BASQUE EXCELLENCE RESEARCH CENTERS 2014-2017 PROGRAM

Direction for Scientific Policy

Estrategia Plana | Plan Estratégico | Strategic Plan

Zentroa | Centro | Center

BASQUE CENTER ON COGNITION BRAIN AND LANGUAGE
www.bcbl.eu

Donostia – San Sebastián 2014

BASQUE CENTER
ON COGNITION, BRAIN
AND LANGUAGE

Contents

1. GENERAL DESCRIPTION AND OBJECTIVES

1.1. Science field and main strategic objectives of the center

This section should include (Max. 3 pages):
Rationale of the creation and development of the center. Definition of medium to long-term strategies and areas of activity. Alignment with Basque Science Policy and Regional Research and Innovation Strategies for Smart Specialisation.

CREATION AND DEVELOPMENT OF THE CENTER

The Basque Center on Cognition, Brain and Language (www.bcbl.eu) is a **world-class interdisciplinary research center for the study of cognition, brain and language** jointly founded by Ikerbasque, Innobasque, UPV/EHU (The University of the Basque Country) and the Government of Gipuzkoa. It is one of the centers of the BERC network (Basque Excellent Research Centers) that has been created to generate new knowledge and synergies in an undeveloped multidisciplinary field within the Basque network of Science and Technology.

The center is situated in Donostia-San Sebastián in the Basque Country (Spain) and was set up in December 2008, when operations began recruiting personnel and creating the necessary research environment, including research equipment, administrative and technical support, etc. After the planning and start up phase during 2009, on-site research was started in January 2010.

It is important to note that the BCBL was created from scratch, starting with a handful of researchers coming from the director's team at the University of La Laguna. During the first years a lot of effort was devoted to planning and creating all the most favourable conditions to build a first class center. Some activities carried out in 2009 among others included (1) the recruitment of personnel (researchers, technical and administrative personnel), (2) the design of the working area and the laboratories, and the execution of the works, (3) deciding on and acquiring the equipment, (4) developing procedures for the functioning of the center, including how to use the equipment in the labs, how to perform an experiment in the BCBL labs and fill the request forms, or the mechanisms involved in presenting in conferences (all this information has been assembled in the intranet wiki that is constantly evolving with the development of the center and thus with new needs) (5) the creation of the webpage and the web *participa* that allow us to advertise experiments and the participants to book the experiments at a particular time, (6) procedures and campaigns to recruit participants with different profiles (undergraduates, patients, babies), (7) training of research assistants to help create experimental materials in Basque and run the experiments (8) writing the proposal for creating, in collaboration with the university of the Basque Country UPV/EHU, a master's and a doctoral program in Cognitive Neuroscience.
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JANUARY 2009

NOVEMBER 2009

CHRISTMAS 2009

DEFINITION OF STRATEGIES AND AREAS OF ACTIVITY

Since its creation, the main goal of the center has been the study of language from an experimental point of view. Language is the most unique human ability and involves complex cognitive processes. Reading and writing are the most impressive cultural developments of our civilization and are at the same time a major developmental milestone in each person's life.

Language fundamentally changes the way in which a person interacts with their environment. However, despite the impressive technological and scientific advances of recent decades we have yet to unravel the complexities of the cognitive processes involved in language and reading and we still do not know the causes of some speech disorders and reading disabilities or how to remedy them. The BCBL carries out research using the most advanced techniques in these fascinating areas, with a special focus on bilingualism.

MISSION, VISION

Provide a platform for researchers and professionals from related areas to carry out **frontline research, development and innovation** in this area. We are a multidisciplinary research center, within the Basque Country Science Network, dedicated to **pursuing excellence in research, training and knowledge transfer within the field of Cognitive Neuroscience of Language**. Our center aims to provide a platform for researchers and professionals from related areas to carry out frontline research, development and innovation in this area.

AREAS OF ACTIVITY

The BCBL works in four areas to meet the mission of the center:

1. Excellence research
2. Science dissemination and outreach
3. Training and education
4. Tech-transfer

Aim of our research

The specific aim of our research activity is to **unravel the neurocognitive mechanisms involved in the acquisition, comprehension and production of language**, with particular emphasis on bilingualism and multilingualism. Some of the areas we study include the processes involved in normal child language acquisition and second language learning in adults, as well as learning disorders, language disorders, the language-related effects of aging and neurodegeneration and language use in different social contexts.

Our commitment

Our **commitment to education and knowledge transfer** in the area of Cognitive Neuroscience extends across different contexts, including university, healthcare, social and business environments, with the aim of **contributing to social welfare by applying the knowledge and technology derived from our research** (2nd axis of Basque Government's Euskadi 2020 program). To this end, we have forged links with institutions and organizations in both the local and wider communities, to provide expertise, consultancy and technology development services, all to the highest international standards.

Research Agenda

Our research agenda also takes advantage of our center's location in the bilingual Basque Country to study language processing in Basque and Spanish. As an isolated language, Basque has unique characteristics and so provides an unrivalled opportunity to unveil both the specific and the universal characteristics of language.

To pursue our aims, we use a variety of methods, including cutting-edge neuroimaging techniques, behavioural methods and computational modelling, developing our own projects and also collaborating with other public and private institutions, **aligning efforts with the Basque Science Policy and regional research and innovation strategies for smart specialization** (2nd axis of Basque Government's Euskadi 2020 program).

2. SCIENTIFIC EXCELLENCE AND RESEARCH QUALITY

2.1. Summary of the recent main activities and achievements

2.1.1. Research Programme(s)

This section should include (Max. 7 pages):
Main research objective(s) and description of the research activities, projects, lines deployed to meet that/those objective(s).

The BCBL **research objectives** are the following:

- To unravel the neurocognitive mechanisms involved in the acquisition, comprehension and production of language.
- To develop research and innovation in Cognitive Neuroscience with particular emphasis on language processing and bilingualism.
- To promote scientific research and national and international scientific relations within the field of Cognitive Neuroscience and to transfer the results of this research to the wider socioeconomic community.
- To promote the transfer and dissemination of knowledge about Cognitive Neuroscience, Language and Bilingualism both within and beyond the Basque Country, by means of organizing courses, seminars, national and international conferences and by other appropriate general communication means.
- To participate in undergraduate and postgraduate education and training programs and encourage the incorporation of young researchers to this field.
- To facilitate the training and ongoing development of BCBL personnel and to promote their collaboration across different lines of research.
- To forge collaborative links and common interest areas with public and private institutions, centers and industries, with the aim of providing research, training, technological and consultancy services to use the work developed in BCBL to the fullest economic and social advantage.

In order to achieve the previous objectives, the research activity in the center is framed along the following research lines:

LINE 1. Language acquisition, representation and processing

_ Language acquisition
_ Language comprehension
_ Language production

The main aim of this research line is to understand how language is acquired, comprehended and produced. It contains three sub-lines of research: acquisition, understanding and production, which will be explained in depth under section 2.2.1.

LINE 2. Multilingualism

_ Neurocognition and processing
_ Educational neuroscience and lifelong learning
_ Cognitive consequences of multilingualism

Research on language acquisition, understanding and production in bilingual and multilingual individuals, with different ages of acquisition of their second language (e.g., native or late learners) and with different degrees of proficiency in their second language is the main focus of this line. Special attention is also paid to multilingualism within the school system and to the development of new educational technologies. This line will also be detailed in depth under section 2.2.1.

LINE 3. Neurodegeneration, language and learning disorders

_ Language and learning disorders
_ Neurodegeneration of language and cognition

The study of patients and of developmental and learning disabilities has always been a source of information on psychological processes in typical development and functioning. In addition, it has the applied long-term value of improving diagnostic methods, the possibility of aiding in early detection and the development of treatments that could prevent or minimize the difficulties of the persons with these disabilities. This line is divided in two research sub-lines which will be described in detail under section 2.2.1.

LINE 4. Advanced methods for cognitive neuroscience

_ Methods of magnetic resonance for cognitive neuroscience
_ Brain electromagnetic activity and neural coherence
_ Computational models of language

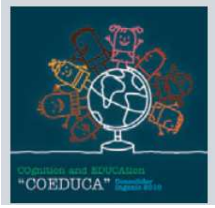
The advance of knowledge in neurocognition of language has been fuelled by the development of advanced methods of research. We pay special attention to research in three methodological areas, which correspond to three sub-lines of research as explained below under section 2.2.1.

RESEARCH PROJECTS

These are the main research projects that BCBL teams have been working on, in the period 2009-2013, funded by Spanish, Basque or local government, as well as by the European Commission and private bodies.

For each project, a brief description of the funding agency, research period, PI, research partners and granted budget is provided. (New, recently granted projects are not included in this section, which covers 2009 to 2013, but rather in section 2.2.1 devoted to the 2014-2017 period. In addition, we have included some special internal projects that have not been externally granted).

COEDUCA / CSD 2008 – 00048



- FUNDING AGENCY: MICINN
- TYPE OF PROJECT: CONSOLIDER INGENIO
- TIME FRAME: 12/2008 - 12/2013
- BUDGET: 4.000.000 Euros
- PARTNERS: UGR, ULL, UM, US, CIC bioGUNE, BCBL
- COORDINATOR: BCBL - PI Manuel Carreiras PhD

ESPAL / HUM 2007 - 30271

- FUNDING AGENCY: MICINN
- TYPE OF PROJECT: ACCIÓN COMPLEMENTARIA
- TIME FRAME: 07/2008 - 07/2010
- BUDGET: 207.000 Euros
- PARTNERS: ULL, UB, BCBL
- COORDINATOR: BCBL - PI Manuel Carreiras PhD

LSE SIGN / PSI 2008 – 04016 – E/EPSIC

- FUNDING AGENCY: MICINN
- TYPE OF PROJECT: ACCIÓN COMPLEMENTARIA
- TIME FRAME: 06/2009 - 12/2011
- BUDGET: 180.000 Euros
- COORDINATOR: BCBL - PI Manuel Carreiras PhD

ITN LCG LANGUAGE, COGNITION & GENDER / PITN-GA-2009-237907

- FUNDING AGENCY: Research Executive Agency
- TYPE OF PROJECT: ITN, MARIE CURIE ACTION
- TIME FRAME: 10/2009 - 10/2013
- BUDGET: BCBL: 411.576 Euros; Total: 4.106.379 Euros
- PARTNERS: Universities of Heidelberg, Berlin, Ceske Budejovice, Fribourg, Modena, Padova, Sussex, Norges Teknisk, BCBL
- COORDINATOR: Bern University - Scientific Coordinator Sabine Sczesny
- SPANISH PI: Manuel Carreiras PhD

SEMA / PSI 2009 – 08889

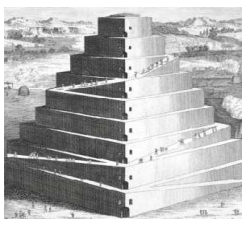
- FUNDING AGENCY: MICINN
- TYPE OF PROJECT: PLAN NACIONAL
- TIME FRAME: 01/2010 - 12/2012
- BUDGET: 298.000 Euros
- PARTNERS: Hospital Donostia, Fundación Ingema, Cita Alzheimer, ULL, BCBL
- COORDINATOR: BCBL - PI Manuel Carreiras PhD

SLI (SPECIFIC LANGUAGE IMPEDIMENTS IN INFANTS AND CHILDREN / 103/11

- FUNDING AGENCY: PROVINCIAL GOVERNMENT OF GIPUZKOA
- TYPE OF PROJECT: PROGRAMA RED
- TIME FRAME: 09/2010 - 09/2012
- BUDGET: 90.000 Euros
- COORDINATOR: BCBL - PI Manuel Carreiras PhD

TELL ME SOMETHING I DON'T KNOW – INFORMATIVENESS AND KNOWLEDGE OF THE REAL WORLD IN UNDERSTANDING LANGUAGE FROM A COGNITIVE NEUROSCIENCE PERSPECTIVE / PSI2010 - 18087

- FUNDING AGENCY: MICINN
- TYPE OF PROJECT: PLAN NACIONAL
- TIME FRAME: 01/2011 - 12/2013
- BUDGET: 145.200 Euros
- COORDINATOR: BCBL - PI Mante Nieuwland PhD



AUTOMATICITY OF SECOND LANGUAGE PROCESSING IN SPANISH-BASQUE BILINGUALS / PSI2010-17781

- FUNDING AGENCY: MICINN
- TYPE OF PROJECT: PLAN NACIONAL
- TIME FRAME: 01/2011 - 12/2013
- BUDGET: 108.900 Euros
- COORDINATOR: BCBL - PI Arthur Samuel PhD

PHONOLOGICAL PRIMING IN CHILDREN / AIB2010DE – 00391

- FUNDING AGENCY: MICINN
- TYPE OF PROJECT: ACCIONES INTEGRADAS
- TIME FRAME: 01/2011 - 12/2012
- BUDGET: 8.000 Euros
- PARTNERS: The University of Gottingen, BCBL
- COORDINATOR: BCBL - PI Eiling Yee PhD

THE EUROPEAN NETWORK ON WORD STRUCTURE / 09 - RNP – 089

- FUNDING AGENCY: European Science Foundation
- TIME FRAME: 2011 - 2015
- BUDGET: 565.000 Euros
- PARTNERS: University of Antwerp (Belgium), University of Vienna (Austria), Jozef Stefan Institute (Slovenia), Université de Toulouse (France), Slovak Academy of Science (Slovak Republic), Helsinki University of Technology (Finland), Zurich University (Switzerland), Lund University (Sweden), National Research Council (CNR - Italy), Siegen University (Germany), Pazmany Peter Catholic University (Hungary), University of Zagreb (Croatia), Norwegian University of Science and Technology (Norway), BCBL.
- COORDINATOR: Pisa University - PI Vito Pirelli PhD
- SPANISH PI: Manuel Carreiras PhD

RESEARCH INTO DRAVET'S SYNDROME AND UNTREATABLE CHANNELOPATHIES

- FUNDING AGENCY: DRAVET FOUNDATION
- TYPE OF PROJECT: Private Foundation
- TIME FRAME: 07/2011 - 06/2013
- BUDGET: 200.000 Euros
- COORDINATOR: BCBL - PI Manuel Carreiras PhD

NEURAL CORRELATES IN LANGUAGE PRODUCTION AND SUPERIOR EXECUTIVE FUNCTIONS IN BERTSOLARIS

- TIME FRAME: 2011-2013
- COORDINATOR: BCBL - PI Pedro Paz-Alonso PhD

LARA (Longitudinal Analysis of Reading Acquisition)

- TIME FRAME: 2011-2014
- COORDINATOR: BCBL - PI Manuel Carreiras PhD

TRAINING FOR SUPERIOR COGNITIVE SKILLS PROJECT

- TIME FRAME: 2011-2012
- COORDINATOR: BCBL - PI Pedro Paz-Alonso PhD

BI-LITERACY: LEARNING TO READ IN L1 AND IN L2 / ERC - 2011 - ADG – 295362

- FUNDING AGENCY: European Research Council
- TYPE OF PROJECT: ERC Advanced Grant
- TIME FRAME: 2012 - 2017
- BUDGET: 2.487.000 Euros
- COORDINATOR: BCBL - PI Manuel Carreiras PhD

THE ROLE OF OSCILLATORY ACTIVITY IN THE LEXICAL AND GRAMMATICAL PLASTICITY OF LANGUAGE LEARNERS / PSI 2011 – 24802

- FUNDING AGENCY: MICINN
- TYPE OF PROJECT: PLAN NACIONAL
- TIME FRAME: 01/2012 - 12/2014
- BUDGET: 96.800 Euros
- COORDINATOR: BCBL - PI Doug Davidson PhD

THE IMPACT OF MEMORY RECONSOLIDATION ON VOCABULARY ACQUISITION: A BEHAVIORAL AND NEURAL INVESTIGATION / PSI 2011 – 24048

- FUNDING AGENCY: MICINN
- TYPE OF PROJECT: PLAN NACIONAL
- TIME FRAME: 01/2012 - 12/2014
- BUDGET: 88.330 Euros
- COORDINATOR: BCBL - PI Nicolas Dumay PhD

NUMBER SEMANTICS IN BILINGUALS PSI 2011 - 23995

- FUNDING AGENCY: MICINN
- TYPE OF PROJECT: PLAN NACIONAL
- TIME FRAME: 01/2012 - 12/2014
- BUDGET: 68.970 Euros
- COORDINATOR: BCBL - PI Elena Salillas PhD

EL LEXICÓN TRILINGÜE - LEXIKOI HIRUELEDUNA - THE TRILINGUAL LEXICON / PI 2012-74

- FUNDING AGENCY: The Basque Government
- TIME FRAME: 01/2012 - 12/2013
- BUDGET: 23.924 Euros
- COORDINATOR: BCBL - PI Jon Andoni Duñabeitia PhD

DEVELOPMENT OF NEURAL MECHANISMS INVOLVED IN LONG-TERM MEMORY RETENTION AND RECUPERATION / PI 2012 – 15

- FUNDING AGENCY: Basque Government
- TIME FRAME: 01/2012 - 12/2013
- BUDGET: 45.090 Euros
- COORDINATOR: BCBL - PI Pedro Paz-Alonso PhD

LANG MIND

- FUNDING AGENCY: GOBIERNO VASCO
- TYPE OF PROJECT: Gaitek
- TIME FRAME: 2012-2014
- BUDGET: 52.920 Euros
- COORDINATOR: BCBL - PI Manuel Carreiras PhD

