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WELCOME TO THE CRG INTERNATIONAL PhD PROGRAMME

Welcome by the Director

Starting a PhD is not a small endeavour. Over the next few years, you will experience all the ups and downs of research in a top biomedical institute. The excitement of learning new techniques, the thrill of submitting your first papers and meeting people from many different countries: all of this will constitute a wonderful experience. You will also go through the frustration of repeating the same experiment over and over again, your work being reviewed when you submit it for publication and the worry of how to continue with your career. Doing science is both a tough and rewarding experience, through which you try to answer a simple question: how do things work? At the CRG, as part of our international PhD programme, we put at your disposal all the resources necessary to ensure that you will be successful. We offer a fantastic combination of top international teams from a broad range of disciplines, first class core facilities to support your research, a wide range of seminars given by high-profile invited speakers, courses on complementary and transferable skills and regular social and networking events that will enrich you both personally and professionally. Our campus hosts a medical school, a hospital and a university, and we nurture biomedical research collaboration projects. We are continuously improving and enlarging the scope of our PhD programme to ensure that you are prepared not only for having a successful scientific career, but also to follow other career paths such as technology transfer or science communication. Our goal is to ensure that you can develop as a person and as a scientist and contribute to shaping the future of biomedicine. It is my great pleasure to welcome you. I hope that the CRG will live up to your expectations and I am looking forward to your contributions.

Luis Serrano, CRG Director

Welcome by the Graduate Committee

Following the path to knowledge is one of the most exciting career options after finishing Graduate School. Whether you decide to stay in basic research or to take one of the increasingly diverse alternative professional routes in science, obtaining a PhD will endow you with the skills necessary to succeed. At the CRG we offer full support for developing your research capabilities. Our training programme includes close supervision through ad-hoc thesis committees, PhD courses and a variety of activities fostered by PhD students (symposia, retreats, seminars, etc.). Furthermore, our active and highly international PhD community has the opportunity to implement its own initiatives through the PhD representatives on the Graduate Committee. By becoming a CRG alumnus, you will gain not only expertise and know-how, but also independence and an important set of complementary skills that will accompany you through life.



From left to right: Luciano Di Croce and Fatima Gebauer, Chairs of the CRG Graduate Committee

SCIENCE AT THE CRG

"The medicine of the future depends on the ground breaking science of today"

The Centre for Genomic Regulation (CRG) is an international biomedical research institute of excellence. The CRG's scientific mission is to advance our understanding of the complexity of life from the genome to the cell up to an entire organism and its interaction with the environment, offering an integrated view of genetic diseases.

The breadth of topics, approaches and technologies at the CRG allows us to ask a broad range of fundamental questions in life sciences and biomedicine. For example, multidisciplinary work involving collaboration between different CRG groups has made it possible to tackle key problems of chromatin organisation, epigenetics, RNA synthesis and processing, and the role of non-coding RNAs in a variety of experimental systems, such as stem cell differentiation, cancer progression and animal models of disease.

With more than 350 scientists from 38 countries, the CRG excellence is based on an interdisciplinary, motivated and creative scientific team that is supported by state-of-the-art and innovative technologies.

"Science is an international endeavour"

CRG partnerships allow a continuous exchange of knowledge and capabilities with the international scientific community across disciplines and borders, and attract top talent to the CRG from all over the world.

Over the past few years, the CRG has spearheaded strategic partnerships with top European Institutes for joint scientific and technological development in life sciences, namely EU-LIFE and CORE FOR LIFE. The institute also participates in research exchange programmes with the National Centre for Biological Science in Bangalore (Bangalore, India), the Riken Centre for Developmental Biology (Kobe, Japan), and the Sidney Brenner Institute for Molecular Biosciences at the Wits University (Johannesburg, South Africa). Lately the CRG has signed a collaboration agreement with the Ministry of Science, Technology and Productive Innovation of Argentina to create a bi-national virtual centre on bioinformatics and related areas.

At European level, since 2006 the CRG has been engaged in a partnership with European Molecular Biology Laboratory (EMBL), which supports the EMBL-CRG Systems Biology Research Unit to advance the understanding of complex biological systems.

In 2012, CRG researchers published 164 papers in international peer-reviewed journals (including *Nature, Cell, Science, PNAS, PLoS Biology*), bringing the CRG to the 5th position in the European ranking and 13th worldwide according to the Q1 indicator for the health sector (SCImago Institution Rankings World Report 2006-2010).

