries, cultural transfer between organ builders in the Austro-Hungarian Empire in the 19th century. Representative contributions include professional consulting and public concerts, as well as publications in mostly local volumes and journals.

## **PSYCHOLOGY**

The **Work and Organisational Research Centre** investigates cognitive dynamics in group learning and creativity, rationality of group decisions, emergent cognitive structures, as well as



affective dynamics in the exploration of emergent states within groups. Likewise, the centre focuses on relational dynamics in coaching, social networks and decision-making quality. Relevant contributions feature largely in journals in the Q1 category of their field (e.g. Management Decision, Human Resource Management Review).

## **PUBLIC HEALTH**

The **Centre for Health Policies and Public Health** focuses on health management and policies (development, implementation and evaluation of programmes designed to improve the effectiveness of the health system, as reflected in an improved population health. Developing public policies and advocating for the use of research findings in the development of public and health policies), community and behavioural health (improving the quality of individual and community health by building an understanding of the interaction between social, psychological and behavioural factors that influence health. Development, implementation, evaluation of programmes and policies to address health risk behaviours drawing on research outputs. Maternal and child health, smoking and other risk behaviours, mental health, health promotion and social marketing), health and safety (potential and existing environmental factors, both ambient and man-made; control and prevention of accidents and violence, environmental health and occupational health; health risk assessment and research in injury monitoring and control, child safety, violence prevention and safety advocacy, rural health and occupational health), international cooperation and development of expertise in public health education and research. Relevant outputs include around 50% of articles in the Q1 category (e.g. Journal of Community Health, Health Research Policy and Systems, Health Policy, Contemporary Clinical Trials).

## **SOCIOLOGY**

**Romanian Centre for Comparative Migration Studies (CSCM)** addresses the social aspects of this phenomenon. Representative publications include international scientific journals and analyses disseminated in the public sector and national media.

The **Interdisciplinary Centre for Data Science - CISD** pursues four major lines of action: (a) building databases and interlinking, (b) data mining, (c) complex data analysis, (d) reporting analyses. Relevant publications feature generally in volumes from leading publishers (e.g. Routledge, Palgrave MacMillan) and journals, some of which are in the Q1 categories in their fields.

The **Centre for Research and Family and Society Violence Prevention** focuses on scientific research and technological development in the areas of: violence against children, child welfare and protection, family structures, domestic violence, structural violence and discrimination and marginalisation of social groups. Representative contributions generally revolve around involvement in the social sector and local publications.

## **POLITICAL SCIENCE**

The **Centre for the Study of Democracy (CSD)** provides services for the community and conducts research on democratisation, education policy, migration, ethnicity, civic education, institutional design, international development and electoral behaviour. Representative contributions cover projects and policies with public impact, also with national authorities, as well as publications with prestigious publishers (e.g. Oxford University Press) and in peer-reviewed journals, some of which are in Q1 (e.g., International Journal of the Commons, Communist and Post-Communist Studies).

## **THEATRE**

The **Vlad Mugur Centre for Research and Creation in Theatre, Film and Media** conducts research on a range of topics such as dramaturgy of the everyday (referencing artistic and media outputs to the social environment), reading theatre and film, audience research, theatre and new multimedia technologies, theatre history and theory, theatre iconography, theatre anthropology, spectacology, aesthetics, visual culture and anthropology, ideology and politics in mass media, research methods in visual culture and art, realism and supernatural in cinema, contemporary Romanian film, multimedia performance, video art, experimental models, management and entrepreneurial models in creative industries, new media, transmedia, crossmedia. Relevant contributions include the transfer to society along the lines mentioned above, but also publications in journals and publishers - mostly local.

## **THEOLOGY**

The **Centre for Biblical Studies** specialises in biblical isagoge, exegesis - paying particular attention to the output of international biblical research, biblical theology, biblical philology, the interference of biblical theology with systematic theology and ecumenical theology. Relevant publications feature in volumes published by major international publishers.