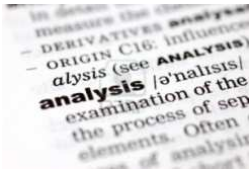
PROCESAMIENTO EN LENGUA DE SIGNOS, DACTILOLOGÍA Y LECTURA EN SORDOS Y CODAS / PSI2012-31448

- FUNDING AGENCY: MINECO
- TYPE OF PROJECT: PLAN NACIONAL
- TIME FRAME: 2013-2015
- BUDGET: 128.700 Euros
- COORDINATOR: BCBL - PI Manuel Carreiras PhD

BASES DEL DESARROLLO NEURAL DE LA RECUPERACIÓN DE MEMORIAS EPISÓDICAS / PSI2012-32093

- FUNDING AGENCY: MINECO
- TYPE OF PROJECT: PLAN NACIONAL
- TIME FRAME: 2013-2015
- BUDGET: 58.500 Euros
- COORDINATOR: BCBL - PI Pedro Paz-Alonso PhD

TRIBAL: TRANSLATION RECOGNITION IN BILINGUALS ACROSS LIFESPAN / PSI2012-32123



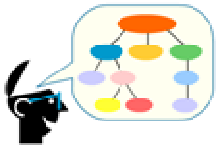
- FUNDING AGENCY: MINECO
- TYPE OF PROJECT: PLAN NACIONAL
- TIME FRAME: 2013-2015
- BUDGET: 52.650 Euros
- COORDINATOR: BCBL - PI Jon Andoni Duñabeitia PhD

LA ACTIVIDAD CEREBRAL ATÍPICA OSCILATORIA, LOS DÉFICITS TEMPORALES DE PROCESAMIENTO Y LA DISLEXIA DEL DESARROLLO / PSI2012-32128

- FUNDING AGENCY: MINECO
- TYPE OF PROJECT: PLAN NACIONAL
- TIME FRAME: 2013-2015
- BUDGET: 58.500 Euros
- COORDINATOR: BCBL - PI Marie Lallier PhD

APRENDER UN NUEVO IDIOMA / PSI2012-32350

- FUNDING AGENCY: MINECO
- TYPE OF PROJECT: PLAN NACIONAL
- TIME FRAME: 2013-2015
- BUDGET: 70.200 Euros
- COORDINATOR: BCBL - PI Nicola Molinaro PhD



LOS CONCEPTOS EN EL CONTEXTO / PSI2012-32107

- FUNDING AGENCY: MINECO
- TYPE OF PROJECT: PLAN NACIONAL

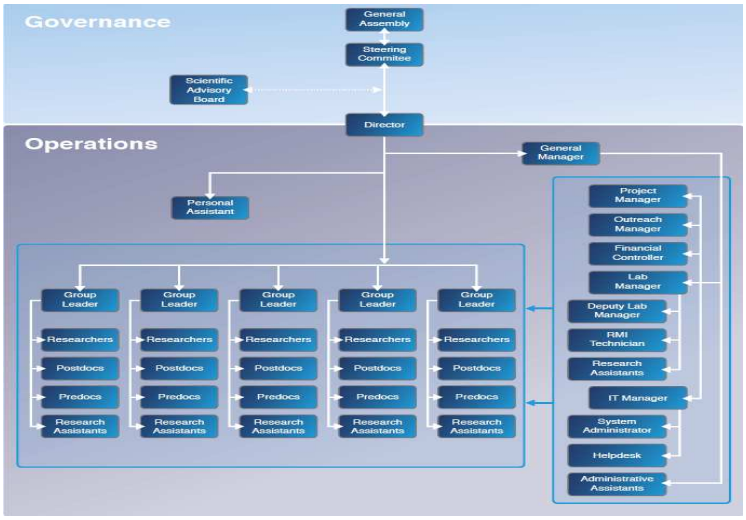
- TIME FRAME: 2013-2015
- BUDGET: 64.350 Euros
- COORDINATOR: BCBL - PI Eiling Yee PhD

2.1.2. Research Groups

This section should include (Max. 3 pages):
Definition of research structure or organisation of the center. Strategies and activities to support the attraction and retention of research talent. Expected evolution of the structure of personnel to achieve the strategic objectives of the center.

STRUCTURE AND ORGANIZATION OF THE CENTER.

The BCBL organizational chart is the following:



The research lines have been promoted by the scientific director and coordinated by the group leaders. The initial aim was to create 4 to 6 research groups. However, this has not been possible yet, since we have not been successful in recruiting more seniors to act as PIs of new groups. We have been actively promoting the recruitment of seniors through Ikerbasque. Additionally, we have been very successful in attracting postdoctoral and junior staff scientists. The current policy is to create independent junior groups. This will happen in 2015, once we know the outcome of the ERC grants submitted during 2014 (four starting grants and two consolidator grants). In addition, we have managed to recruit talented PhD students, and we will continue in the coming years. One of the tools for such recruitment is the ongoing Master in Cognitive Neuroscience of Language that the BCBL runs in collaboration with the UPV/EHU.

The management supports all research activities, crossing the organizational chart horizontally. The management includes four supporting departments: Information Technologies, Laboratories, Administration (finance control, project management and outreach) and Tech-Transfer. It is important to highlight that since many researchers are foreigners, the BCBL needs a group of trained research assistants in the different laboratories (Miramón, Korta and Vitoria) to be able to run experiments in Basque and in Spanish.

This is the current research staff at the BCBL in early 2014:

- **Director**: Manuel Carreiras
- **Seniors** / group leaders: 2
- **Staff Scientists**: 7
- **Post-doctoral Researchers**: 13
- **Affiliated Researchers**: 4
- **Ikerbasque Visiting Professors**: 1
- **Pre-doctoral Researchers**: 22

STRATEGIES AND ACTIVITIES TO SUPPORT THE ATTRACTION OF TALENT.

The BCBL has been actively **recruiting, promoting and retaining talent to the Basque science system, while** also obtaining **externally funded fellowships** in order to increase the presence of the Basque science system in European programs (2nd axis of Basque Government's Euskadi 2020 program).

Since its creation, the BCBL has launched yearly calls for PhD students, postdoctoral researchers and staff scientists, with significant success attracting talent from abroad due to the developed talent attraction plan, which includes multiple training and professional development activities, the quality of the research and support teams and the laboratories equipped with cutting-edge technological platforms for research in cognitive neuroscience. Our commitment has always been to **recruit the most outstanding personnel in order to become an international benchmark center** in the center's field of research.

All these processes have been carried out following the policies of **transparency, equity and concurrence,** and all records have been encrypted and saved.

A **welcome plan** is carried out for every single researcher coming to BCBL for the first time. It includes explanations and a thorough description of the city, local administration, introduction to all new colleagues, help in the search for housing, as well as the employee handbook, which includes all topics such as mission, vision and values, legal structure, ISAB, research programs and lines, platforms and techniques, internal organization, procedures, key policies, confidentiality and data protection procedures, rules for participation in conferences and research trips, IT procedures, purchasing conditions, health care, tax system, education system, nearby universities and general information about the city and surrounding area.

talenthouse
COMPREHENSIVE KNOWLEDGE HOSTING PLAN
Go to index page DONOSTIA-SAN SEBASTIÁN

Most of the researchers coming from abroad are hosted through the BCBL at the Talent House, a residence for researchers coordinated by the Donostia Town Hall, with which the BCBL has a permanent agreement.

We think that it is very important to continue attracting new talent and we aim to continue launching calls every year as long as the budget and external grants allow.

The quality of the research teams and the scientific production has been outstanding, and proof of that is the **significant success obtaining funding for research projects and individual fellowships:**

2009-2013 FELLOWSHIPS

FUNDING AGENCY	SUCCESSFUL	NON-SUCCESSFUL	TOTAL SUBMITTED PROPOSALS
MINECO			
* Ramón y Cajal	3	18	21
* Juan de la Cierva	2	8	10
* PTA	3	1	4
* FPI & short stays	4	0	4
MEC			
* FPU	0	4	4
7TH FRAMEWORK PROGRAMME			
* IEF	8	2	10
* IIF	1	2	3
* IOF	1	0	1
* CIG	1	0	1
* ERC STARTING	0	3	3
* ERC CONSOLIDATOR	0	1	1
* ERC ADVANCED	1	1	2
BASQUE GOVERNMENT			
* BFI	4	3	7
* Postdoctoral	1	1	2
IKERBASQUE			
* Research Professor	2	0	2
* Research Fellowship	2	0	2
* Visiting Fellowship	2	0	2
DIPUTACION FORAL GIPUZKOA			
* Programa Fellows	2	0	2
OTHER	3	0	3
TOTAL	40	44	84

For more detail, please find below **a list of the 7PM Marie Curie fellowships granted to the BCBL** in the 2009-2013 period:

- FP7-PEOPLE-2010-IEF–Vocal Athletes: Behavioural and brain bases for phonetic aptitude in monolingual and bilingual learners of a foreign language. PI: Dr. Adriana Hanulikova.
- FP7-PEOPLE-2010-IEF-BIMATH: Brain and Behavior of Math Cognition in bilinguals. Implications for dyscalculia. PI: Dr. Elena Salillas.
- FP7-PEOPLE-2010-IEF–BIRD–Bilingualism Impact on Reading Development. PI: Dr. Marie Lallier.
- FP7-PEOPLE-2010-IIF–PSPSWR–Prediction in Speech Perception and Spoken Word Recognition. PI: Dr. Phillip Monahan.
- FP7-PEOPLE-2011-IEF-WORD-SEM STORE: How words and semantics are stored in the brain? PI: Dr. Stéphanie Massol.
- FP7-PEOPLE-2011-IOF-CCVP-Cross-linguistic and Cross-Population Verb Processing. PI: Dr. Marie Pourquié.
- FP7-PEOPLE-2012-IEF- R&B BRAIN- The restless and bilingual brain: Non-stationary dynamics of functional brain networks at rest in bilinguals. PI: Dr. Cesar Caballero.

STRATEGIES AND ACTIVITIES TO SUPPORT THE RETENTION OF TALENT.

BCBL considers its staff to be its most important resource and the only guarantee of success for its global project. As part of the objectives outlined in our Strategic Plan, our **personnel policy** is based on the following strategies:

- To build research, administration and technical support teams that are highly-qualified, motivated, resourceful, willing to work in teams and open to the world.
- To define a training structure adequate to the needs of the BCBL.
- To incorporate excellent research personnel at national and international levels.
- To set up mechanisms for recruiting and maintaining researchers from early levels of training.
- To facilitate the incorporation of new professional bodies with a multidisciplinary focus to guarantee the transversal direction of scientific activities.
- To build a flexible and efficient system of student and researcher exchange.
- To foment programs of temporary collaboration with researchers of excellence in those areas of research that are high-priority for BCBL but have deficiencies at present.
- To define and develop an ongoing training plan for research and other areas of interest.
- In the selection of personnel, BCBL places great importance not only on the technical skills and knowledge of the person but also on human aspects such as respect, ability to work in a team, people skills, empathy, constancy, creativity, learning curve, etc.

Within our talent retention strategy, we have **organized seminars and workshops, and also dissemination and knowledge transfer events.** These events have involved not only our own staff, but also high level researchers, providing the center and the personnel involved in these activities with the prestige necessary to compete internationally at all levels.

Since most of the members of the BCBL´s research staff are international, in order to retain the talent, it is important that they feel at home here. With the objective of facilitating the integration into the city, in January 2010 we began to offer Spanish classes at the center, aimed at all the staff researchers who needed them and wanted to attend on a voluntary basis. Given the success obtained, in January 2011 we also began to offer Euskera courses on a regular basis.

We are determined to support the quality and **continuous training and involvement of our personnel**. As previously stated some of the staff scientists will become group leaders in the near future.

PROFESSIONAL DEVELOPMENT PLAN AND PERFORMANCE EVALUATION

The training policy and program is described under section 2.1.4. However, it's important to note that each researcher is provided with an annual budget to attend international and local conferences and workshops.

A professional development plan is agreed on with each employee after evaluating their performance at least once every two years.

The details of what the evaluation looks for is described under section 3.3.

Expected evolution of the structure of personnel to achieve the strategic objectives of the center.

One of the critical issues in achieving the strategic objectives of the center is the creation of new research groups. We will continue with our efforts to recruit seniors so new groups can be created around other group leaders. However, this enterprise is not easy because highly competitive seniors have established good positions and have families, and so they are difficult to convince to move. Some high profile seniors were very attracted by the resources that the BCBL could offer them. However, the salaries offered them are simply not competitive in the market, and so it is extremely difficult to convince them to move the whole family to Donostia-San Sebastian, an expensive city. Thus, although we will continue our efforts to recruit seniors, we expect that some of the current junior staff scientists will become group leaders of junior independent groups in the near future. We also expect to continue recruiting more staff scientists, postdoctoral researchers and PhD students to allocate efforts to the less developed lines, with special attention to methods in cognitive neuroscience.

Finally, we do not expect many changes in the evolution and structure of the different departments of management that support research. The major changes will be temporary recruitment of new research assistants if new grants that need workforce in the schools are obtained.

2.1.3. International Collaboration

This section should include (Max. 3 pages):
Agreements and collaboration frameworks with international entities that help in the internationalisation of the center. Composition and role of the external scientific advisory board.

Throughout the period 2009-2013, the primary and **fundamental objective for us has been to situate the BCBL as an international player** by producing first-class research and continuously seeking the international projection and recognition of the center and its research teams. To do so, several actions have been undertaken, such as endowing the BCBL with cutting-edge equipment and research techniques in the field, recruiting researchers of great international reputation, organizing periodic forums for the exchange of ideas (congresses, workshops, symposia) and arranging short visits and longer periods of residence for researchers of great international reputation.

In these fields, international collaboration comes about largely through the collaborations established by the center's researchers with other researchers from different centers and universities.

The governing bodies of the BCBL have motivated the researchers to embrace the **need to set up links with researchers from other centers of reference, with the aim of strengthening, improving and raising awareness of the research carried out in the BCBL**. To that end, a part of the budget is allocated for holding congresses, symposia, workshops, etc., as well as to stimulate and support the presence of members of the BCBL in international forums.

As of today, the BCBL has had research projects with active collaborations involving the exchange of researchers with international bodies, such as (but not limited to):

- CNRS (France)
- University of la Provenza (Italy)
- Haskins Laboratories (USA)
- Academia Sinica (Taiwan)
- University of San Francisco (USA)
- Hebrew University of Jerusalem (Israel)
- University of Magdeburg (Germany)
- Max Planck Institute for Psycholinguistics in Nijmegen (Holland)
- Donders Institute (Holland)
- Tufts University (USA)
- Massachusetts University (USA)
- University of California at San Diego (USA)
- University College London (UK)
- Universiteit Utrecht (Netherlands)
- University Vrÿe (Amsterdam)
- Macquarie center for Cognitive Science (Australia)
- Bogaziçi University (Turkey)
- Netherlands Organisation for Scientific Research (Netherlands)
- Fondation Fyssen (France)

At the same time, as explained in previous sections, the BCBL is taking part in several European Projects. This participation has involved arriving at agreements with several bodies, such as:

- ITN LCG Language, Cognition & Gender PITN-GA-2009-237907 (2009-2013) which involves collaboration with:
    - University of Bern (Switzerland)
    - University of Heidelberg (Germany)
    - University of Berlin (Germany)
    - University Ceskych Bude Jovicich
    - University of Friburgo (Germany)
    - University of Modena (Italy)
    - University of Padova (Italy)
    - University of Sussex (UK)
    - University Norges Teknisk (Norway)

- The European Network on Word Structure 09 - RNP – 089 (2011-2015) which implies collaboration with:

- University of Antwerp (Belgium)
- University of Vienna (Austria)
- Jozef Stefan Institute (Slovenia)
- Université de Toulouse (France)
- Slovak Academy of Science (Slovak Republic)
- Helsinki University of Technology (Finland)
- Zurich University (Switzerland)
- Lund University (Sweden)
- National Research Council (CNR - Italy)
- Siegen University (Germany)
- Pazmany Peter Catholic University (Hungary)
- University of Zagreb (Croatia)
- Norwegian University of Science and Technology (Norway)

INTERNATIONAL SCIENTIFIC ADVISORY BOARD

The main role of the International Advisory Board is to advise on the center's orientation and overall strategy. The International Advisory Board comprises internationally renowned researchers and professionals. The members of the International Advisory Board are:

- **Ron Mangun** (Chair). Center for Mind and Brain. University of California at Davis, USA.
- **Anne Cutler**. Max Planck Institute for Psycholinguistics, The Netherlands.
- **William Marslen-Wilson**. University of Cambridge, UK.
- **Jay McClelland**. Center for Mind, Brain and Computation. Stanford University, USA.
- **Mike Posner**. University of Oregon and Sackler Institute, USA.
- **Tim Shallice**. SISSA (Scuola Internazionale Superiore di Studi Avanzati – International School for Advanced Studies), Italy and Institute of Cognitive Neuroscience, UCL, UK.

The BCBL prepares and submits an activity report and a management report to the ISAB every 4 years. The first activity and management report for 2009-2012 was prepared and sent in 2012.

The Scientific Advisory Committee conducted its first site visit to the BCBL in May 2010, and plans to return to visit the center in either 2014 or 2015 are being made.

The ISAB sent the first evaluation report to the Basque Government in 2012.

2.1.4. Training activities

This section should include (Max. 1 page):
Training activities for researchers and support staff in all the different career stages, designed to recruit, strengthen and retain the talent and personnel.