The CRG has a very successful track record in attracting funding from highly competitive funding agencies (12th position in the Spanish ranking list of EU funds and 1st in ERC grants in Life Sciences). For example in 2012, the competitive funding amounted to €13.8 million, which accounts for over 50% of the annual budget. The awards obtained from the European Commission represent the largest share (over 68% of the external grants in 2012). Other relevant international funding agencies are the Howard Hughes Medical Institute, the National Institute for Health, the Human Frontier Science Programme and the Association for International Cancer Research.





Almost 100 theses were defended in the period 2004-2012

Bioinformatics and Genomics The objectives of this programme are the implementation of computational and experimental approaches to understand the encoding of biological information in the sequence of genomes and its relationship to human health. Research lines include the investigation of the signals involved in gene specification in genomic sequences (Guigo); development of new tools for the analysis of protein and RNA sequences (Notredame); comparative genomics approaches for studying complex biological systems of clinical relevance (Gabaldon); prediction and analysis of protein-RNA interactions (Tartaglia); population genetics and evolutionary theory applied to computational studies of genomic information (Kondrashov); the role of genomic and epigenomic variation (Osswosky and Estivill), and non-coding RNAs (Estivill) in genetic diseases and cancer.

Systems Biology The aim of this programme is to achieve a global quantitative understanding of biological systems, developing models that capture biological complexity and have predictive value. Common to all these groups is the integration of quantitative measurements with computer modelling of the systems analysed. Research lines include work on gene networks (Isalan, until December 2013), signal transduction in cancer and modelling of small organisms (Serrano); the relationship between genotype and phenotype and the impact of genetic noise (Lehner); modelling and analysis of organogenesis (Sharpe); comparative analysis of developmental systems in insects (Jaeger); quantitative analysis of sensory systems and behaviour (Louis); and behavioural and integrative neuroscience in mouse models of disease (Dierssen). Since 2006, the Systems Biology programme has hosted the EMBL-CRG Systems Biology Research Unit, in partnership with the European Molecular Biology Laboratory.



The faces of our science

and core facilities at the CRG go to:

www.crg.eu/research www.crg.eu/core_facilities



LIST OF RESEARCH GROUPS & CORE FACILITIES

RESEARCH GROUPS

Bioinformatics and Genomics Programme (Coordinator: Roderic Guigó)

Computational Biology of RNA Processing Group leader: Roderic Guigó

Genomics and Disease Group leader: Xavier Estivill

Comparative Bioinformatics Group leader: Cedric Notredame

Comparative Genomics Group leader: Toni Gabaldón

Evolutionary Genomics Group leader: Fyodor Kondrashov

Gene Function and Evolution Group leader: Gian Gaetano Tartaglia

Genomic and Epigenomic Variation in Disease Group leader: Stephan Ossowski

Cell and Developmental Biology Programme (Coordinator: Vivek Malhotra)

Intracellular Compartmentation Group leader: Vivek Malhotra

Microtubule Function and Cell Division Group leader: Isabelle Vernos

Coordination of Cytokinesis with Chromosome Segregation Group leader: Manuel Mendoza

Biomechanics of Morphogenesis Group leader: Jerome Solon

Organelle Biogenesis and Homeostasis Group leader: Pedro Carvalho

Gene Regulation, Stem Cells and Cancer Programme Coordinator: (Juan Valcárcel)

Regulation of Alternative pre-mRNA Splicing during Cell Differentiation, Development and Disease Group leader: Juan Valcárcel

Haematopoietic Stem Cell Biology and Differentiation Group leader: Thomas Graf

Chromatin and Gene Expression Group leader: Miguel Beato

Reprogramming and Regeneration Group leader: Maria Pia Cosma

Epigenetic Events in Cancer Group leader: Luciano Di Croce Regulation of Protein Synthesis in Eukaryotes Group leader: Fátima Gebauer

Gene Function

Group leader: Susana de la Luna

Mechanisms of Cancer and Ageing Group leader: Bill Keyes

Genome Architecture

Group leader: Guillaume Filion

Structural Genomics

Group leader: Marc Marti-Renom

Systems Biology Programme (Acting coordinator: James Sharpe)