The **Centre for Patristic Studies and Ancient Christian Literature (C.S.P.L.C.A.)** studies classical philology (Greek, Latin, Hebrew, Coptic, Syriac), ancient history of the Mediterranean region, ancient philosophy, ancient Christian literature, patristic philosophy and theology. The Centre is new and the list of its representative contributions has not yet been reviewed.

#### **4. Financial support for RU from UBB in-house grant competitions**

As of 2016, UBB has won a total of 5 grants from the Ministry - 4 annual and one multi-annual - for institutional support of RU research programmes. These were allocated to the RU through internal competitions as described above. The total values of the grants amounted to:

CNFIS-FDI 2016: 245,000 lei

CNFIS-FDI 2017: 240,000 lei + 30,000 lei co-financed by UBB

CNFIS-FDI 2018: 372,000 lei + 37,200 lei co-financed by UBB

CNFIS-FDI 2019: 388,000 lei + 19,400 co-financed by UBB

33PFE /2018: 307,692 lei

33PFE/2019: 2,620,725.89 lei

This amounts to a total of approximately 900,000 EUR over 4 years - or an average of 220,000 EUR/year. Against the total of 64 accredited RUs, this amounts to an average of about 3,000 EUR/year/RU.

However, it should be noted that not all RUs participated in competitions - as shown below.

27 RUs have benefited from the STAR-UBB Advanced Internal Fellowship programme, totalling 68 fellowships (noting that there were no RUs applying for a Fellowship that did not secure at least one fellowship):

<b>RU</b>	<b>Internal Fellowship</b>
Ekphrasis Centre	7
Research Centre of Applied Analysis	7
Centre for Applied Philosophy	5
Vlad Mugur Centre for Research and Creation in Theatre, Film, and Media	5
Institute for European Research	4
ICI-BNS - Institute for Interdisciplinary Research in Bio-Nanosciences	4
PHANTASMA Centre for Imagination Studies	4
CS-UBB/STAR-UBB	3
Integrated Geological Research Centre	3

Research Institute for Sustainability and Disaster Management based on High Performance Computing (ISUMADECIP)	2
Research Centre - Software Engineering	2
Centre for Ancient and Medieval Philosophy	2
Population Study Centre	2
Centre for Research on Settlements and Urbanism	2
International Institute for Advanced Studies in Psychotherapy and Applied Mental Health	2
Centre for Systems Biology, Biodiversity and Bioresources (3B)	2
Centre for Interdisciplinary Research in Physical Education and Sport	2
Applied Computational Intelligence Research Centre	1
Research Centre on Fundamental and Applied Heterochemistry	1
Work and Organizational Psychology Research Centre WOP-RC	1
Ioan Lupas Research Centre	1
Supramolecular Organic and Organometallic Chemistry Centre – CCSOOM	1
Centre for Patristic Studies and Ancient Christian Literature	1
Research Centre for Sustainable Development (CCDD)	1
Research Centre in Computer Assisted Chemical Engineering	1
DigiHUBB Transylvania Digital Humanities Centre	1
Business Information Systems Research Centre	1

In addition, 19 RUs were awarded External Fellowships, totalling 42 fellowships (noting that there were no RUs applying for a Fellowship that did not secure at least one fellowship):

<b>RU</b>	<b>External Fellowship</b>
Applied Philosophy Centre	6
Ioan Ursu Institute of Physics	6
Centre for Ancient and Medieval Philosophy	5
Research Centre on Fundamental and Applied Heterochemistry (METALOMICA)	5
PHANTASMA Centre for Imagination Studies	2
CS-UBB/STAR-UBB	2
International Institute for Advanced Studies in Psychotherapy and Applied Mental Health	2
Business Information Systems Research Centre	2
Supramolecular Organic and Organometallic Chemistry Centre	2
Research Institute for Sustainability and Disaster Management based on High Performance Computing (ISUMADECIP)	1
Research Centre - Software Engineering	1
Centre for Systems Biology, Biodiversity and Bioresources (3B)	1
Research Centre of Applied Analysis	1
ICI-BNS - Institute for Interdisciplinary Research in Bio-Nanosciences	1
Public Administration Research Centre	1
Vlad Mugur Centre for Research and Creation in Theatre, Film, and Media	1
Population Study Centre	1