As an excellence research center, the BCBL cares for the **permanent learning and quality training** of its members by organizing conferences, workshops, conferences and postgraduate programs.

Training is the key point of success, as researchers need to be aware of recent theoretical and methodological developments and also of new ideas that could challenge and/or reinforce theoretical developments. In addition, there are also crucial advances that help to improve their methodological knowledge on a particular technique. That is why it is important to allocate a significant budget to the development, implementation and organization of such events.

- Many **technical training** courses have been arranged to improve the skills of our scientists and lab personnel (MEG, fMRi, eyetracking, Matlab, Presentation, etc.)

- The BCBL organizes several **conferences** annually involving the most influential researchers in the field of "cognitive neuroscience of language". These events are a great opportunity for the BCBL´s researchers to attend lectures, to discuss their work with other attendees and, of course, to expand its network.

- The center also offers both **Spanish and Euskera courses** for our researchers.

- The BCBL organizes research seminars to be given by invited external speakers. All these seminars take place at the BCBL Auditorium, are opened to the scientific community of the area and are announced at www.bcbl.eu. Since February 2010, the BCBL has organized **119 seminars**, inviting external speakers from the most prestigious research groups and centers all over the world.

Other significant activities **to attract young talent** are our Master and PhD programs in Cognitive Neuroscience:

EDUCATION- MASTER IN COGNITIVE NEUROSCIENCE OF LANGUAGE:

The BCBL coordinates with the Department of Basque Language and Communication of the University of the Basque Country in the design, **organization, and execution of this Master's Degree**. It was approved by the ANECA of the Spanish Ministry of Science and Education as an Official Master's Degree. It is becoming a highly demanded master training in research for those young scientists that want to pursue a research career by developing a PhD thesis.

One of the aims of this graduate program, launched in October 2011, is to train interdisciplinary researchers in the Cognitive Neuroscience of Language to further advance and transfer this knowledge to the areas of Health and Education. Thirty one students have been enrolled in our master's program within the 3 editions (2011-12, 2012-13 and 2013-14) and ten out of them have joined the BCBL in order to complete their PhD program.

The duration of the program is one academic year with 60 ECTS credits.

2.1.5. Other activities

This section should include (Max. 3 pages):
Other complementary actions, such as dissemination, technology surveillance, knowledge transfer activities, etc.

Since its creation, the BCBL has devoted efforts to **internationally promote the Basque Science System, by organizing international scientific congresses and workshops, linking the "Euskadi-Basque Country" brand to the scientific quality value** (3rd objective of Basque Government's Governance Program).

The BCBL has performed several dissemination activities.

- First, for the scientific community through conferences, seminars and congresses.
- Second, for the citizenship, through Brain Talks and the Science week.
- Third, for everybody through the media.

Our dissemination and communication activities pursue the following main objectives:

- To publicize the existence of the BCBL and position it at the local, national and international levels as the Research Center in Excellence in Cognitive Neuroscience and Language.

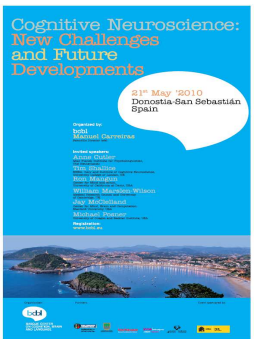
- To make the knowledge generated in the BCBL available to society by disseminating the scientific advances achieved to society at large.

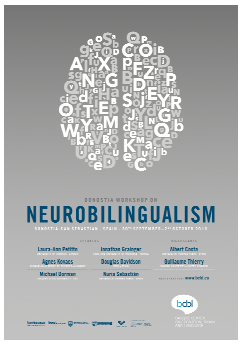
These events offer the possibility to address the various challenges of our activity simultaneously, since international conferences are a natural environment for excellent research, the first step to internationalization, and the best opportunity for young researchers to learn and interact with the world leaders in the field.

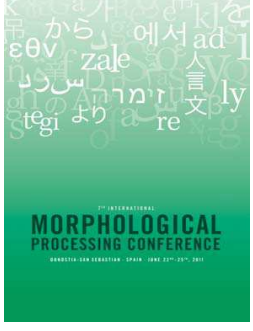
ORGANIZATION OF CONFERENCES, SEMINARS AND WORKSHOPS

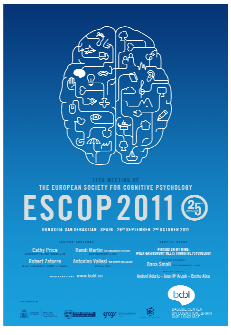
From the beginning, the BCBL has played an active role in the promotion of research in cognitive neuroscience and language starting with the organization of international conferences and workshops.

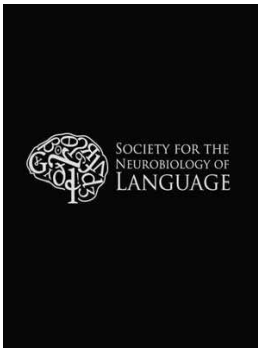
These are the international conferences organized and hosted by the BCBL(2010-2013)

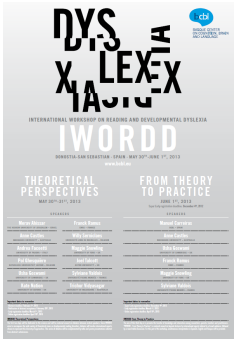












And their main achievements have been:

- More than 1.000 scientific presentations and around 2.000 attendees throughout 2009-2013.

SCIENCE OUTREACH ACTIVITIES

Apart from purely scientific events, the BCBL promotes **open scientific conferences for the general public** called "**Brain Talks**" In addition, some of our researchers participated in open conferences organized by other institutions. The aim of these events is to popularize neuroscience in general and cognitive neuroscience and language in particular, in society at large. The Brain Talks endeavour to make cognitive neuroscience more accessible and comprehensible to society, using language that is less scientific than in regular neuroscience conferences. Furthermore, the Brain Talks are filmed in video and uploaded to the BCBL's Youtube channel: http://www.youtube.com/user/OutreachBCBL

Most of the open talks for the general public were organized taking advantage of the presence of the invited speakers in the scientific conferences we held in San Sebastián. We have organized so far seven Brain Talks, with 1.370 attendees and we have participated in six talks organized by other institutions with 500 attendees ("Week of Science", "FASICAM", PrisMA", "Educación para el futuro" and "International University of Andalucía").

- Brain Talks I. Michael Posner, University of Oregon, USA. Education shapes the infant brain. 20 May, 2010.
- Brain Talks II. Nuria Sebastián, Universitat Pompeu Fabra, Spain. El bilingüe en la cuna: El aprendizaje de dos lenguas desde el nacimiento. 30 September, 2010.
- Brain Talks III. David Poeppel, NY University, USA. Lenguaje en el cerebro: Qué debes saber para hacer amigos y ser influyente. 13 April, 2011.
- Brain Talks IV. Itziar Laka, University of the Basque Country, Spain. La vida secreta de las palabras. 22 June, 2011.
- Brain Talks V. Dana Small (Yale University, USA), Eneko Atxa and Andoni Aduriz (Basque Culinary Center, Spain). Pintxos on my mind: When gastronomy meets cognitive psychology. 29 September, 2011.
- Brain Talk VI. Gary Lupyan, (University of Wisconsin – Madison, USA). Why are so many languages in the world and why are some of them so complicated? 13 July, 2012.
- Brain Talk VII. Karen Emmorey, (San Diego State University, USA). The signing brain: What sign languages reveal about human language and the brain. 28 October, 2012

BCBL IN THE MEDIA

In addition, we carried out communication activities pursuing three main objectives:

1. To **promote the BCBL and position it as a center of reference both at a local and international level** in the field of Cognitive Neuroscience of Language, especially in advanced research and training.

2. To promote BCBL excellence in order to **expand the base of possible collaborators** in the development of its research and training activities.

3. To **socialize the knowledge** generated in the BCBL, disseminating our scientific achievements to society at large. Along these lines, the BCBL made a qualitative leap in 2011 thanks to its presence in national communication media and its entry into the social networks. The benchmarks of dissemination and communication achieved by the BCBL are as follows:

Since 2009, the presence of the BCBL in the communications media has increased exponentially, both in the number of appearances and in their quality. After starting with sporadic appearances in local media in 2009, a monthly presence in the local and national communication media has been achieved since 2010.

In addition to achieving certain public recognition in the communication media thanks to the milestones attained by the center (opening ceremony, relevant scientific articles, research project development, etc.), the BCBL is regularly consulted by different media as an expert adviser in cognitive neuroscience, management in the scientific field and promoting scientific vocation among the youth.

On the other hand, in addition to its off-line media presence (press, TV and radio), during 2011 the BCBL deployed a new on-line communication strategy. Since the BCBL is conscious of the importance of on-line tools for dissemination and communication, it has created corporate channels in the **main social networks**: Facebook, Twitter, Google+, Youtube and Vimeo. Using these channels, the BCBL sends a daily communication related to cognitive neuroscience and language, which is followed and forwarded by the followers of these channels.

An exceptionally innovative aspect of the BCBL's on-line communication is the Open Cognitive Neuroscience initiative, which is based on the publication in YouTube of short videos (2 minutes) related with the BCBL's research areas. Each time a researcher from the center publishes a scientific article in a prestigious scientific journal, s/he briefly explains the finding using language directed at society at large.

TECH-TRANSFER

Throughout 2009-2013 the BCBL has also been focused on technological transfer to society.

The **most ambitious program is NEURE**, which will be explained in Section 2.2.5.

In addition, the BCBL has developed several databases that can be used for free by the scientific community, and any others interested in language research. They are available at our webpage bcbl.eu/databases/:

- ESPAL (Web interface to Spanish word frequency data and other word properties based on written and subtitle corpora).
- LSE-Sign: A database of 2,400 LSE (Spanish Sign Language) signs and 2,500 pseudosigns.
- Subtlex-GR: A Modern Greek word frequency database listing more than 23 million Modern Greek words taken from 6.000 subtitle files.
- Syllabarium database: Complete statistics for Basque and Spanish syllables.
- Vocabulary Size Calculator: A webpage that enables researchers to estimate infant and toddler vocabulary size from his/her score. The BCBL took an already developed principle and made a practical tool.

2.1.6. Planning

This section should include (Max. 2 pages):
Temporal plan for the deployment of the strategies and activities

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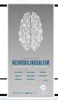
<tr><td rowspan="7">OTHER ACTIVITIES</td><td>Congresses / Workshops / Seminars</td><td></td><td></td><td></td><td></td><td></td><td>OPENING CEREMONY</td><td>  </td><td>NEUROBILINGUALISM</td><td>   </td><td>X SIMPOSIO PSICOLINGÜÍSTICA / VII INTERNATIONAL MORPHOLOGICAL CONFERENCE</td><td>  </td><td>ESCOP 2011</td><td>  </td><td>NCPW13</td><td></td><td>NEUROBIOLOGY OF LANGUAGE</td><td></td><td>WORKSHOP ON INFANT LANGUAGE DEVELOPMENT</td><td>READING AND DISLEXIA</td><td></td></tr>
<tr><td>Open talks to the public</td><td></td><td></td><td></td><td></td><td></td><td>BRAIN TALK</td><td></td><td>BRAIN TALK</td><td></td><td>BRAIN TALK</td><td></td><td>PINTXOS ON MY MIND</td><td></td><td>BRAIN TALK</td><td></td><td>BRAIN TALK</td><td></td><td></td><td>BRAINTALK</td><td></td></tr>
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2.2. Strategic Plan for 2014-2017

2.2.1. Research Programme(s)

This section should include (Max. 7 pages):
Main research objective(s) and description of the research activities, projects, lines deployed to meet that/those objective(s).

As described under section 2.1.1, the lines deployed to meet the strategic objectives of the BCBL are the following, hereby described in detail:

1. Language acquisition, representation and processing

- Language acquisition
- Language comprehension
- Language production

The main aim of this research line is to understand how language is acquired, comprehended and produced. It contains three sub-lines of research: acquisition, understanding and production.

Language acquisition

The aim of this sub-line is to understand how language is acquired. In order to so, several processing levels are explored (e.g., phonological, lexical, syntactic). In this line, the processes are explored both in oral (predominantly Basque and Spanish) and sign languages, in monolingual and bilingual populations. Spoken signals are very complex, but our brain is able to decode and process them with extraordinary speed and accuracy. Up to now, most of the underlying mechanisms have not been discovered. Over the last decades, phonology and phonetics have become privileged areas of experimentation in monolingual and bilingual acquisition. Moreover, the analysis of the acoustic signal can provide us with a set of results that could be applied to the computational replication of the characteristics of spoken language, such as automatic voice recognition, written-to-oral conversion, and semi-automatic translation. Other areas of interest in the field of language acquisition are morphology, lexicon and syntax.

In sum, the main focus of this research line is the study of the decoding of the spoken signal (phonology, morphology, syntax and lexicon) by monolingual and bilingual babies with sophisticated experimental methods.

Language comprehension

This second sub-line studies the complex processes implicated in language understanding in different modalities. The processes intervening between the reception of a signal (acoustic, as in speech perception, or visual, as in reading or in sign language perception) and the generation of a unique meaning in the receptor's mind are explored. Similarly, research is carried out in order to determine to what extent the processes involved in language understanding and/or the cortical representation of language are universal or specific. Research in different oral languages is a key issue for answering this question; however, in order to delimit modality-specific processes, the study of sign language processing becomes essential. Sign language is the natural language of the deaf and their main means of communication with their surroundings. Although these languages are expressed in a different modality from oral languages (visual vs. auditory), they share a set of characteristics. Similarly to the rest of human languages, it has been demonstrated that sign languages have phonological, morphologic and syntactic structures.

Another important area of study concerns the processes implicated in reading. Reading is an important skill in modern society and one of its building blocks is the recognition of words.

One of the aims is to investigate the various codes (orthographic, phonological, syllabic, morphological) implicated in word recognition and the functional architecture of the mental lexicon. In addition, studying how reading is carried out in different languages will help us to explore the existence of different levels of importance in the various codes or sub-lexical units in each of them. For this reason, cross-linguistic research is an important issue.

Language comprehension is being investigated at a variety of levels: sublexical processes, word recognition, morphosyntactic, semantic and pragmatic processing.

Language production

This line explores the processes that a transmitter of a message carries out, from the generation of an idea to the emission of a series of sounds (in the case of spoken languages), a series of gestures (in the case of sign languages), or a series of gestures on paper (in the case of written outputs). Production involves great computational complexity (as understanding does), requiring the concatenation of a series of intricate processes, such as the assignment of syntactic functions to the different phrasal elements, and the recovering of the corresponding lexical elements, phonological, phonetic and articulatory patterns, among others.

Research on the production processes of sign languages is crucial to determine which processes are universal to the human capacity of language, and which are modality-specific (auditory for oral languages, and visuo-spatial for sign languages). Production processes in patients are also studied within this research line.

2. Multilingualism

- Neurocognition and processing
- Educational neuroscience and lifelong learning
- Cognitive consequences of multilingualism

Research on language acquisition, understanding and production in bilingual and multilingual individuals, with different ages of acquisition of their second language (e.g., native or late learners) and with different degrees of proficiency in their second language is the main focus of this line. Special attention is also paid to multilingualism within the school system and to the development of new educational technologies.

Neurocognition and processing

Phonology, morphology and syntax are the aspects of language most difficult to master when a second language is being learnt late in life, while lexical aspects are more easily acquired. The specific morphological and syntactic characteristics of Basque and Spanish offer a key opportunity for investigating the acquisition and processing of the two languages as first or second languages.

Sentence understanding involves the hierarchical organization of different phrase constituents, sometimes distant from each other, or the linkage of elements from two different sentences like an anaphoric pronoun and its antecedent, among other processes. Examining which strategies and which processes are used by monolingual and bilingual speakers during syntactically ambiguous sentence understanding, during agreement processes, or during anaphor resolution and antecedent assignment, is highly important for understanding the underlying cognitive mechanisms of this complex activity.

We compare the cortical representation of bilingual and monolingual individuals, which constitutes a particular case of cerebral plasticity due to external influences. Various environmental factors have been proposed as determinants for cerebral organization of language:

(a) Second language age of acquisition

(b) Understanding and production proficiency in each language

(c) Similarity between languages in their structure or modality

In order to investigate these and other questions, studies on lexical access and syntactic processing in monolingual and bilingual participants at different ages (babies, children, young adults and the elderly) are carried out using behavioural and neuroimaging techniques.

Educational neuroscience and lifelong learning

Modern societies increasingly demand education based on scientific evidence. Reading and bilingualism are important skills in classroom settings that can benefit from new discoveries on human cognition research in the lab.

Children can learn two or more languages at very early ages, and people continue learning new languages throughout life, so we are all increasingly multilingual. This multilingual education, which is a highly desirable goal, both from a cognitive and a social perspective in the Basque Country, involves among other things learning to read and math learning in the L1 and L2. We investigate the neural substrates of the reading acquisition process and its constituent cognitive components, as well as the math learning process, with specific attention to individual differences and reading and math disabilities. We also investigate the relationship between specific cognitive functions and the changes in neural activity that take place in the course of learning to read and math learning in the L1 and L2. We also investigate the effects of training different cognitive processes such as attention and inhibition in reading and math processing. All this research is carried out with children of school age as well as with adults and the elderly.