Multicellular Systems Biology Group leader: James Sharpe

Design of Biological Systems Group leader: Luis Serrano

Genetic Systems Group leader: Ben Lehner

Gene Network Engineering (until December 2013) Group leader: Mark Isalan

Sensory Systems and Behaviour Group leader: Matthieu Louis

Comparative Analysis of Developmental Systems Group leader: Johannes Jaeger

Cellular and Systems Neurobiology Group leader: Mara Dierssen

CORE FACILITIES (Director: Mónica Morales)

Advanced Light Microscopy Unit leader: Timo Zimmermann

Bioinformatics

Acting unit leader: Jean-François Taly

Genomics

Unit leader: Heinz Himmelbauer

Proteomics

Unit leader: Eduard Sabidó

Biomolecular Screening & Protein Technologies Acting unit leader: Carlo Carolis

FACS

Unit leader: Òscar Fornas

THE PhD PROGRAMME INANUTSHELL The CRG International PhD programme aims to provide graduate students from all over the world with the possibility of training and research in the attractive scientific environment of the CRG, which forms part of the Barcelona Biomedical Research Park (PRBB). The aim of the programme is to nurture the potential of selected students to become excellent and independent researchers. The CRG offers a unique international scientific environment. Our resources, cutting-edge facilities, and staff provide the necessary technical support for the research projects and promote high quality research training for graduate students. 3 out of 4 PhD students are foreign

CRG

WELCOME FOR NEWCOMERS

Newcomers are supported in their first steps at the CRG and Barcelona in both academic and HR related issues, ranging from registration at the University, student mentoring and training to visas and work permits, accommodation and medical insurance. PhD representatives also welcome newcomers and provide comprehensive support to help them find their feet from the very first day.

MENTORING

PhD Students are supervised by the Thesis Advisory Committee, composed of the group leader and up to three other advisors (typically one additional CRG group leader from the same programme, one from a different programme and a non-CRG scientist from the student's university), whose role is to guide the students during their thesis work and to provide advice on future directions and decisions.

TRAINING

First year students participate in an introductory course which aims to introduce PhD students to new techniques and high-end technologies. Courses include both theoretical and practical sessions, for example on statistics, bioinformatics, introduction to deep-sequencing and mass spectrometry. The students also receive additional training in scientific writing and oral presentations, fellowships, communication and ethics.

Another training tool for PhD students are the shared weekly journal clubs, data clubs, monthly faculty meetings and annual retreats (at institute, department and group level), that promote exchanges within the institute and offer a forum to present and discuss results with colleagues and senior researchers. Courses@CRG is a new training series at the CRG also open to PhD students and external participants, which covers a wide range of topics, from practical scientific to technological courses.

CAREER DEVELOPMENT AND TRANSFERABLE SKILLS

The successful INTERVALS Programme open to PRBB residents offers training in a range of skills to enhance future career progress and improve employability. PhD students can attend courses on scientific writing, fellowship writing, how to publish in high-ranking journals, and presentation skills in English, that will help them prepare their PhD defence, scientific talks and job interviews. The CRG also offers Spanish and Catalan classes to facilitate the integration of students in the local life of Barcelona.

PhD SYMPOSIA & RETREATS

The CRG has a very active PhD community. In addition to annual PhD symposia and retreats, since 2011 joint retreats have been organised with top European biomedical institutes to promote collaboration. Additional events such as the Women's Symposium and Career Fair are promoted together with the postdocs. These activities are entirely organised by students/postdocs. At the PhD Symposium, second year PhD students present their projects and results and receive feedback from the CRG faculty and colleagues; while annual retreats offer an informal forum for discussing science and life at the CRG and enjoying outdoor activities together.

SOCIAL ACTIVITIES

PRBB residents can participate in a number of social activities on campus such as a beach volleyball tournament, theatre, choir, yoga and capoeira classes. Happy hours at the CRG bring the CRG community together and facilitate informal exchanges. Additionally, PhD students at the CRG organise other social and sporting activities.

WHAT OUR STUDENTS SAY



"The CRG is a great place to come to do your PhD: The science is top-quality, the atmosphere friendly and international, the location right by the sea in the heart of Barcelona, and we have a very involved PhD community and a well organised support structure to help you through your time here."