Applied Analysis Centre	1
Romanian Centre for Comparative Migration Studies	1
Grand Total	42

The infrastructure allocations were distributed to 18 RUs - noting that the RUs not included in the list did not apply for any of the 6 open competitions.

RU	Infrastructure amounts (RON)
International Institute for Advanced Studies in Psychotherapy and Applied Mental Health	351,586
METALOMICA	257,290
Ioan Ursu Institute of Physics	178,000
ICI-BNS	120,985
National Centre for Magnetic Resonance	106,340
Biocatalysis and Biotransformation Research Centre	105,359
Business Information Systems Research Centre	101,105
ICCRR	95,795
Centre for Hazard and Risk Research	72,142
Research Centre in Computer Assisted Chemical Engineering	70,667
Integrated Geological Research Centre	67,583
Centre for Systems Biology, Biodiversity and Bioresources (3B)	64,108
ANALYTICA Centre	56,976
ISUMADECIP	42,610
Supramolecular Organic and Organometallic Chemistry Centre	41,437
Electron Microscopy Laboratory 'Professor Constantin Crăciun'	31,588
Electrochemistry and Unconventional Materials Research Centre	14,995

Note that the resources allocated by UBB to research programmes have indeed been directed towards those RUs that have prevalently delivered first-rate output in the sense of European or world-class competitiveness (be it books published by leading publishers or articles in Q1 journals).

## **5. Social/economic impact results - outcome of technology and knowledge transfer**

In terms of technology transfer, between 2016 and 2019, UBB registered 25 patent applications and

14 granted patents - all at national level, along with one application submitted at international/European level. These all came from RUs accredited and supported by the grants/programmes listed above.

In terms of outputs with economic and/or social impact we provide some relevant examples from three subject areas below. We note, however, that in the area of technology and knowledge transfer, the potential of the UBB RU is much greater, both in terms of the number of achievements and their relevance.

- 1 The project “*Smart Systems for Public Safety through Control and Mitigation of Residential Radon linked with Energy Efficiency Optimization of Buildings in Romanian Major Urban Agglomerations – SMART-RAD-EN*”, recently won the Smart Health Award in the Smart Living Category, granted by the Romanian Association for Smart City at the fourth edition of the Smart City Industry Awards, the most important event in the Smart City Industry in Romania, now a tradition in the Romanian business environment.

The key output of the project is the innovative ICA SMARTRADON prototype:

<https://news.ubbcluj.ro/ubb-lanseaza-pe-piata-un-aparat-care-masoara-calitatea-aerului-si-eficienta-energetica-a-cladirilor-cu-implicatii-pentru-sanatate/>. The device is an innovative

integrated system for monitoring, control and remediation of air quality inside buildings.

Currently, in cooperation with the Cluj-Napoca City Hall, an ongoing assessment of air quality in school buildings in Cluj-Napoca is being carried out.

- 2 PsyPills is an app developed by psychologists from the Department of Clinical Psychology and Psychotherapy at Babeş-Boylai University of Cluj-Napoca (UBB), available in Romanian and English. The app targets self-control and emotional regulation through ‘psychological pills’ that diagnose and curb irrationality and foster rationality, with the end goal of reducing unhealthy negative emotions and increasing well-being/quality of life through healthy emotions.