We take advantage of information technologies in the development of computerized diagnostic and training tools for dementia patients and persons with different learning disabilities (i.e. Dyslexia, dyscalculia, SLI, ADHD, etc.). The aim is to develop computerized tools that include different tasks designed according to research knowledge on the acquisition, understanding and production of language and other cognitive processes, in the typically developing population, in children with special educational needs and in dementia patients. We measure potential benefits of an intervention with these tools. The objective is to empirically validate the training packages by carrying out experiments that measure cognitive functioning and brain activity before and after a program intervention.

These kinds of experiments involve both typically developing children and individuals with special needs, such as those children with certain disorders, dementia patients, and children from different socioeconomic backgrounds. For example, some of the more important causes of educational failure are related to socioeconomic and/or immigrant status. The interaction of these variables with cognitive processes is very important for the study of reading acquisition, for the design of training programs aimed at children with reading disabilities and in order to predict the conditions for success of these interventions.

Cognitive consequences of multilingualism

We constantly need to adapt our behaviour to new task situations, requiring cognitive control. One of these situations is language control in bilinguals. In fact, language switching is frequently used to study language control in language production. We compare balanced and unbalanced bilinguals in different task domains and use this as an expertise model to study questions such as inhibition of irrelevant information in language and non-language task switching or the brain activation associated with language and general control mechanisms. People can vary greatly in their level of language switching experience. Whereas monolinguals or unbalanced bilinguals have no or very little experience in language switching, balanced bilinguals can be considered experts in switching between languages. These bilinguals have probably developed an efficient, general language control mechanism, which is not available to monolinguals, or at least less efficient and less general. Several studies have suggested that being bilingual, and the practice in language control that comes with it, improves general cognitive control capacities, even in non-verbal tasks. Nonetheless, recent data do not seem to replicate these findings. This sub-line investigates the cognitive and brain mechanisms underlying language control and general cognitive control by comparing monolinguals and bilinguals (balanced and unbalanced bilinguals) in several paradigms using different techniques.

3. Neurodegeneration, language and learning disorders

- Language and learning disorders
- Neurodegeneration of language and cognition

The study of specific developmental and learning disabilities has always been a source of information on psychological processes in typical development and functioning. In addition, it has the applied long-term value of improving diagnostic methods, the possibility of aiding in early detection and the development of treatments that could prevent or minimize the difficulties of the persons with these disabilities. This line is divided in two research sub-lines:

Language and learning disorders

Language, developmental and learning disorders, such as aphasias, specific language impairment (SLI), dyslexia, dyscalculia, attention-deficit hyperactivity disorder (ADHD) and autism spectrum disorders (ASD), have serious emotional, personal and social consequences. They also entail important costs for the societies in which these people live.

Learning and education are intimately related to brain developmental mechanisms. This research line centers on the study of how cognitive processes and the brain function and develop during the development of reading, mathematical thinking, attention and social and emotional processing, and their influence on the acquisition of language, attention, arithmetic and problem-solving in typical and atypical development. In particular, we study typical development and the development of children with Special Educational Needs (e.g., dyslexia, SLI, and dyscalculia) using social and economic variables, genetic markers, and neuronal, cognitive and behavioural measures.

Research into these disorders will increase our knowledge of cognitive and brain processes involved in language and learning processes and will facilitate improved tools for diagnosis and treatment. The eventual inclusion of disorders of a different nature, such as ADHD, SLI and ASD, permits a comparative analysis of various components and aspects of language development. The combined expertise of different groups of the center will thus be brought to bear on the language development of these populations with problems in language development, resulting also in applied studies.

Neurodegeneration of language and cognition

Neurodegenerative diseases are the center of much attention, not only because of their scientific interest, but also due to their social implications. Among these disorders, Alzheimer's disease is perhaps one of the best known because it is close to the personal experience of many people. Symptoms described in various forms of dementia, such as Alzheimer's, Parkinson’s disease or semantic dementia, include important cognitive aspects such as language.

The phases of deterioration in dementia of the different components of language are being investigated. In particular, in Alzheimer's disease and in mild cognitive deficit, language disorders are some of the earliest expressions of the disease and constitute the most frequent cognitive difficulty after memory problems. They could therefore be used as early markers of the disease. Language components that could be most sensitive to decline in different types of dementia (Alzheimer Disease, Parkinson’s disease, Semantic Dementia, etc.) are being researched.

4. Advanced methods for cognitive neuroscience

- Magnetic resonance imaging methods for cognitive neuroscience
- Electromagnetic brain activity and neural coherence
- Computational models of language

The advance of knowledge in neurocognition of language has been fuelled by the development of advanced methods of research. We pay special attention to research in three methodological areas, which correspond to three sub-lines of research

Magnetic resonance methods for cognitive neuroscience

In recent years, extraordinary technical developments have allowed us to register neural correlates of human activity while participants are performing tasks and perceiving or producing stimuli (for instance during language understanding and production). This has allowed us to advance in the understanding of the brain and mind.

Techniques such as functional magnetic resonance imaging (fMRI) have opened a window to investigate the biological bases of complex processes such as language. In particular, they have allowed the examination of changes in brain activation as well as functional and structural connectivity between brain areas. In addition, recent advances have shown the impact of genes on the neuro-physiological correlates and on cognitive performance in several cognitive abilities. The use of such advanced techniques, together with the appropriate theoretical background and the appropriate paradigms, facilitates the investigation of the biological bases of language processing in monolingual and bilingual individuals, the biological processes of learning and other cognitive processes such as reading in children with typical development and in those with learning disorders. In addition, they allow us to investigate the biological bases of cognitive impairment, deterioration and dementia, especially in those areas related to language.

This research line investigates the improvement of sequences for obtaining data (e.g., MRI sequences, image resolution, diffusion tensor imaging), as well as for the data analysis of brain activation and structural and functional connectivity.

Brain electromagnetic activity and neural coherence

Techniques such as electroencephalography (EEG) or magnetoencephalography (MEG) facilitate the on line investigation of the neural correlates and biological bases of complex processes such as language. In particular, by measuring neural synchronization and electrophysiological changes time-locked to the presentation of stimuli, they provide fine grained temporal resolution in the investigation of neural activity. These techniques also permit us to estimate the neural sources of the electrophysiological signal through the application of advanced analysis techniques to the EEG signal. Other complex wavelets data analyses open new windows to extract new information from the EEG signal. It is possible to measure which types of waves (e.g., alpha, theta) are influenced in a particular experiment by a particular manipulation and the connectivity between regions. In addition, brain connectivity measures from graph theory are helping us to advance in our knowledge of brain mechanisms. This research line will apply and investigate new analyses to extract information from the signal obtained with EEG and MEG techniques.

Computational language models

We devote one line of research to formal modelling of behaviour and cognition. Clearly, developing theories that can be applied across experimental domains is an important step toward the goal of developing general theoretical principles of cognition. Indeed, it is only through careful empirical investigation of human cognition using appropriate mathematical models that the representations underlying different cognitive processes can be optimized.

The main aim is to develop and test computational models of cognitive processes both at a broad molecular level --and also at a neural level-- in the framework of cognitive neuroscience. One basic tenet of this line of research is that the proposed models will be biologically plausible.

More specifically, we focus on the cognitive modelling of language not only for typically developing adult individuals, but also for children and special populations. That is, we develop these computational and/or mathematical models using an approach that stresses the dynamic changes in the cognitive processes (e.g., the process of learning to read and the subsequent changes in the cognitive processes –i.e., models of language acquisition). For instance, we computationally model the acquisition process and examine the correlations between a model's performance and data from linguistic environments that children are exposed to. Furthermore, we also examine how the cognitive processes underlying language (at different levels) can be hindered in special populations (e.g., dyslexic and brain damaged individuals, Alzheimer patients, etc).

One obvious additional advantage of computational models is that they can easily be tested across a varied range of techniques. This allows further refinement of the proposed models, and also increases the theoretical interest of the questions examined in the other research groups at the BCBL. In order to do so, researchers in these groups actively collaborate with the other groups at the BCBL

RESEARCH PROJECTS

Many of the projects obtained during 2009–2013 and detailed in point 2.1.1 are still ongoing in the present period.

Please find below the two **recently started** and externally funded new projects:

ATheME/ FP7-SSH-2013-1-GA613465

- FUNDING AGENCY: 7PM
- TYPE OF PROJECT: COLLABORATIVE PROJECT
- TIME FRAME: 03/2014 - 02/2018
- BUDGET: BCBL: 245.430 Euros TOTAL: 4.999.990 Euros.
- COORDINATOR: Leiden University - Scientific Coordinator Lisa Cheng
- BCBL PI: Manuel Carreiras PhD

Qatar Learning to read in two/ NPRP 6-378-5–035

- FUNDING AGENCY: QATAR FOUNDATION
- TYPE OF PROJECT: RESEARCH PROJECT
- TIME FRAME: 04/2014 - 03/2017
- BUDGET: BCBL: 362.160 Dollar TOTAL: 1.031.136 Dollar
- COORDINATOR: BCBL - PI MANUEL CARREIRAS PhD

Additionally, this list contains the **research proposals** we have submitted during the first three months of 2014:

THE HEALTHY AND IMPAIRED MULTISENSORY TALKING BRAIN

- FUNDING AGENCY: MINECO
- TYPE OF PROJECT: PLAN NACIONAL
- TIME FRAME: 01/2013 - 12/2016
- REQUESTED BUDGET: 97.910 Euros
- COORDINATOR: BCBL - PI MARTJIN BAART PhD

MULTIMODAL NEUROIMAGING OF OSCILLATORY NETWORKS DURING WORKING MEMORY

- FUNDING AGENCY: MINECO
- TYPE OF PROJECT: PLAN NACIONAL
- TIME FRAME: 01/2013 - 12/2016
- REQUESTED BUDGET: 140.600 Euros
- COORDINATOR: BCBL - PI CESAR CABALLERO PhD

HABILIDADES LINGUISTICAS EN HABLANTES BILINGÜES Y MONOLINGÜES

- FUNDING AGENCY: BASQUE GOVERNMENT
- TYPE OF PROJECT: PIBA – PROYECTOS DE INVESTIGACIÓN BÁSICA Y APLICADA
- TIME FRAME: 2014 - 2016
- REQUESTED BUDGET: 52.102 Euros
- COORDINATOR: BCBL - PI SIMONA MANCINI PhD

WHAT IS THE EXACT LOCUS OF THE ASYMMETRICAL LANGUAGE SWITCHING COST?

- FUNDING AGENCY: BASQUE GOVERNMENT
- TYPE OF PROJECT: PIBA – PROYECTOS DE INVESTIGACIÓN BÁSICA Y APLICADA
- TIME FRAME: 2014 - 2016
- REQUESTED BUDGET: 58.218 Euros
- COORDINATOR: BCBL - PI CLARA MARTIN PhD

RETRASO EN LA MADURACIÓN CEREBRAL DEL PACIENTE CON TDAH: EVALUACIÓN DE UNA HIPÓTESIS Y OBTENCIÓN DE INDICADORES BIOLÓGICOS.

- FUNDING AGENCY: BASQUE GOVERNMENT
- TYPE OF PROJECT: PIBA – PROYECTOS DE INVESTIGACIÓN BÁSICA Y APLICADA
- TIME FRAME: 2014 - 2016
- REQUESTED BUDGET: 55.000 Euros
- COORDINATOR: BCBL - PI ALEJANDRO PEREZ PhD

We are currently working on four ERC Starting Grant applications to be submitted March 2014:

ACQUIRING A SECOND LANGUAGE IN THE ELDERLY: THE BENEFITS OF A HEALTHY BILINGUAL MIND – MENSSANA.

- FUNDING AGENCY: H2020
- TYPE OF PROJECT: ERC Starting Grant
- TIME FRAME: 2015 – 2020
- TO BE REQUESTED BUDGET: 1.460.238 Euros
- PI: DR. Jon Andoni Duñabeitia PhD

LEARNING DIFFERENT LANGUAGES BEFORE LEARNING TO READ: IMPLICATIONS FOR DEVELOPMENTAL DYSLEXIA. – DYSBILANG.

- FUNDING AGENCY: H2020
- TYPE OF PROJECT: ERC Starting Grant
- TIME FRAME: 2015 – 2020
- TO BE REQUESTED BUDGET: 1.435.700 Euros
- PI: DR. Marie Lallier PhD

PRESTO: PREDICTING AS A STRATEGICAL OPTION

- FUNDING AGENCY: H2020
- TYPE OF PROJECT: ERC Starting Grant
- TIME FRAME: 2015 – 2020
- TO BE REQUESTED BUDGET: 1.449.200 Euros
- PI: DR. Nicola Molinaro PhD

BICODE: BRAIN SOURCES OF BILINGUAL MATH: LANGUAGE SHAPES TYPICAL AND ATYPICAL NUMERICAL DEVELOPMENT.

- FUNDING AGENCY: H2020
- TYPE OF PROJECT: ERC Starting Grant
- TIME FRAME: 2015 – 2020
- TO BE REQUESTED BUDGET: 1.465.856 Euros
- PI: DR. Elena Salillas PhD

Furthermore, we are also working on two ERC Consolidator applications to be submitted May 2014:

- ERC Consolidator: PI Dr. Clara Martin.
- ERC Consolidator: PI Dr. Eiling Yee.

2.2.2. Research Groups

This section should include (Max. 3 pages):
Definition of research structure or organisation of the center. Strategies and activities to support the attraction and retention of research talent. Expected evolution of the structure of personnel to achieve the strategic objectives of the center.

According to the chart outlined in section 2.1.1 and the philosophy and procedures previously explained, we expect the future development of our research team based on the international calls, launched yearly by Ikerbasque for seniors and fellows, as well as the BCBL calls. The capacity of the current researchers to obtain further funding is also key.

One of the major challenges we are facing, as described before, is the recruitment of senior group leaders to create new research groups. We will be working together with Ikerbasque to attack this problem. The attraction of Senior Ikerbasque Professors may be a bit easier in these coming years given the increased reputation of the BCBL in the scientific community. Nonetheless, it is also important for Ikerbasque's offers to be competitive and, obviously, our success will depend on the negotiations carried out between the applicants and Ikerbasque.

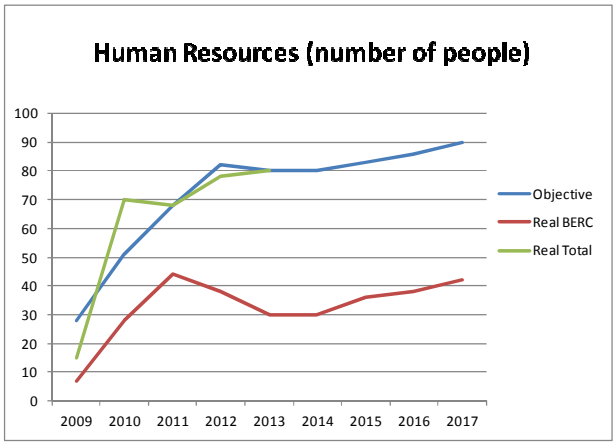
In addition, given that our staff scientists have gained experience, we will start creating junior independent groups in 2015. In this regard, it will be helpful to know the outcome of the six ERC applications submitted during this year.

Furthermore, as usual, the internal applications for postdoctoral and staff scientists will follow a rigorous evaluation procedure including an initial evaluation to get a short list followed by job talks.

We would like to concentrate the recruiting efforts specifically on strengthening lines (3) neurodegeneration, language and learning disorders and (4) advanced methods for cognitive neuroscience.

Based on the current staff at the BCBL, the requested fellowships and the estimation of direct help to be received from the Basque Government, this is the expected evolution of BCBL staff. Therefore, and even with the current crisis situation, we expect to maintain the same ratio between the personnel paid from the BERC direct help and those paid thanks to competitive fellowships or projects.

In fact, this graph gives an overview of the evolution of BCBL staff against the provisions of the 2009-2012 Strategic Plan, also showing the evolution of the number of people hired under the BERC Program.



As can be seen, although there was a rise in 2011, the number of people funded by the BERC grant in 2012 and 2013 declined to 2010 levels. This means that 50 of the 80 people hired in the BCBL have their costs funded by personal fellowships and externally funded research projects.

INDIVIDUAL FELLOWSHIPS

BCBL has always been active in the submission of proposals for granting individual fellowships through different Regional, National and International programs and schemes.

The table below displays the current running fellowships and the submissions to be done during the first months of 2014:

2014 FELLOWSHIPS

FUNDING AGENCY	RUNNING IN 2014	SUBMITTED IN 2014
MINECO		
* Ramón y Cajal	1	2
* Juan de la Cierva	0	10
* PTA	2	2
* FPI & short stays	3	0
MEC		
* FPU	0	1
7TH FRAMEWORK PROGRAMME		
* IEF	4	0
* IIF	1	0
* IOF	1	0
* ERC STARTING	0	4
* ERC CONSOLIDATOR	0	2
* ERC ADVANCED	1	0
BASQUE GOVERNMENT		
* BFI	3	0
* Postdoctoral	1	0
IKERBASQUE		
* Research Professor	2	0
* Research Fellowship	2	1
* Visiting Fellowship	1	0
DIPUTACION FORAL GIPUZKOA		
* Programa Fellows	2	0
OTHER	1	0
TOTAL	25	22

In 2013 we succeeded in the application of three Marie Curie fellowships, which have been running since February **2014**:

- FP7-PEOPLE-2013-IIF -UNIVERSAL-A Universal Model of Word Comprehension. PI: Dr. Blair Armstrong.
- FP7-PEOPLE-2013-IEF - PSLOAHMD- Predicting Sequential Learning from Oscillatory Activity In Human Meg Data. PI: Dr. Frederic Roux.
- FP7-PEOPLE-2013-IEF- NINAME- Brain Dynamics And Patterns Of Activity Signature Of Inner Speech During Recall And Conceptual Emergence In Bilinguals. PI: Dr. Loretxu Bergouignan.

