IBEC International PhD Programme
”la Caixa” · Severo Ochoa fellowships

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www.ibecbarcelona.eu/phd

1. PRESENTATION

The Institute of Bioengineering of Catalonia (IBEC, http://www.ibecbarcelona.eu) is a leading-edge multidisciplinary research centre based in Barcelona that conducts excellent interdisciplinary research at the frontiers of engineering and life sciences in order to generate new knowledge by putting together fields like nanomedicine, biophysics, biotechnology, tissue engineering and the applications of health information technology.

IBEC is a non-profit-making foundation set up in 2005 by the Departments of Innovation, Universities and Enterprise and Health of the Government of Catalonia, the University of Barcelona and the Technical University of Catalonia. It conducts interdisciplinary research at the highest international level, creating knowledge that helps to enhance quality of life, improve health and create wealth. IBEC aims to cement a solid international position in the field of nanomedicine and bioengineering. It is currently located in Barcelona Science Park, has facilities covering 2,500 square metres of floor space, 18 research groups and a team of researchers and support services made up of 250 people from more than 20 different countries. This location in Barcelona Science Park offers a highly stimulating biomedical environment where the institute can work in close cooperation with both public and private sector organisations.

IBEC is one of the top research institutions named as a Severo Ochoa Research Centre by the Ministry of Economy and Competitiveness (MINECO) in charge of research and innovation policy in Spain, which recognizes excellence at the highest international level in terms of research, training, human resources, outreach and technology transfer. The Severo Ochoa award provides 4m€ over 2015-2019 to implement IBEC's Research and Human Resources Programmes.

"la Caixa" is a non-profit entity whose activity in education is based on the principle of promoting equal access of citizens to quality qualifications and specializations at national and international levels. Over the years, thousands of students have advanced their training thanks to a "la Caixa" Foundation fellowship, enabling them to undertake postgraduate studies in Spain and abroad.

Since 2012, "la Caixa" has supported Severo Ochoa centres by offering fellowships to excellent candidates to perform a PhD. Within this

framework, three "la Caixa"–Severo Ochoa grants are offered at IBEC to start in the academic year 2016-2017.

The MINECO also supports Severo Ochoa centres through the 'Ayudas para contratos predoctorales para la formación de doctores' call. To start in the academic year 2016-2017, six MINECO fellowhsips are offered at IBEC.

2. MODALITIES AND ECONOMIC CONDITIONS

Each of the two types of fellowships offered by "la Caixa" and the MINECO offer different economic conditions to the successful candidates, according to the following modalities:

2.1. "la Caixa"–Severo Ochoa fellowships

"la Caixa"–Severo Ochoa fellowships offer a 4 year predoctoral contract with the following gross salary:
- 18.546,56 € for the first year
- 19.303,56 € for the second year
- 20.666,16 € for the third year
- 22.558,67 € for the fourth year

Moreover, 6.400€ is also offered for mobility and training during the 4-year period.

2.2. MINECO 'Ayudas para contratos predoctorales para la formación de doctores'

The 'Ayudas para contratos predoctorales para la formación de doctores' 2016 call from the MINECO offer a 4 year predoctoral contract with a gross salary of 16.422€, plus 6.250€ for mobility and training during the 4-year period.

Candidates who finish and defend their PhD thesis before the start of the fourth year of the MINECO fellowship will be able to sign a 1 year postdoctoral contract (POP) with a gross salary of 19.000€. The aim of this contract is to provide an orientation period to consolidate the knowledge acquired during the PhD thesis and start looking for postdoctoral opportunities, including those through other competitive fellowships.

2.3. General conditions applying to both types of fellowships

Gross salaries provide full social security coverage, which includes health and accident insurance, pension and unemployment benefits.

Working conditions at IBEC also include:

- Yearly 23 working days of paid holidays
- 9 leave days for personal matters
- Measures to reconcile work and family life, such as:
    - Maternity leave (16 weeks)
    - Paternity leave
    - Leave for breastfeeding
    - Shorter hours for guardianship or leave to care for children and relatives.