For more details see: <https://itunes.apple.com/ro/app/psypills/id589004229?mt=8> PsyPills may be used in clinical practice, self-administered therapy (with therapeutic monitoring), psychoeducation and research. PsyPills comes at a minimum price (\$0.99), to make it accessible to the socio-economically disadvantaged. In addition, MoodWheel is a (partial) free demo version of PsyPills, and the authors will give their permission for free use of PsyPills - if Apple agrees - for educational/research purposes.

- 3 In our country, pheromone research was initiated three decades ago in the Natural Products Laboratory of the Raluca Ripan Institute for Research in Chemistry and focused on the study and synthesis of sex pheromones in butterflies (Lepidoptera) (more than 25 species) and

microlepidoptera (5 species), as well as aggregation pheromones in certain species of bark beetles (Coleoptera), major pests of coniferous forests. Efficient and non-polluting methods for forecasting pest outbreaks, warning as well as combating them have been developed using pheromones. Our own research in the field of pheromones is implemented in the Raluca Ripan Institute for Research in Chemistry Cluj-Napoca, where we provide innovative solutions for combating insect pests in forestry, fruit growing, field crops and viticulture. The implementation of this new system helps modernise the protection of ecosystems while reducing and optimising the consumption of conventional biocides, by determining the optimal time for applying treatments and the adequate dosage, depending on the phytosanitary condition of the targeted site. The Institute is annually producing and marketing pheromones worth more than 1.5 million lei.

## **I. Conclusions**

At UBB, research programmes are institutionally defined through internally accredited research units (RU). This accreditation is established by the UBB Senate at the proposal of the Administrative Council, following an analysis conducted by the Scientific Council, which reports to the Vice-Rector responsible for scientific research. Re-accreditation of the RU is done every four years, while the updating of the lists containing strategic equipment of the RU in the UBB strategic infrastructure network is done annually.

In accreditation, re-accreditation and in the evaluation of rUBB elements, consideration is given to the impact of the representative contributions of the RU, their size, involvement in teaching activities and involvement in the social and economic environment. In the previous sections, the impact levels of the various research lines of the RU have been reviewed, with emphasis on those where contributions are first-tier (high impact book publishers, journals in the first quartile of impact factor) and on those providing services or producing patents.

RU funding is provided mainly through UBB in-house infrastructure grants and Advanced Fellowship programmes under the aegis of the STAR-UBB Institute. These programmes have been running at UBB since 2016, noting that they are not the main source of research funding at UBB but rather provide additional resources from external research grants from national, international, private sector authorities. Analysis of allocation of these funds indicates that they have been predominantly directed towards those RUs that are more active and where contributions prevail at the forefront of

world-class research/ scholarship.

The analysis identified several lines of action along which the management of UBB programmes can evolve in the near future:

- 1 There is a chronic underfunding and lack of predictability in the Romanian research system. Given that in-house UBB grants are funded by the line ministry, multi-annual initiatives to fund research programmes was potentially unrealistic. However, having been able to identify resources for in-house grants to RU every year since 2016, it can be argued that the operationalisation of longer-term plans may prove sensible. For example, the Advanced Fellowship programme could be extended from one month or one semester to a period of 2-3 years, so that it may be part of a head-hunting effort in line with the world-class objectives pursued by UBB.
- 2 Accreditation and re-accreditation procedures are still too bureaucratic. This can be simplified both by limiting the data required and by streamlining the document management route, using online assessment platforms.
- 3 Administrative details associated with defining RUs can be partly re-evaluated. One of them pertains to membership in multiple RUs, i.e. guest/external memberships.
- 4 In the assessment of RUs and in determining what is ‘of excellence’ (perhaps too presumptuous a term, but still systematically used in the funding system in Romania and elsewhere; alternatives such as ‘world-class’ could be considered), one could aim for a greater emphasis on world-class contributions, as long as the term is properly applied with the field-specific context and fairly treating local and national contributions as long as they are relevant, substantial and have a scientific and/or societal or economic impact.

A stand-alone policy paper will be drafted on the latter issues.