2.2.3. International Collaboration

This section should include (Max. 3 pages):
Agreements and collaboration frameworks with international entities that help in the internationalisation of the center. Composition and role of the external scientific advisory board.

As mentioned before in point 2.1.3 of this report, international collaboration in these fields comes about largely from the collaborations established by the researchers who form part of the organization with other researchers from other centers and universities. Therefore, a part of the budget will be allocated for holding conferences, symposia, workshops, etc., as well as to stimulate and support the presence of members of the BCBL in international forums.

The BCBL will continue to collaborate actively with the aforementioned **International bodies**, such as the CNRS (France), the University of la Provenza (Italy), the University of Magdeburg (Germany), the Max Planck Institute for Psycholinguistics in Nijmegen (Holland), the Donders (Holland), the Tufts University (USA), Massachusetts University (USA), University of California (USA), University College London (UK), Universiteit Utrecht (Netherlands), University Vrÿe (Amsterdam), Macquarie Center for Cognitive Science (Australia), Bogaziçi University (Turkey), Netherlands Organization for Scientific Research (Netherlands) and the Fondation Fyssen (France), as well as others that we collaborate with on some European Projects.

At the same time, we will work in the **European project** *The European Network on Word Structure 09-RNP–089* (please refer to 2.1.3.1) and have recently started the **7PM Collaborative Project** *AThEME Advancing the European Multilingual Experience* which will entail active collaborations with the project's partners who are: University of Leiden (Netherlands), University of Nantes (France), University of Utrecht (Netherlands), The University of Reading (United Kingdom), The University of Edinburgh (United Kingdom) Universitat Konstanz (Germany), Koninklijke Nederlandse Akademie Van Wetenschappen–Knaw (Netherlands), Univerza V Novi Gorici (Slovenia), Universitat Pompeu Fabra (Barcelona – Spain), Center National De La Recherche Scientifique (France),Universidad del País Vasco Ehu Upv (Spain), Universita Degli Studi Di Trento (Italy), Universita Degli Studi Di Verona (Italy), Queen Mary And Westfield College, University Of London (United Kingdom),De Taalstudio BV (Netherlands), University Of Rijeka - Faculty Of Humanities And Social Sciences (Croatia).

We will also continue with the current programs that we are using to interchange students and researchers with other research centers or universities, such as the Fyssen Foundation, the NOW (Nederlandse Organisatie voor Wetenschappelijk Onderzoek) and the Brazil Minesterio Da Educaçao (Brasil).

Furthermore, some of our researchers are taking part in different publications as **members of editorial boards**:

Manuel Carreiras PhD: Director and Group Leader.
Q1 (top Journal Publication) *Language and Cognitive Processes*
Indexed Research Publications: *Frontiers in Language Sciences, Cahiers de Psychologie Cognitive/Current Psychology of Cognition, Frontiers in Language Sciences, Revista Cognitiva,Psicologica.*

Eiling Yee PhD: Staff Scientist.
Q1 (top Journal Publication): *Cognition.*
Indexed Research Publications: *Frontiers in Language Sciences.*

Jon Andoni Duñabeitia PhD: Staff Scientist.
Associate editor of an indexed research publication: *Journal of Cognitive Psychology & Frontiers in Psychology.*

Arthur Samuel: Senior and Group Leader.
Q1 (top Journal Publication): *Journal of Memory and Language & Psychological Science.*

Clara Martin PhD: Staff Scientist
Indexed Research Publications: *Frontiers in Language Sciences*.

Regarding the Management Department, there have been some collaborations such as:

Our Project Manager, Ana Fernandez, took part as an invited speaker in the framework of the European ITN-LCG project's summer school 2012-2013 in Berlin and Bern.

The General Manager of the BCBL, Miguel A. Arocena PhD, is regularly invited as external evaluator for the research centers associated with CERCA (Catalonian Research Center's Association).

INTERNATIONAL SCIENTIFIC ADVISORY BOARD

The main role of the International Advisory Board is to advise on the center's orientation and overall strategy. The composition of the ISAB is still the same as it was at the beginning, and has been detailed under section 2.1.3.

2.2.4. Training activities

This section should include (Max. 1 page):
Training activities for researchers and support staff in all the different career stages, designed to recruit, strengthen and retain the talent and personnel.

As an excellence research center, the BCBL cares for the permanent learning and quality training of its members by organizing conferences, workshops, and postgraduate programs. Please, find more information about conferences in section 2.1.5 and 2.2.5.

Training is the key point of success, as researchers need to be aware of recent theoretical and methodological developments and also of new ideas that could challenge and/or reinforce theoretical developments. In addition, there are crucial advances that help to improve their methodological knowledge of a particular technique. That is why it is important to allocate a **significant budget to the development, implementation and organization of such events.**

Additionally, as previously detailed, the BCBL leads, and will continue to lead, in the design, organization, and teaching of the **MASTER IN COGNITIVE NEUROSCIENCE OF LANGUAGE**, offered through the Department of Basque Philology of the University of the Basque Country. One of the aims of this graduate program, launched in October 2011, is to train interdisciplinary researchers in the Cognitive Neuroscience of Language to further advance and transfer this knowledge to the areas of Health and Education.

EDUCATION - PhD PROGRAM:

The BCBL together with the UPV/EHU Department of Basque Language and Communication and the Department of Classical Studies of the Facultad de Letras (UPV/EHU) launched a new PhD program on linguistics that has been recently approved by the ANECA. **Most of the BCBL's new PhD students are enrolled in this program.**

2.2.5. Other activities

This section should include (Max. 3 pages):
Other complementary actions, such as dissemination, technology surveillance, knowledge transfer activities, etc.

Since its creation, the BCBL has been devoted to **promoting the Basque Science System internationally, by organizing international scientific congresses and workshops, linking the "Euskadi-Basque Country" brand to the scientific quality value** (3rd objective of Basque Government's Governance Program).

The BCBL will continue with the strategy of performing several dissemination activities:

- First, for the scientific community, through conferences, seminars and congresses.
- Second, for the citizenship, through Brain Talks and the Science week.
- Third, for everyone, through the media.

ORGANIZATION OF CONFERENCES, SEMINARS AND WORKSHOPS

Throughout 2014-2017 the BCBL will organize a minimum of one international conference annually. Specifically, the BCBL has already arranged the organization of one international workshop, one international summer school and one local meeting (Neurogune) for 2014 and one international workshop for 2015:

International Workshop on Learning and Memory Consolidation

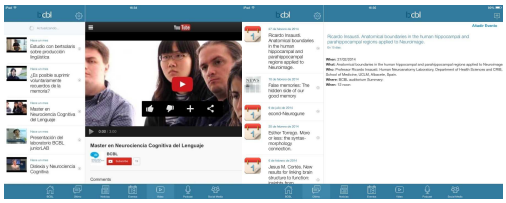
ESCOP Summer School.

Also, the **BCBL – Basque Center on Cognition, Brain and Language together with the Basque Government, Biodonostia Health Research Institute** and **Achucarro center** are supporting the organization of the second meeting of the Basque research community in all the areas of neuroscience.

Additionally, the BCBL will organize and host the **Interdisciplinary Advances in Statistical Learning** conference in June 2015.

Following our communication and social media strategy, we will continue being present in the following corporate channels in the main social networks.

In 2014, the BCBL will also launch a free scientific communication App for Iphone and Android, sponsored by the Government of the Basque Country through the Special Actions Program.



TECHNOLOGICAL SURVEILLANCE

As regards technological vigilance, the BCBL takes special care to stay informed of all the events that take place in its surroundings involving its field of action. The purpose of this vigilance is to **identify the points that may represent a source of opportunity,** a threat or a benefit. Publications, seminars, etc. are used to identify international scientific progress and thus determine the path and direction of our own research activities. We once again highlight the annual budget provided to each researcher to attend scientific conferences in order to communicate or learn of the most recent advances and developments in the field of cognitive neuroscience.

With the purpose of being continuously informed about calls and grants launched regionally, nationally and internationally, the BCBL is registered in several **alert services** that keep us updated on relevant information and deadlines (i.e. MINECO, MEC, GV, H2020, NIH, EARMA, OTRI, EUROPAMEDIA, etc.).

TECH-TRANSFER

Tech-transfer is one of the long term pillars for the BCBL, thus **strengthening the Basque Science System by transferring knowledge** and research results to society.

In addition to carrying out basic research intended to increase knowledge, we also intend to provide knowledge that can be applied to other bodies and that, in the medium run, can be transformed into products and services, while making this process as efficient as possible.

In order to reach this goal, BCBL Management ensures that the research results undergo continuous evaluation with regard to their potential application and rapid transfer to their specific field of development.

BCBL Management also promotes cooperation with the rest of the actors in the science and research system in order to increase the probabilities for the transfer of knowledge and results between organizations.

This Strategic Plan includes the creation of two tech-transfer initiatives, which might be future start-ups,

based on the technology and knowledge generated in the BCBL.

The first initiative is a **clinic for the diagnosis, treatment and monitoring of learning disorders, focused primarily on school children**.

The Strategic Plan also includes a second initiative addressing diagnosis and intervention software for children with learning disorders as we will further explain in point 3.4.

The first initiative capitalizes on the research knowledge of the BCBL regarding learning disabilities using neuroimaging techniques. The aim is to provide early diagnosis of learning disabilities (specifically, SLI, dyslexia and dyscalculia) in children at risk, as well as a more complete diagnosis of children already having learning disabilities, by providing a detailed assessment of different cognitive processes. This is an opportunity for establishing collaboration with professionals in the field to set up a way of providing a detailed and well-informed diagnosis.

The characteristics of the first initiative are similar to those of a clinic with two important strategies:

1. ASSISTANCE: The clinic will be a valued complement for the diagnosis of learning and development disorders.

2. RESEARCH: The clinic will supply the database of the Basque Center on Cognition Brain and Language (BCBL), transforming it into a win-win cooperation between both bodies. The clinic will supply the database of the BCBL, making this a win-win collaboration between both bodies. The BCBL's expertise will benefit the clinic, while the collection of clinical histories in the database will benefit the BCBL's research,

In the second stage, we intend to **develop and market educational software** and software for valid early diagnosis of learning disorders such as dyslexia, dyscalculia or specific language impairment disorders. The software will consist of tools for early diagnosis of learning disorders with multimedia support, previously tested in a large sample. It will be presented as a user-friendly suite supported by findings obtained from the basic and excellence research by the BCBL. It will be distributed through the marketing channels appropriate for these advanced diagnosis programs.

This software will be oriented towards the world of education. Given its multimedia support, the software will permit automation of the process, interaction with the child, and the possibility of evaluating results quickly against a growing, aggregated database, allowing for increasing adjustment of the diagnosis discrimination factor, while increasing the research database of the BCBL.

This product will distinguish itself from other diagnostic suites in the market by the following:

- Digital support
- Scientific quality and nature
- Support: User-friendly. Interactive. Recreation-oriented
- Discrimination factor: diagnostic accuracy

Right now, the BCBL is working on two initiatives in parallel, one for dyslexia and another for SLI, while also initiating a third initiative on dyscalculia.

The clinic is built and will start giving diagnoses and support to therapists in 2015.

Finally, together with the neurosurgeons of the Cruces Hospital, we are setting up a collaboration to carry out pre-surgical, and post-surgical mapping of language in patients that need brain surgery at the BCBL, as well as surgical mapping during the operation. Meetings are being held held with the managing bodies of the hospital, the neurosurgeons and Osakidetza to offer the patients better prognosis for the operation by taking advantage of the equipment and know-how of the BCBL.

2.2.6. Planning

This section should include (Max. 2 pages):

Temporal plan for the deployment of the strategies and activities

PLANNING		2014				2015				2016				2017			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
SCIENTIFIC PROGRAM	Language acquisition, representation and processing	EXPERIMENTS & PUBLICATIONS; PROJECT PROPOSALS AND PERFORMANCE				EXPERIMENTS & PUBLICATIONS; PROJECT PROPOSALS AND PERFORMANCE				EXPERIMENTS & PUBLICATIONS; PROJECT PROPOSALS AND PERFORMANCE				EXPERIMENTS & PUBLICATIONS; PROJECT PROPOSALS AND PERFORMANCE			
	Multilingualism	EXPERIMENTS & PUBLICATIONS; PROJECT PROPOSALS AND PERFORMANCE				EXPERIMENTS & PUBLICATIONS; PROJECT PROPOSALS AND PERFORMANCE				EXPERIMENTS & PUBLICATIONS; PROJECT PROPOSALS AND PERFORMANCE				EXPERIMENTS & PUBLICATIONS; PROJECT PROPOSALS AND PERFORMANCE			
	Neurodegenaration, language and learning disorders	EXPERIMENTS & PUBLICATIONS; PROJECT PROPOSALS AND PERFORMANCE				EXPERIMENTS & PUBLICATIONS; PROJECT PROPOSALS AND PERFORMANCE				EXPERIMENTS & PUBLICATIONS; PROJECT PROPOSALS AND PERFORMANCE				EXPERIMENTS & PUBLICATIONS; PROJECT PROPOSALS AND PERFORMANCE			
	Advanced methods for cognitive neuroscience	EXPERIMENTS & PUBLICATIONS; PROJECT PROPOSALS AND PERFORMANCE				EXPERIMENTS & PUBLICATIONS; PROJECT PROPOSALS AND PERFORMANCE				EXPERIMENTS & PUBLICATIONS; PROJECT PROPOSALS AND PERFORMANCE				EXPERIMENTS & PUBLICATIONS; PROJECT PROPOSALS AND PERFORMANCE			
INTERNATIONAL COLLABORATIONS	International Agreements	ANNUAL CYCLE: STRATEGY DEFINITION/ESTABLISHMENT OF CONTACTS/SIGNATURE OF AGREEMENTS				ANNUAL CYCLE: STRATEGY DEFINITION/ESTABLISHMENT OF CONTACTS/SIGNATURE OF AGREEMENTS				ANNUAL CYCLE: STRATEGY DEFINITION/ESTABLISHMENT OF CONTACTS/SIGNATURE OF AGREEMENTS				ANNUAL CYCLE: STRATEGY DEFINITION/ESTABLISHMENT OF CONTACTS/SIGNATURE OF AGREEMENTS			
	7th Framework Program applications	7PM GRANT NEGOTIATION (MARIE CURIE, ERC)		7PM GRANT PREPARATION (MARIE CURIE, ERC)	7PM GRANT SUBMISSION (MARIE CURIE, ERC)	7PM GRANT NEGOTIATION (MARIE CURIE, ERC)		7PM GRANT PREPARATION (MARIE CURIE, ERC)	7PM GRANT SUBMISSION (MARIE CURIE, ERC)	7PM GRANT NEGOTIATION (MARIE CURIE, ERC)		7PM GRANT PREPARATION (MARIE CURIE, ERC)	7PM GRANT SUBMISSION (MARIE CURIE, ERC)	7PM GRANT NEGOTIATION (MARIE CURIE, ERC)		7PM GRANT PREPARATION (MARIE CURIE, ERC)	7PM GRANT SUBMISSION (MARIE CURIE, ERC)
RESEARCH TEAM TRAINING	Open Seminars / Invited speakers	EVERY 2 WEEKS				EVERY 2 WEEKS				EVERY 2 WEEKS				EVERY 2 WEEKS			
	PhD Program	MASTERS PROGRAM TEACHING/PHD PROGRAM START				MASTERS PROGRAM TEACHING/PHD PROGRAM START				MASTERS PROGRAM TEACHING/PHD PROGRAM START				MASTERS PROGRAM TEACHING/PHD PROGRAM START			
OTHER ACTIVITIES	Congresses / Workshops / Seminars		Neurogune 2014	ON LEARNING AND MEMORY CONSOLIDATION / ESCOP SUMMER SCHOOL / NEUROGUNE			WORKSHOPS/ SEMINARS TO BE DEFINED		CONGRESS TO BE DEFINED		WORKSHOPS/ SEMINARS TO BE DEFINED		CONGRESS TO BE DEFINED		WORKSHOPS/ SEMINARS TO BE DEFINED		CONGRESS TO BE DEFINED
	Open talks to the public			BRAINTALK					BRAINTALK								
	Presence in congresses, seminars	PARTICIPATION				PARTICIPATION				PARTICIPATION				PARTICIPATION			
	Paper publication	PUBLICATIONS				PUBLICATIONS				PUBLICATIONS				PUBLICATIONS			
	Technological surveillance																
	Tech Transfer				neure								CREACION SPIN-OFF 2				
	Presence in congresses, seminars	ACTIVE PARTICIPATION				ACTIVE PARTICIPATION				ACTIVE PARTICIPATION				ACTIVE PARTICIPATION			

3. GOVERNANCE, INFRASTRUCTURES AND MANAGEMENT FOR EXCELLENCE

3.1. Governance

This section should include (Max. 2 pages):
Description of the legal entity of the center and the partner institutions/persons and the agreements among them and the center.