Nationality: British

David Hayes, PhD student currently at Jerome Solon lab, and representative of the PhD Community at the CRG



"The institute regularly attracts renowned international scientists to come and present their work here, and as students we always have the opportunity to meet and talk to them. There is an array of courses organised every year by the CRG so that all its employees have access to high quality tuition, and the administration is always responsive to requests for training in different areas. The yearly thesis committee pushes us to consolidate and reanalyse our data, and a panel of 3 group leaders offers a fresh perspective of help, comments and criticism to help us maintain direction in our work. There are many social events, retreats and other social activities organised and funded by the CRG which promote its friendly atmosphere and a high level of cross-talk and support from people in different fields."

Nationality: Estonian

Kadri Reis, PhD student currently at Ben Lehner lab, and representative of the PhD Community at the CRG



"A PhD at the CRG has been an intense professional and personal experience. The special location, scientific network and advanced technologies offered by this centre have allowed me to get a feeling for many aspects of the life of a scientist. I have had the opportunity to work on a highly stimulating research project aimed at understanding the pathophysiological mechanisms related to the development and extinction of fear memories in a mouse model of panic disorder, I directed the CRG PhD community as its representative student for one year and was able to contribute to improving the programme and PhD life. Last but not least I had the privilege to take part in the organisation and realisation of the most important European neuroscience meeting, the FENS forum 2012, as an organising committee member. Science, community and exchange are all important aspects in the growth of a scientist and if this is your career plan, then the CRG is the place where you want to go. Enjoy it!"

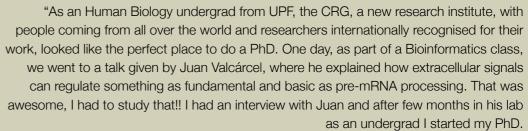
Nationality: Italian Davide d'Amico, PhD student currently at Mara Dierssen lab.



"From its breathtaking location, to the interdisciplinary approach to biomedical research, the CRG is a truly inspiring place. As a PhD student you are challenged to develop and pursue your own ideas, with excellent guidance and top-notch equipment at hand. The student community is great; very diverse and motivated. I had the opportunity to organise joint retreats with other top institutes in Europe, conferences and invite world-class scientists to speak. We are also encouraged to travel and participate in courses and training; all this makes for a very rich experience!"

Nationality: Polish Natalia Czerniak, PhD student currently at Jerome Solon lab.

WHAT OUR ALUMNI SAY



Doing the PhD at CRG in Juan's lab gave me the opportunity to develop a critical thinking and to learn how to tackle, in a shrewd, scientifically appropriate manner, several projects, some of them very interesting. At the CRG, I could also interact with people working in different fields, which gave me a broad perspective on how to address specific problems related to my research.

The knowledge I acquired during those years and the papers we published as a result of my work as a PhD student allowed me to continue with my learning process as a postdoctoral researcher at MIT".

Nationality: Spanish

Anna Corrionero, Postdoctoral Researcher currently at Bob Horvitz lab, Howard Hughes Medical Institute and Department of Biology,
Massachusetts Institute of Technology (MIT), Cambridge, USA.



"I always wanted to be a scientist. And I wanted to do something "sexy" and important. What's better than Sex-lethal for that? Thus Fatima Gebauer. Thus CRG. Along the way my priorities changed and now I am a Commercial Director at ITW-Panreac Quimica SLU.

During my career as a scientist and especially during my training with Fatima (2002-2006) I have developed an appreciation for the adequate planning of time and resources. I have learned how to coordinate diverse projects to meet a supervisor's goals while being part of multi-national and interdisciplinary teams. All this and much more helped me understand the value of diversity, respect and team-work. Thanks to these joint efforts with Fatima and her entire lab I was selected as a finalist for "The RNA Society Scaringe" Award 2006. And they select the best researchers amongst RNA biology students in the world. So serious and so much fun!

My entire experience at the CRG showed me that I am an effective contributor in an environment where passion for knowledge and excellence are rewarded. Looks like we made a perfect match!"

Nationality: Croatian Irina Abaza, Commercial Director at ITW-Panreac Quimica SLU.



OUR PARTNER UNIVERSITIES

As a research institute, the CRG is not entitled to award academic degrees; therefore all PhD students need to register with a university.

The CRG has partnerships with Barcelona universities allowing students to obtain degrees from the University Pompeu Fabra (UPF), University of Barcelona (UB) and University Politècnica of Catalunya (UPC), which offer Masters and PhD programmes in Life Sciences and Computing Sciences that can be carried out at the CRG.