The Basque Center on Cognition, Brain and Language is a world class interdisciplinary research center for the study of cognition, brain and language jointly founded by Innobasque, Ikerbasque, UPV-EHU and the Government of Gipuzkoa.

Founding Partners

Ikerbasque. Basque Foundation for Science
www.ikerbasque.net

Innobasque. Basque Innovation Agency
www.innobasque.com

Local Government
www.gipuzkoa.net

University of the Basque Country
www.ehu.es

Promoted by

Gobierno Vasco / Eusko Jaurlaritza
www.euskadi.net

It was created as a non-profit association, with its own statutes that define all legal regulations pertaining to the final goals, objectives, social address, duration, administration and governing authorities, general assembly and its authorities (such as general activity plan approval, composition of the board and statutes' modification), composition, meeting frequency, calls for meetings, the steering board and its authorities (such as the definition and approval of the yearly program and budget and naming of the scientific Director), and rules for the meetings. The statutes also address the President, Vice-President, secretariat and treasurer and their authorities and duration, as well as who can be an associated body, how, and their rights and obligations.

Every year, at least twice, the Steering Committee and the General Assembly conduct a revision of the status of the center and supervise the advances in all strategic actions and lines. The Director and the General Manager give a summary of the developed programs and the financial status as well as the future lines and budget for them, in order to receive acceptance or modification feedback and improvement suggestions from the steering board.

3.2. Infrastructure and Equipment

This section should include (Max. 3 pages):
Detail of the current and future infrastructures to achieve the strategic objectives of the regional and the center.Detailed justification of the need and opportunity of the equipment.

BUILDING

Throughout 2009 the BCBL's Director and General Manager visited and analyzed some of the key European research centers in this sector, to be able to design and build the exceptional facilities that support cutting-edge research on language and cognition in adults and children, using both behavioural and neuroscientific approaches. Today the BCBL has three sites. The headquarters (main laboratories and offices) are located in San Sebastián's Technological Park with a total surface area of 1,823 m2 (1,170 m2 for offices, meeting rooms, auditorium, library and lounge and 653 m2 for labs). The second location is a 100 m2 space located in the Jose Mª Korta building in the University of the Basque Country Campus. Finally, the BCBL has extended its facilities with the Junior Lab in Vitoria (120 m2).

LABORATORIES

Miramón & Korta

Cutting edge neuroscience methodologies are available, including EEG/ERP, MEG, and fMRI. All facilities are connected to a high-speed local network that also supports communication between user workstations. As far as possible, the same stimulus presentation tools and data recording hardware and software are employed across the experimental facilities, to ensure comparable experimental setups across different experimental methods/platforms (Behavioural, MEG, MRI, EEG, Eye Tracking, babyLAB and NIRS). For special-purpose applications, a skilled technical group supports the installation and use of different hardware and software.

Junior Lab

As a consequence of the numerous projects that imply child participation, the idea of creating a lab inside a school was explored. Today, the Junior Lab is located in Carmelitas School in VITORIA. It is an external laboratory of the main BCBL Lab with significant potential and possibilities for exploring language development in children. It is equipped with 2 behavioural cabins, 1 eye tracker and 1 EEG. The behavioural cabins have a touch screen in order to ease participant performance. The EEG complies with the main laboratories EEG standards. The eye tracker is a cutting edge device. It is special as it has a mirror system allowing participants to move during the experiment. This feature is very critical in the case of child participation.

RESEARCH FACILITIES

Behavioural

Eight soundproof chambers are available to conduct behavioural experiments. Each chamber is equipped with a standardized, quality, experimental setup, which can collect reaction-time data such as pushbutton responses or naming latencies. Chambers can be used for individual testing sessions with one experimenter monitoring individual participants, as well as for testing up to 4 participants simultaneously. The hardware for each chamber includes monitors (ViewSonic G90FB 19" CRT), soundcards (Soundblaster Titanium X-FI, with ASIO support) and headsets (Sennheiser HMD 280 pro push button response boxes). The standard software packages are DMDX and Presentation but the

technical group can build and develop special-purpose hardware and software when the standard configuration does not provide the functionality for a particular study. The lab is also equipped with a special sound booth in order to prepare and run production and perception experiments.

MEG

Magnetoencephalography (MEG) provides a noninvasive method for recording cortical activity with exceptional temporal resolution and fine spatial resolution. The MEG facility at the BCBL is a 306-sensor (204 planar gradiometers and 102 magnetometers; arranged in a helmet configuration) Elekta Neuromag® device with 16 digital trigger lines and 8 auxiliary analog input channels. The setup will allow for the delivery of both auditory and visual stimuli, and recordings can be performed in either supine or sitting position. The MEG device also includes an integrated 64-channel EEG system (60 single channel and 4 differential electrodes) for simultaneous MEG and EEG recordings that can be acquired at a sampling rate of up to 8 kHz (5 kHz standard) in either AC or DC. Throughout the experimental session, a participant's head position within the scanner is sampled so that the data can be linked to independently acquired anatomical MRI images. The facility at the BCBL includes passive shielding to reduce external noise, as well as MaxFilter™ software, which filters artefacts as well as internal and external noise sources. For data analysis, the Elekta Neuromag® includes advanced analytical software, including powerful tools for visualization and source modelling of the recorded data. The system includes a new Phantonics panel for auditory stimulation to avoid to artefacts.

MRI

The BCBL is equipped with a Siemens 3T Magnetom magnetic resonance imaging (MRI) device for functional, structural, and diffusion tensor imaging. This system uses the Siemens total imaging matrix (TIM) coil system with a 32 channel RF coil, which provides high image quality and improved performance with iPAT (integrated parallel acquisition techniques) and excellent workflow. It comes with a TQ-engine (45mT/m @200 T/m/s) offering a large anatomical coverage with a maximum field of view (F0V) of 50 cm. Siemens protocols allow for BOLD imaging and Resting State imaging, as well as T1-weighted anatomical scans. Diffusion-weighted images can be acquired using a spin echo echo-planar imaging sequence that provides at least 60 gradient directions. Some new devices have been acquired in order to complete the setups for production experiments like the 2 perpendicular microphones that allow voice recordings during the scans.

EEG

The center is equipped with five EEG systems that are installed in four Faraday cage - soundproof chambers. Each chamber is equipped with a BrainAmp DC® amplifier. Using the recording software (Brain Recorder®) all the amplifier options, including the switch from DC to AC recording mode as well as selecting different filtering bandwidths, can be controlled. The BrainAmp DC® is more stable than older EEG systems in a variety of applications, and it supports simultaneous EEG/TMS and EEG/MEG input to the Brain Computer Interface and Neurofeedback. Two chambers are equipped with a 64-channel system and three chambers with a 32-channel amplifier. The BrainAmp DC® is a portable amplifier which connects to any laptop and can be powered with batteries. As a result, the 32-channel amplifiers can also be used for experiments outside the center (e.g., in schools or hospitals). Each chamber is also equipped with sets of electrodes that can be arranged on EasyCaps® in whatever pattern needed for a given experiment. Each cap has 64 equidistant electrode positions (10%-System); several different sizes are available, including those suitable for children. For off-line EEG/ERP analyses, Vision Analyzer® 2.1 software is available on each computer via a network key. Our center is equipped with the hardware and software resources to carry out and analyze a wide range of on-line reading experiments and experiments using the visual word paradigm. An EEG fMRI-compatible BrainAmp MR Plus (32 channels) has recently been acquired and multimodal type experiments can therefore be carried out.

Eyetracking

Our Lab has three Eyetracking systems which are one of the latest and most complete systems for eye tracking: EyeLink 2K (SR Research Ltd.). EyeLink 2K provides an excellent sampling rate (2000 Hz) and is especially suitable for real-time data collection. EyeLink 2K can be used for monocular as well as binocular eye tracking, and the system is perfectly compatible with most contact lenses and spectacles. This system has a very high average accuracy, down to 0.15º. Many paradigms can be implemented in the EyeLink 2K, such as the visual word paradigm, the boundary technique (parafoveal previews) or silent sentence reading. The EyeLink 2K system uses a remote desktop mounting, which allows participants to be free of any head-mounted cameras.

babyLAB

In our state-of-the-art infant lab, a number of methods and techniques are available for discovering the first steps of human language development. The behavioural set-up supports the Visual Habituation, Head-turn Preference, and Intermodal Preferential Looking procedures to assess preverbal infants' general language skills (from 3 to 12 months of age), and to investigate older infants' syntactic and lexical knowledge up to 28 months of age. In addition to behavioural and physiological methods, we are also equipped with EEG/ERP systems suitable for infants and children. Electrophysiological recordings are advantageous in infancy as they provide a direct and online measurement of processing abilities. Moreover, the exact same technique can be applied throughout the whole lifespan, making it possible to track language related developmental changes. Our EEG/ERP systems can also be integrated with the ECG system. Finally the set-up is supplemented with a Near Infrared Spectroscopy (NIRS) and an Eye tracking device. The BCBL babyLAB offers a cutting-edge research venue within an exceptional environment for comprehensively investigating monolingual and bilingual language development.

NIRS

Near -infrared spectroscopy is a light-based imaging technique. Our system, NIRScout, is an ultra-compact and scalable solution for applications where flexibility is the dominant concern. This system is ideally suited for longitudinal studies with children, combined EEG functional NIRS studies and freely moving studies. For instance, it provides a flexible methodology for measuring cortical activity during overt speech production while avoiding some of the limitations of traditional imaging technologies. The BCBL Nirscout has eight illumination points and sixteen sensors, can enlarge, is EEG-compatible and has three caps from baby to infant studies available.

DATA MANAGEMENT CENTER

A centralized storage system is the core of the information system at the BCBL. It stores both experimental recordings and user data. Among other advantages, it delivers unlimited extension capability, superior performance, independent physical access and transparent backup. Permissions and rights are managed with a single domain system, enabling the use of only one username and password for all the IT services in the center. This also applies to the mail system, which is hosted in the BCBL data center. Users do not have to worry about the maintenance and administration of their desktop computers (either Windows or Mac-based), as they are managed by the IT support unit. The same controlled environment is also implemented in the experimental cabins. The application of standard setups ensures that all of the experiments are run under the same optimal configurations.

Having the fMRi and the MEG systems together in the same laboratory makes the BCBL lab very attractive for talented researchers as there are very few laboratories in the world with both techniques. However, this implies a huge need for data storage, processing and safety backup, because each experiment in either one of these techniques needs around 400 GB capacity.

Even though the data center was designed for big data needs, very soon we will need to increase the system capacity due to the huge amount of data being generated through the experiments run at the center.

For resource-demanding statistical analyses, there are machines with generous capabilities and either Windows or Linux server operating systems. Among the software for such computations are Matlab, SPSS and R, complemented with open source toolboxes and well-known specific tools, such as SPM or FSL.

Remote access to data and applications is enabled by a VPN SSL appliance. BCBL is connected to the Internet through RedIRIS, the Spanish science and technology network. An optical link managed by i2Basque, the Basque equivalent of RedIRIS, is able to provide symmetric broadband of up to 1Gbps, thus covering any potential need.

3.3. Management

This section should include (Max. 3 pages):
Organisation of the center. Systems or procedures for internal evaluation and quality assurance.

Human Resources:

Given that one of the BCBL's objectives is to become an international benchmark in its field of research, the quality of its staff has been a fundamental part of its strategy from the outset. Our core research team was created based on three fundamental principles: quality staff, international dimension and the recruitment of talented researchers. The organizational chart and how the administration department supports research has been explained under section 2.1.2.

The evaluation for scientists looks for:

- Publications with BCBL affiliation
- Conferences, Seminars and Workshops: oral presentations, posters, others….
- Invitations to lectures
- Research Projects and research activity both for externally funded or BCBL-funded projects
- Student supervision / Teaching and other relevant activities
- Future plans and projects
- Degree of commitment / Involvement towards the BCBL, pro-activity, help, service and cooperation for external issues (BCBL visibility, popularization of science, recruitment of participants, events preparation and support, etc.) and also for internal issues (lectures, trainer training and trainee support and colleague assistance, team spirit, etc.).

Related to the administration team, everyone has the opportunity to attend **continuous improvement** courses yearly, with the aim of improving those skills considered important for their jobs and also to fill those improvement actions resulting from the annual personal assessment.

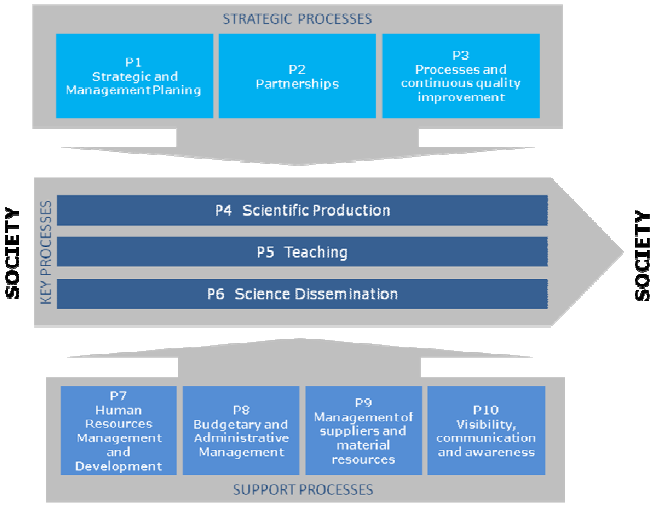
The evaluation for administrative personnel and technicians looks mainly for competences, behaviour, functional skills, transversal cooperation, problem solving and decision making, flexibility and team work, as well as the development of a plan to improve weaknesses and maintain strengths and skills.

Among the objectives of the BCBL management is the constant application to public and private grant calls in order to get funding for covering the costs of hiring research staff for the center.

Systems or procedures for internal evaluation and quality assurance.

The BCBL has established several management protocols and procedures covering all the fields below:

- **Key policies**



BCBL adheres to a culture of social responsibility, voluntarily assuming commitments that go further than regulatory obligations and accepting Corporate Social Responsibility (CSR) through a global focus from its own corporate strategy.
BCBL adopts three pillars of Corporate Social Responsibility, which include:

Economic Responsibility

- To collaborate in the economic development of the community.
- To meet legal obligations.
- To be a non-profit entity and reinvest surplus into its own activities.
- To establish transparent corporate managerial criteria and transmission of values.

Social Responsibility

- To ensure equal opportunities.
- To provide personal, family, and work-life conciliation.
- To establish active ergonomic policies and occupational health and implement a balanced salary system.
- To promote communication channels between management and workers.
- To pay attention to training needs.
- To support and respect the protection of human rights.
- To respect occupational rights.
- To establish an environmental policy.

Environmental policy

At the BCBL we actively support the conservation of the environment and have policies to reduce energy consumption.

- **Personal data protection law.**

According to Spanish Organic Law 15/1999 of 13 December, the Personal Data Protection Act (PDPA) is aimed at guaranteeing and protecting the treatment of personal data, public freedom and the fundamental rights of physical persons, especially as regards their family and personal honor, intimacy, and privacy. These regulations are applicable to all BCBL personnel and all external personnel who collaborate with the center. All documentation with data of interest is handled in such a manner that its integrity and confidentiality is guaranteed, preventing the access to this documentation by any unauthorized persons.

- **Personnel Policy**

This has been described under section 2.1.2. Besides, BCBL is actively concerned with **healthcare**, occupational risk prevention and planning, complying with legislation currently in force. An evaluation of possible occupational risks is carried out in all facilities, offices and laboratories. An Emergency Plan is also activated and shared with all employees.

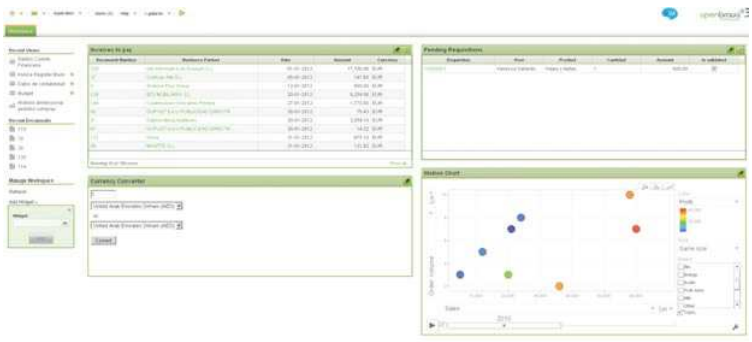
The management team supports all researcher needs, not only from the purely managerial point of view, but also including searching for participants, running experiments in the lab and preparing materials for the researchers.

The BCBL is an open, tolerant, cosmopolitan and multicultural center. Courtesy, order and cleanliness are important for us and can all contribute to a more agreeable and harmonious working atmosphere.

MANAGEMENT & IT

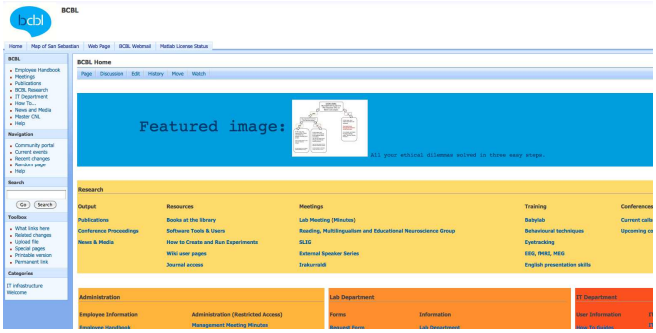
An extensive list of procedures has also been prepared for items such as purchases, conference travel, absences from work, holidays, reimbursement of expenses, and reserving facilities and equipment or requests for maintenance.