Most of our students register in one of our partner universities in Barcelona, but it is also possible to obtain a degree from other universities.



HOW TO APPLY

Are only students from the European Union eligible to apply?

There are no nationality restrictions. Highly qualified students of all nationalities may apply for the CRG International PhD Programme.

Does the programme have specific language requirements?

The programme language is English throughout.

Can I apply for the PhD Programme before I receive my degree?

You can apply even if you have not yet received your degree provided that you hold your university degree by the time you start your PhD.

Do I need to contact a specific group leader before applying to the CRG International PhD Programme?

No. It is neither necessary nor recommended to contact group leaders individually. Prospective students will find all necessary information regarding research projects in the various laboratories on the CRG website. Please note that not all group leaders accept students every year.

When do I need to submit my application?

The application deadlines and all relevant information are published well in advanced on the PhD Programme website (www.crg.eu/lacaixa_fellowships). Please note that the International PhD Programme applications are accepted exclusively online through the online application system. The call is opened once a year.

What are the evaluation criteria for the applications?

The selection of students is taken in different steps (pre-selection based on the CV, evaluation of the CV by the prospective Group Leaders and an oral interview in Barcelona) and based on a candidate's academic qualifications and research excellence, as described on the website.

What is the format of the interviews?

Pre-selected candidates will be invited to attend an oral interview. The interviews last for 5 days and include lab presentations by recruiting group leaders, personal interviews with your group of interest and prospective colleagues and a panel interview. Travel expenses and accommodation will be covered.

When will I know if my application has been pre-selected? When will candidates be informed about the final results?

Pre-selected and non pre-selected candidates will be informed at the very latest by one week after the interviews.

If my application is successful, when will the fellowship start?

Selected candidates should start their fellowships within six months of the interview and no later than October 1st.

Will the CRG help me find accommodation and deal with paperwork?

The CRG HR department provides advice, support and assistance to national and international staff who are relocating to Barcelona, including finding temporary and long-term accommodation, opening a bank account, applying for health insurance, obtaining a Spanish identity number (NIE) and paperwork related to work permits and any necessary visas.

How am I paid?

PhD students receive a work contract according to the Spanish public system, including health and social security.

How long does it take for students to complete their PhD?

Students enrolled in the CRG International PhD Programme must complete their PhD thesis within 4 to a maximum of 5 years.

For more information please visit: www.crg.eu/phd_programme or contact the Academic Office at phdprogram@crg.eu



LIVING IN BARCELONA

With a population of 1.6 million in the city itself and a further 4 million in the suburbs, Barcelona is the second largest city in Spain, and probably the most cosmopolitan and most exciting. It is located in the north-eastern region of the Iberian Peninsula, lying between the glittering Mediterranean to the east and the Collserola Mountains to the west. There are two official languages in Barcelona: Catalan and Spanish. Residents in cosmopolitan Barcelona enjoy a dynamic city, which figures among the top European places in quality of life rankings, has spectacular cuisine, contemporary and rich culture, history and tradition, exceptional architecture and balmy weather almost all year round.

From a scientific point of view, Barcelona and its surroundings constitute the principal and most prominent biocluster in the Southern European Bioregion. The BioRegion of Catalonia is the cluster for biotechnology, biomedicine and medical technology in Catalonia. It is made up of 520 companies, 440 research groups and 54 research centres, 10 universities, which offer life sciences studies, and 15 hospitals with noteworthy research activity. It also includes innovation and technology-transfer support structures and networks. The organisation Biocat boosts and promotes the cluster. The city also hosts a wide range of cutting-edge technological platforms and scientific core facilities, including ALBA, a synchrotron light facility, as well as the Barcelona Supercomputing Center, home to the MareNostrum supercomputer.

The Centre for Genomic Regulation (CRG) is part of the Barcelona Biomedical Research Park (PRBB), one of the scientific parks in the city, which is physically connected to the Hospital del Mar. The PRBB groups together different institutions, including the Experimental and Health Sciences Department of Pompeu Fabra University, the Hospital del Mar Medical Research Institute, the Centre of Regenerative Medicine in Barcelona, the Centre for Research in Environmental Epidemiology, the Institute of Evolutionary Biology, and the Pasqual Maragall Foundation for Research in Alzheimer, creating a critical mass of biomedical research.

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