An Enterprise Resource Planning (ERP) system, named Open Bravo, is running at the BCBL currently. This is a **system that integrates internal and external management information across an entire organization**, embracing finance/accounting, purchasing and services, customer relationship management, etc. ERP systems automate this activity with an integrated software application.



Their purpose is to facilitate the flow of information between all business functions inside the boundaries of the organization and manage the connections to outside stakeholders. At BCBL, an ERP called Open Bravo has been running since 2011 to help us manage all projects, stocks, bought out items, assets and finance- related issues.

Our **wiki** is permanently updated and includes all kinds of information that might be necessary for our employees, such as the employee handbook, all meeting minutes, the repository of publications and conference proceedings, grants, resources, training courses, news and media, how to, FAQ, events, experimental procedures and much more. Being a wiki, this is permanently built up by all users.



For **resource-demanding statistical analyses**, there are machines with generous capabilities and either Windows and Linux server operating systems. Among the software for such computations are Matlab, SPSS and R, complemented with open source toolboxes and well-known specific tools, such as SPM or FSL. Remote access to data and applications is enabled by a VPN SSL appliance. BCBL is connected to the Internet through RedIRIS, the Spanish science and technology network. An optical link managed by i2Basque, the Basque equivalent of RedIRIS, is able to provide symmetric broadband of up to 1Gbps, thus covering any potential need.

Remote access to data and applications is enabled by a VPN SSL appliance.

BCBL is connected to the Internet through RedIRIS, the Spanish science and technology network. An optical link managed by i2Basque, the Basque equivalent of RedIRIS, is able to provide symmetric broadband of up 1Gbps, thus covering any potential need.

Another task where continuous improvement is key to success is management, especially **laboratory management, which involves recruiting a large number of voluntary participants and managing** them adequately so they return again and communicate their experiences so that others in their social surroundings come for experiments, thus enlarging the database and the recognition of the BCBL in society.

A **specific website for recruitment and booking of participants** has been running since the summer of 2011. More than 1600 volunteers are already registered.

- Researchers can obtain the complete linguistic profile of the registered users and can filter potential candidates from there.
- This website is also useful for labs booking management.

One of the problems we have been encountering is that, since our “natural” participant is a university student, and since the main laboratory of the BCBL is far from the university campus, the ratio of success in the recruiting campaigns is not as high as could be wished for. The participants find it much easier to go to our satellite laboratory on campus than to the main laboratory at the Parque Tecnológico of San Sebastian.

This change in location has been a demand voiced by the BCBL from the start, in order to guarantee greater success in the recruitment and management of volunteers and later processing of the data obtained.

3.4. Future development of the center

This section should include (Max. 2 pages):
A view on the next steps of the center after 2017.

SCIENTIFIC EVOLUTION

The goal for upcoming years is to consolidate the research lines described in this report and obtain a consolidated group of people for each line of work. Thus, each research team will focus primarily on a line or sub-line of work and, ideally, will consist of an Ikerbasque senior as group leader, a staff scientist, three postdoctoral researchers and 6 predoctoral researchers. In addition, we anticipate the creation of several junior teams consisting of 1 staff scientist, one or two postdoctoral researchers and two or three predoctoral researchers. In any case, we expect researchers from different groups to collaborate with members of other groups, since one of the strengths of the BCBL is its interdisciplinary character.

One of the keys for consolidating these 4 lines of research will be the capacity to attract and retain talent, especially senior researchers and staff, although we must also continue attracting and retaining younger researchers (postdoctoral researchers and PhD students).

We expect to strengthen lines 3 and 4. In particular the strength of line 4 will be important in testing some of the theoretical advances on brain connectivity with new tools and from different perspectives. Theoretical and methodological advances related to brain connectivity will be promoted to investigate language.

Interestingly, in order to reach our goals, we foresee stronger collaborations with other entities of the Basque network for science and technology that we have not yet collaborated with, such as the Achucarro Basque Center for Neuroscience or BCAM. Collaboration with BCAM can help us to refine our computational tools to investigate brain connectivity.

We will continue attracting resources by participating in different calls at various levels including the Basque Government, the Spanish Government, the EU and other international agencies. In addition, in line with our commitment to communicate science at different levels, we will continue organizing scientific events and events for the general public.

Furthermore, the BCBL will be present in two fields essential to the welfare state and the future of the country, Health Care and Education (2nd axis of Basque Government's Euskadi 2020 program).

In Health Care specifically, apart from the projects that are already in place with leading bodies in the research and treatment of the elderly, such as the Instituto Gerontológico Matia through the Ingema Foundation or the Donostia Hospital and Biodonostia, we want to promote new bonds and joint projects with other centers of reference dedicated to studies in ageing. In addition, as described before, we will collaborate with the neurosurgeons of Cruces Hospital to provide pre-surgical, surgical and post-surgical mapping helping to increase the quality of life of patients that need brain surgery.

Another pillar of society is Education. The BCBL, given its mission and its lines of research, will be actively present in studies related to learning (e.g., learning a second language) and learning disabilities (e.g., SLI, dyslexia, dyscalculia), especially in a bilingual environment.

We are already collaborating with various schools both in Donostia and Vitoria. Moreover, in the Sagrado Corazón School of the Carmelite order in Vitoria, we arrived at an agreement to install a permanent BCBL Junior Lab laboratory in order to more conveniently perform longitudinal experiments on the children attending the school. In addition, we keep a close relationship with Dislebi (Basque association for dyslexia) among other associations. It is quite likely that the BCBL will produce knowledge that can be transferred to the educational arena, including information regarding typical processes and how these can be improved (e.g., when a foreign language will

best be assimilated), as well as knowledge regarding individual differences and learning disabilities and how these can be helped. In addition, the BCBL will provide assessment tools for diagnosis of several learning disabilities (dyslexia, dyscalculia and SLI) both in Spanish and Basque, a current demand from society and professionals.

One of the needs we anticipate for the future is finding monolingual control groups so that we can understand, compare and interpret the data obtained from bilingual children and adults. We will have to study the best way to collect this data in a reliable manner, probably by means of another small implementation or satellite laboratory in a territory where the educational policy is monolingual.

TECH-TRANSFER

In order to find an outlet for the knowledge generated by the basic research of the center, and offer more **added value services and products to society through innovation**, the goal is not only to launch the two initiatives described above, but also to attempt to achieve their consolidation and economic and managerial autonomy, thus **strengthening the Basque Science System by transferring knowledge** and research results to society (2nd axis of Basque Government's Euskadi 2020 program)

neure CLINIC

Based on the experience acquired throughout years of research and in view of the opportunity provided by the availability of a first rate human team and scientific equipment, we have the opportunity to **combine the existing capacities and new technologies to transfer part of the scientific advances of the BCBL to society** (2nd axis of Basque Government's Euskadi 2020 program) in the form of a product and a service.

4. INTEGRATION OF THE BASQUE SCIENCE SYSTEM IN THE EUROPEAN RESEARCH AREA

4.1. Collaboration with Basque entities

This section should include (Max. 2 pages):
Description of the collaboration frameworks or agreements with other public and private Basque entities.

During these years the BCBL has set up collaborations with several institutions of the Basque Science System. We will describe below the most significant ones:

EDUCATIONAL INSTITUTIONS

The Euskampus Campus of International Excellence (CEI Euskampus) is a project that aims to place the Basque Country in a position of global leadership as regards education, research activities and its capacity for innovation and knowledge transfer.

The CEI Euskampus has been conceived with a long-term commitment and with the aim of becoming a key element for the achievement and development of relevant social and economic values for the Basque Country, showing it to be an internationally competitive alliance that brings dynamism to the research, the innovation and the economy of its surroundings.

In March 2012, BCBL signed a collaboration agreement with Euskampus that includes the general collaboration framework between EUSKAMPUS FUNDAZIOA and BCBL. It defines the relations within the structure of the EUSKAMPUS Project and through the EUSKAMPUS FUNDAZIOA that will be maintained between UPV/EHU and BCBL for the promotion of training, research and knowledge transfer, innovation and dissemination.

This partnership also provides support for the development of a high-quality postgraduate studies program in the UPV/EHU and the deployment of the Master's and Doctorate School of the UPV/EHU within the context of the International Excellence Campus (see point 2.2.4).

PhD ON LINGUISTICS
The BCBL together with the UPV/EHU department of Basque Language and Communication and department of Classical Studies of the Facultad de Letras (UPV/EHU) launched a new PhD program on linguistics that has been recently approved by the ANECA.

ELEBILAB
The BCBL has been collaborating since its foundation with the Psycholinguistic Laboratory of the University of the Basque Country, ELEBILAB, headed by Itziar Laka. This collaboration is based on carrying out conjoined experiments, the exchange of results of research performed in common areas, joint planning and implementation of training programs, such as the master's program on Cognitive neuroscience of language, the PhD program in linguistics, the bi-weekly seminars organized in the BCBL or the workshops organized by ELEBILAB or by the BCBL.

PRACTICUM AND INTERNSHIP PROGRAMS
An agreement for the teaching of practical courses for students in the Faculty of Philosophy and Educational Sciences was signed in July 2011 in order to enhance collaboration between the BCBL and the UPV/EHU. This collaboration promotes the optimal use of the human and material resources of both institutions to improve the practical training of the students studying this discipline, and promotes direct contact of these students with the reality of the labour market, which will result in a higher professional qualification of future graduates.

The BCBL has also signed several agreements with different Basque faculties for the development of internship programs: Faculty of Psychology, Faculty of Philosophy and Educational Sciences, Faculty of Arts (Letras), Faculty of Business EHU/UPV. University of Deusto, ESTE

Polytechnical Institute of Easo: Tutoring 15 students during practical courses in the Advanced Module of Child Education

Colegio Carmelitas – Sagrado Corazón (Vitoria): See point 3.2, Junior Lab.

OTHER PUBLIC INSTITUTIONS

On February 2012 the BCBL signed an agreement with the local government for a backup server and a virtualization server to be hosted by the IT service of the local government (IZFE) at their facilities in the Technological Park of San Sebastian. Thanks to this architecture, the BCBL not only has the daily data backup save but also, if the local IT system does not work, the secondary server at IZFE provides instant access to all data and services and therefore the end user (BCBL researcher) is not affected by any disturbance in his or her daily work thanks to the virtual system at IZFE.

Gipuzkoako Foru Aldundia
Diputación Foral de Gipuzkoa

The BCBL has been granted funds to invest in a Helium liquefier system by the local Gipuzkoa Government. This will help to reduce the consumption of helium. Furthermore, the BCBL was granted funds to cover the cost of two postdoctoral researchers for four years through the **GIPUZKOA FELLOWS program,** .

PRIVATE INSTITUTIONS

The BCBL has a very active and close collaboration with Ikerbasque, the Basque foundation for science. Among other actions, we have closed many agreements such as:

- Initial funding of BCBL launching activities, signed in December 2008.
- Collaboration framework agreement signed in November 2008 to regulate the various aspects of the relations between Ikerbasque and the BCBL, specifically those related to the definition of the contribution of Ikerbasque to the promotion and development of research by hiring researchers, the regimen of the research staff destined to the BCBL in its condition of center of assignment.
- International calls for professors and research fellows and also through their sciencecarees.eu web site.

Adhesion in May 2009 to i2Basque. i2BASQUE is a “Plan Euskadi en la Sociedad de la Información” program, developed by the Basque Government Education, Universities and Research Department.It focuses on supporting the RDI community in the Basque Country, providing telecom and ICT service infrastructures to Basque Science and Technology Network players.

Agreement signed in 2013 between the two Neuroscience BERCs, Achucarro and BCBL (2nd goal of the Basque Government program), in order to share training opportunities and organize different dissemination activities such as NeuroGune’2014 (Basque neuroscience community meeting).

OTHER COLLABORATION AGREEMENTS

The BCBL has signed framework agreements for collaboration in **research studies** with the following organizations:

- Biodonostia, Instituto de Investigación Sanitaria de Euskadi
- BCC, Basque Culinary Center
- Bertsozale Elkartea
- Different Basque Schools and nurseries in order to reach society and recruit participants.

In addition, the BCBL continues to be a member of various local activities that **intend to share general knowledge** acquired regarding science and innovation with companies and institutions, such as:

- The Body of Biosanitary Coordination, coordinated by the Diputación de Gipuzkoa
- Estrategia 2020 – A bioscience work team coordinated by the Oficina de Estrategia de Donostia – San Sebastián
- European capital of culture Donostia 2016. One of the main reasons behind the Donostia 2016 candidacy is multilingualism, and the collaboration between both parties is expected to be fruitful.

4.2. Collaboration with European entities

This section should include (Max. 2 pages):
Description of the collaboration frameworks or agreements with other public and private European entities

RESEARCH

The BCBL has signed various collaboration agreements with different entities to carry out several research projects in the last years:

Consolider – COEDUCA (See Point 2.1.1 Research Projects)
- University of Granada
- University of Murcia
- University of La Laguna

ITN LCG Language, Cognition & Gender (See Point 2.1.1 Research Projects)
- University of Bern (Switzerland)
- University of Heidelberg (Germany)
- University of Berlin (Germany)
- University Ceskych Bude Jovicich
- University of Friburgo (Germany)
- University of Modena (Italy)
- University of Padova (Italy)
- University of Sussex (UK)
- University Norges Teknisk (Norway)

The European Network on Word Structure (See Point 2.1.1 Research Projects)
- University of Antwerp (Belgium)
- University of Vienna (Austria)
- Jozef Stefan Institute (Slovenia)
- Université de Toulouse (France)
- Slovak Academy of Science (Slovak Republic)
- Helsinki University of Technology (Finland)
- Zurich University (Switzerland)
- Lund University (Sweden)
- National Research Council (CNR - Italy)
- Siegen University (Germany)
- Pazmany Peter Catholic University (Hungary)
- University of Zagreb (Croatia)
- Norwegian University of Science and Technology (Norway)

AThEME (See Point 2.2.1 Research Projects)
- University of Leiden (Netherlands)
- University of Nantes (France)
- University of Utrecht (Netherlands)
- University of Reading (United Kingdom)
- The University of Edinburgh (United Kingdom)
- Universitat Konstanz (Germany)
- Koninklijke Nederlandse Akademie Van Wetenschappen–Knaw (Netherlands)
- Univerza V Novi Gorici (Slovenia)
- Universitat Pompeu Fabra (Barcelona – Spain)
- Center National De La Recherche Scientifique (France)
- Universita Degli Studi Di Trento (Italy)
- Universita Degli Studi Di Verona (Italy)
- Queen Mary And Westfield College
- University Of London (United Kingdom)
- De Taalstudio BV (Netherlands)
- University Of Rijeka - Faculty of Humanities And Social Sciences (Croatia).

The BCBL continues actively collaborating with the following International bodies: the CNRS (France) , the University of la Provenza (Italy) , the University of Magdeburg (Germany) , the Max Planck Institute for Psycholinguistics in Nijmegen (Holland) , the Donders (Holland) , the Tufts University (USA) ,

Massachusetts University (USA) , University of California (USA) , University College London (UK), Universiteit Utrecht (Netherlands), University Vrÿe (Amsterdam), Macquarie center for Cognitive Science (Australia), Bogaziçi University (Turkey), Netherlands Organisation for Scientific Research (Netherlands) and the Fondation Fyssen (France).

In 2009, BCBL and the CNSE Foundation for the Suppression of Communication Barriers signed a framework agreement for the promotion of studies and research that contribute to the knowledge and protection of Spanish sign language.

We will also continue with the current programs that we are using to interchange students and researchers with other research centers or universities, such as the Fyssen Fondation and the NOW (Nederlandse Organisatie voor Wetenschappelijk Onderzoek).

PRACTICUM AND INTERNSHIP PROGRAMS

The BCBL has reached numerous agreements with a variety of university faculties and training centers, such as:

TECNUN, Universidad de Navarra

- End of studies projects
- Internships

ISSA, Universidad de Navarra

- End of studies projects
- Internships

UNIVERSITY OF MURCIA

- Practical courses for Psychology degree studies.
- Agreement to run Spanish monolinguals at their laboratory there.

4.3. Collaboration with other entities

This section should include (Max. 2 pages):
Description of the collaboration frameworks or agreements with other public and private international entities

RESEARCH

Research into Dravet's Syndrome And Untreatable Channelopathies: A project developed together with the Dravet Syndrome Foundation. (See 2.1.1)

Qatar Learning to read in two: A project that will start in 2014 and will be developed with the funding of the Qatar Foundation. (See 2.2.1)

The Marcs Institute: In 2012 a PhD student of the BCBL spent four months in this center developing research activities within the framework of the project Automaticity Of Second Language Processing In Spanish-Basque Bilinguals (see 2.1.1)

PRACTICUM AND INTERNSHIP PROGRAMS

Macquarie Center for Cognitive Science, Australia. The BCBL received students from this center for an internship.

Brazil Minesterio Da Educaçao (Brasil). The BCBL has an agreement with this Brazilian entity for the interchange of students.

5. INDICATORS

This section should include the main indicators of the Excel file provided as template.

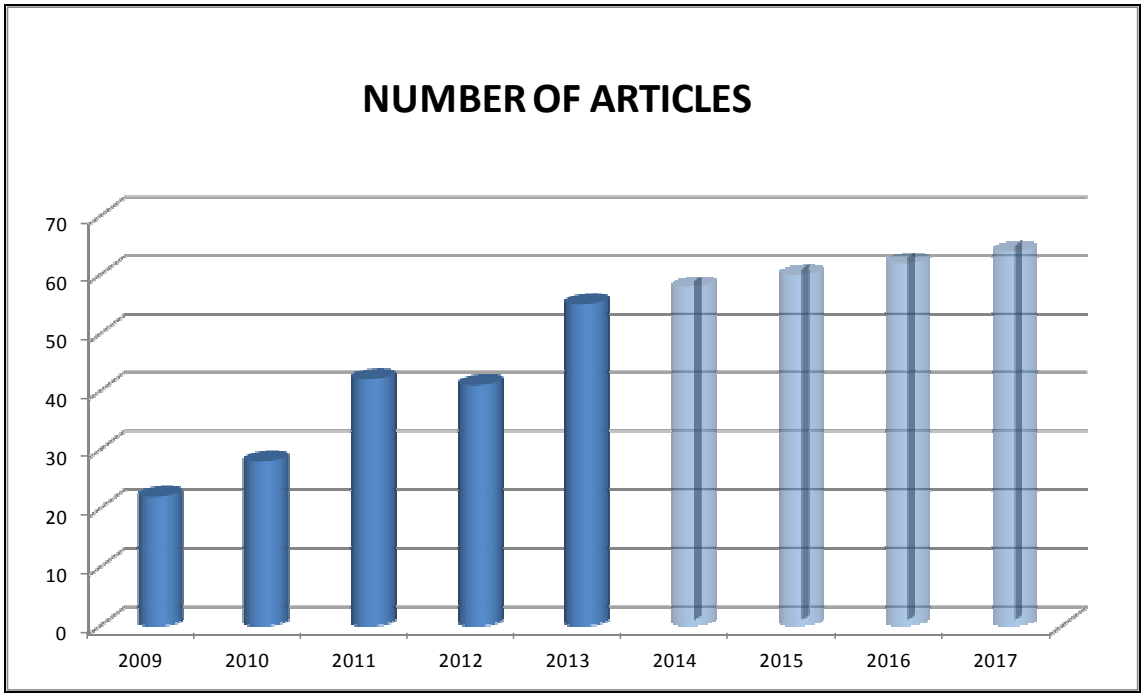
In this section there is a detail of those indicators considered as the most significant for the BCBL:

SCIENTIFIC OUTPUT: number of articles published and conference proceedings.

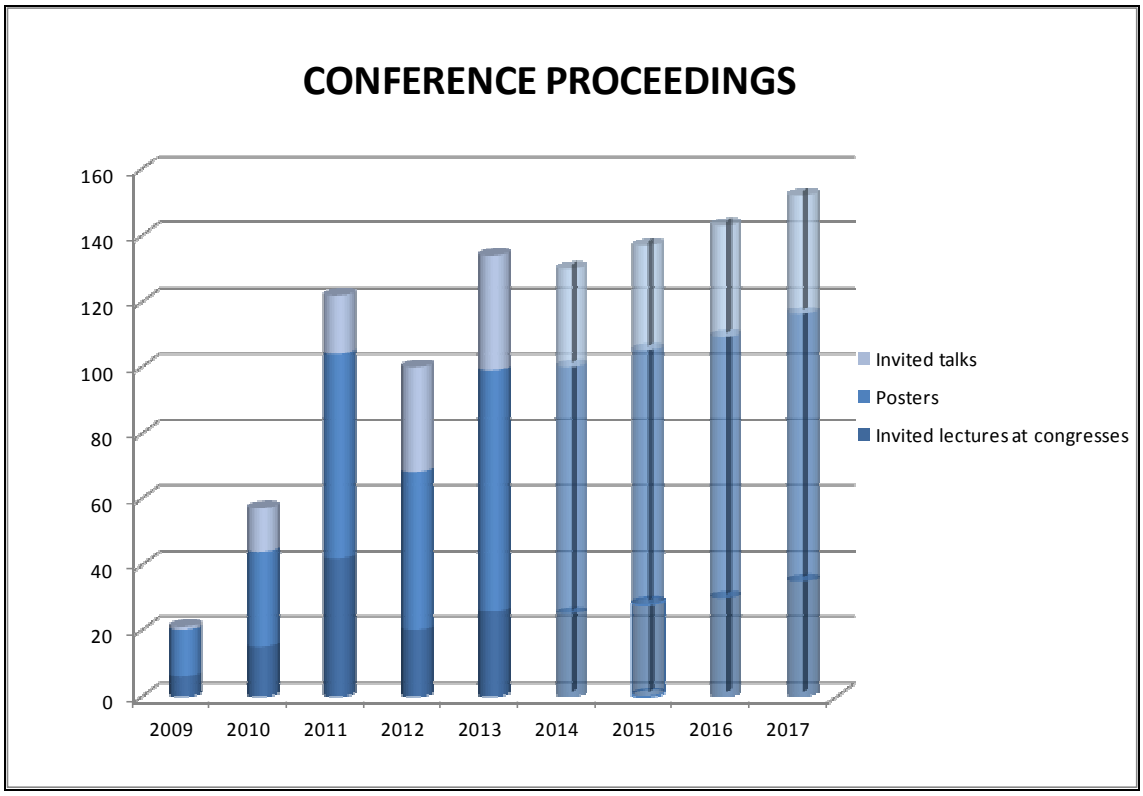
Scientific output

INDICATORS	OBTAINED RESULTS 2009-2013						PROPOSED INDICATORS 2014-2017				
	2009	2010	2011	2012	2013	TOTAL / AVRG	2014	2015	2016	2017	TOTAL / AVRG
Number of articles published in the given year	22	28	42	41	55	188	58	60	62	64	244
Number of indexed articles	21	21	39	33	42	156	44	46	48	50	188
% of indexed articles Q1	68,2%	50,0%	78,6%	73,2%	58,2%	65,6%	65,0%	66,0%	67,0%	68,0%	66,5%
% of indexed articles by the Scientific Director	100,0%	53,6%	40,5%	36,6%	25,5%	51,2%	30,0%	27,0%	25,0%	25,0%	26,8%
Number of citations during the given year of all indexed articles published by the center	5	31	84	174	258		200	210	220	230	
H index of the center for the indexed articles published until the given year	3	5	8	9	11		11	12	12	13	
Number of books, book chapters and monographies published in the given year	1	7	3	8	13	32	10	10	10	10	40
Invited lectures at international scientific congresses	6	15	42	20	26	109	25	28	30	35	118
Posters at international scientific congresses	14	29	62	48	73		75	77	79	81	
Invited talks at labs and universities	1	13	18	32	35	99	30	32	34	36	132

The number of articles published in 2009-2013 shows a growing trend as can be seen in this graph:



We expect this trend to continue in the 2014-2017 period, as well as for the conference proceedings:



The number of invited talks, presented posters and invited lectures significantly increased from 2009 to 2013. This is reasonable considering that the number of researchers has been growing since the creation of the center and that the active participation in congresses is directly related to experience.

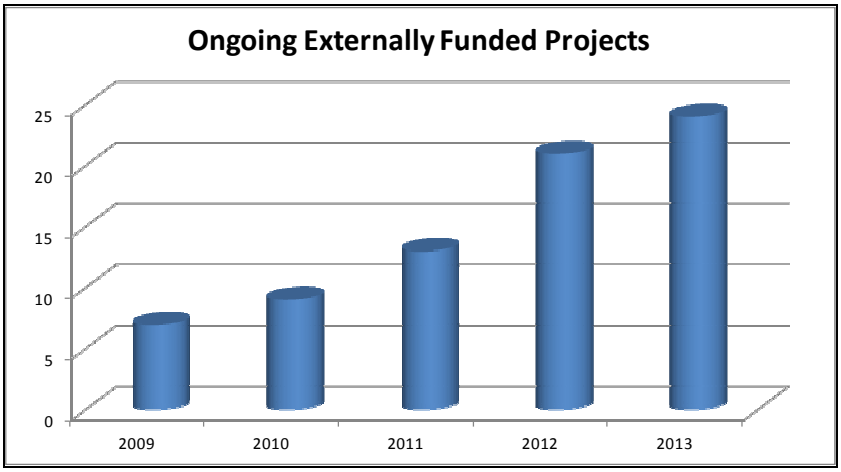
EXTERNAL FUNDING: Self financing ratio

External funding

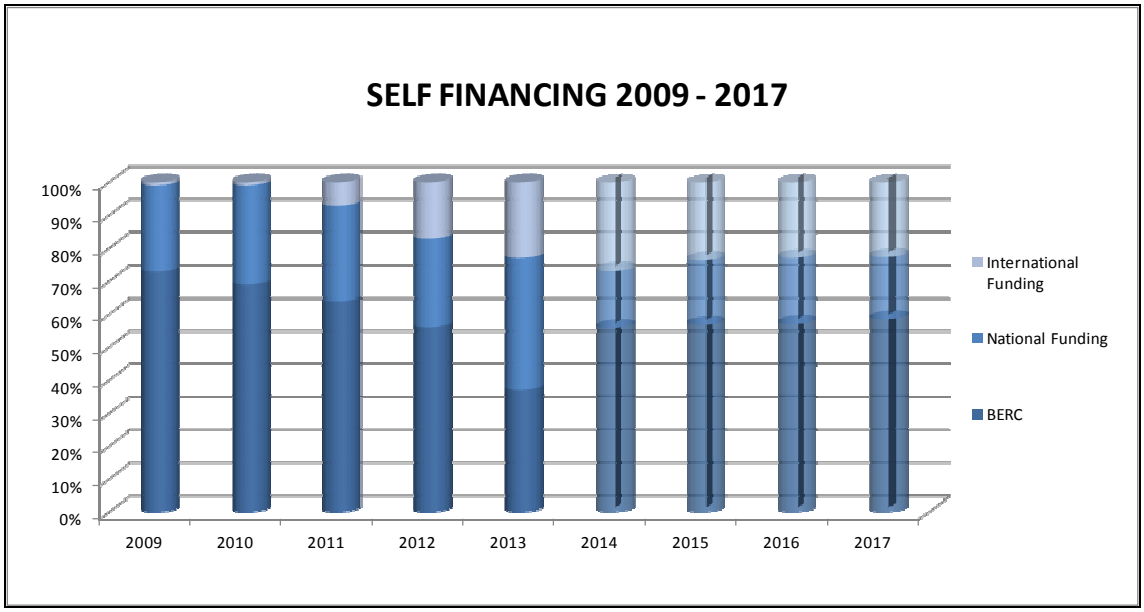
INDICATORS	OBTAINED RESULTS 2009-2013						PROPOSED INDICATORS 2014-2017				
	2009	2010	2011	2012	2013	TOTAL / AVRG	2014	2015	2016	2017	TOTAL / AVRG
% of other national funding (different from BERC funding)	26%	30%	29%	27%	40%	0,304	17%	20%	20%	19%	19%
% of international funding	1%	1%	7%	17%	23%	0,098	27%	24%	23%	23%	24%
% of external funding (total)	27%	31%	36%	44%	63%	0,402	44%	43%	43%	42%	42%
Other indicators						0					0

As the previous figure shows, the percentage of the external funding in the total BCBL budget increased from 2009 until 2013. From the beginning, the BCBL has had external funds, due to the fact that Manuel Carreiras brought some significant projects and their grant funding to the center.

For the subsequent years we have intensively worked at submitting a high number of proposals. All our PIs have been actively applying for new grants, and have been successful in many cases, as can be seen in the following figure (see points 2.1.1 and 2.2.1).



The following graph shows the same information as the aforementioned table but in a more visual format.

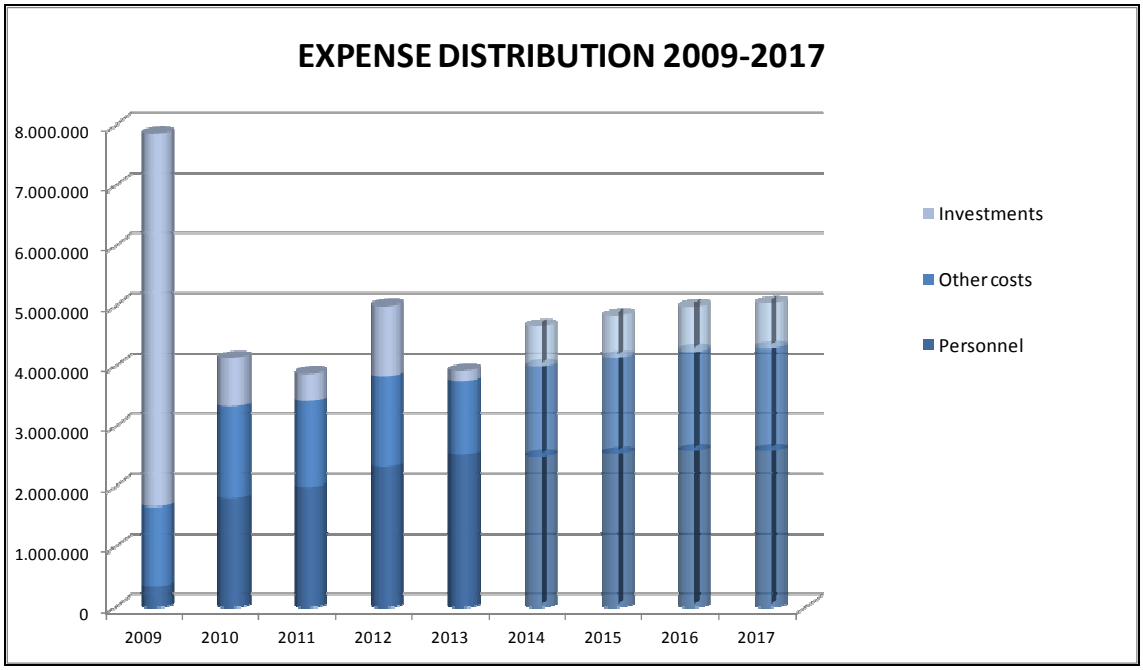


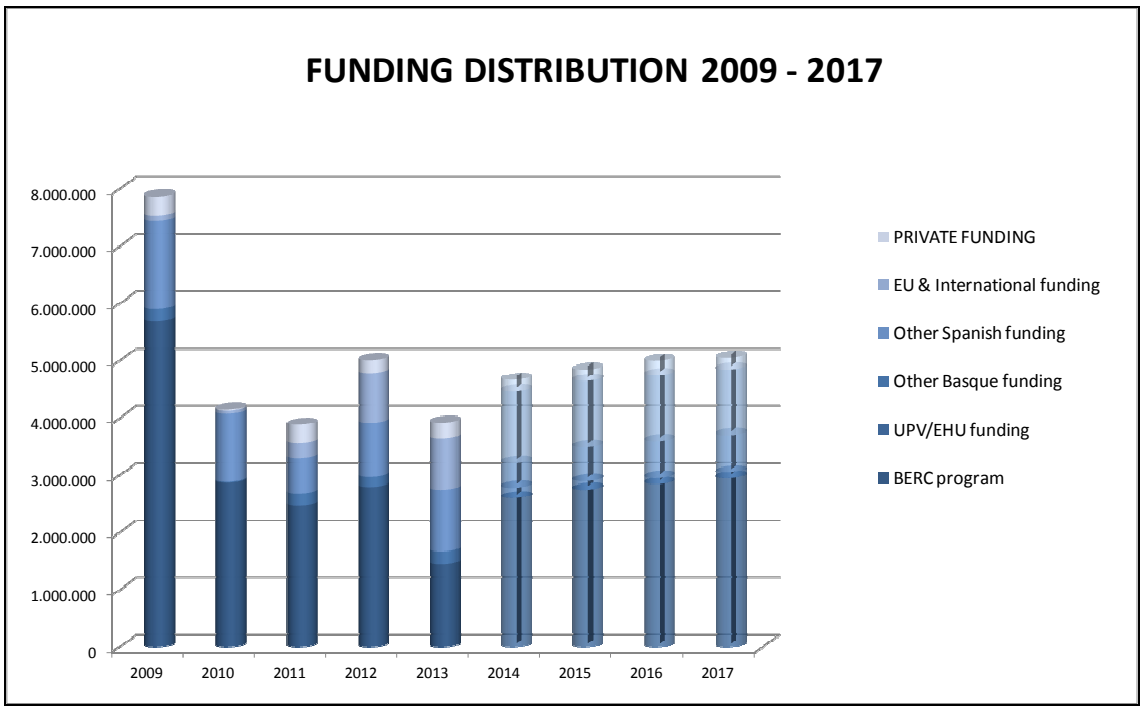
In 2009-2012 there was a continuous growth of the percentage of external funding in the BCBL, but in 2013 this ratio was more significant, arriving to 63%. The reason for that was the cut suffered in the BERC grant, which resulted in it not being enough to cover all the costs generated in the year to maintain the structure. We had to cut several items from our budget and also look for further funds in our granted research projects.

For the future we have a cautious approach regarding the self financing ratio. Due to the economic situation, the newly granted projects have been endowed with a smaller budget than in previous years, and some grant calls have been cancelled or delayed. Furthermore, some projects have finished recently that provided a high budget not only for the direct costs of the project but also for the general expenses of the center (there are indirect costs covered by projects that are direct costs for the center).

Regarding the previous paragraph, we estimate that the self financing ratio for the 2014-2017 period will be around 40-45%, which is the average of the percentage of the previous 5 years (2009-2013).

Additionally, the following pictures show the expense distribution and the funding distribution for the 2009-2017 years:





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