IBEC also provides seminars with top names in bioengineering and nanomedicine from all over the world in order to offer the opportunity to discuss and network the developments. At the same time IBEC offers several training courses specifically devoted to PhD students and early postdocs, covering such topics as scientific writing, how to publish in high ranking journals, preparing a PhD thesis and presentation skills in English. IBEC also offers further courses to give the opportunity to learn new skills such as leadership, communication, time management, and language skills.
The institute holds an annual symposium on a different scientific theme, as well as hosting and organizing several other project-based or general scientific meetings and workshops throughout the year.

3. ELIGIBILITY

Highly qualified researchers of all nationalities willing to join a stimulating, interdisciplinary research and high quality scientific environment are welcome to apply.

The following requirements are common to the two types of fellowships:

- Candidates should be ready to enter an official doctoral programme in September 2016 (under Spanish Law). By this time, they must have obtained a university degree and a masters degree; or must hold an official university qualification from a country of the

European Higher Education Area with a minimum of 300 ECTS of official university studies, of which at least 60 are at masters level.

- Candidates must have a strong commitment to scientific research and an excellent academic record.

- Candidates must have good working knowledge of English.

Other particular requirements are:

- "la Caixa" fellowships candidates may not be at IBEC for more than six months before the deadline of the call.

- MINECO fellowships candidates may not have held a PhD contract exceeding 12 months in June 2016.

4. PhD RESEARCH TOPICS AND PROJECTS

In the online application form you will be asked to indicate your preference of **up to two** research topics from the following:

1. Biomimetics, bio-inspired materials and nanorobotics;
2. Cell mechanics;
3. Electrical and optical detection at the nanoscale;
4. Fighting infectious diseases;
5. M-health devices for connected care;
6. Point-of-care diagnostics and prognostics;
7. Restoring organ and tissue function.

Each topic encompasses several PhD projects. If you are invited to IBEC for interview, you will have the chance to discuss the different PhD projects within your chosen topics with the group leaders responsible, and decide which project you prefer.

In your application, you will be able to choose whether you want to apply for a "la Caixa"–Severo Ochoa fellowship, a MINECO 'Ayudas para contratos predoctorales para la formación de doctores' fellowship, or both. Please bear in mind that the two types of fellowships have different associated research projects, so your eventual choice of project also depends on whether you are eligible to apply for that particular fellowship.

4.1. "la Caixa"–Severo Ochoa fellowships

TOPIC 1: Biomimetics, bio-inspired materials and nanorobotics

- Hybrid Micro-Bio-Robots based on motile cells

TOPIC 2: Cell mechanics

- Shaping epithelial sheets in two and three dimensions

TOPIC 5: M-health devices for connected care

- Flexible sensors for Biomedical Technology

TOPIC 7: Restoring organ and tissue function

- Targeting intermediate and paraxial mesoderm in induced pluripotent stem cells

4.2. MINECO 'Ayudas para contratos predoctorales para la formación de doctores'

TOPIC 1: Biomimetics, bio-inspired materials and nanorobotics

- Behaviour of Mesenchymal Stem Cells on Thermo-Responsive Substrate
- Design of novel antiviral nanomaterials
- Development of cell-derived matrices (CDM) as bioinks for 3D-bioprinting
- Development of haptotactic chemokine gradients in biomimetic 3D environament
- Engineering symbiotic behaviours between bacteria and stem cells
- Enzyme-powered Nano-Robots as Active Drug Delivery Systems
- Fabrication of electrically conductive and mechanically robust hybrid hydrogel composites using dielectrophoresis approach to engineer functional tissues for regenerative medicine and in vitro Applications
- Soft, Smart, Self-powered, Polymeric Micro-robots

TOPIC 2: Cell mechanics

- Biomechanical Regulation of Cancer Progression
- Biophysics of the tumour-stroma interactions
- Mechanobiology of durotaxis – from single cells to tissues
- Quantification of cellular forces in 3D
- The cell membrane as a mechanical and biochemical hub

TOPIC 3: Electrical and optical detection at the nanoscale

- Electrochemical tunneling microscopy and spectroscopy of redox proteins and photosynthetic complexes
- NanoBio-Tomography based on Scanning Probe Microscopies
- Scanning Probe Electrophysiology – imaging ionic channel activity at the nanoscale
- Visualizing molecular mechanics and function at the nanoscale

TOPIC 4: Fighting infectious diseases

- Deciphering the molecular mechanisms involved in bacterial virulence
- Development of polymer-based nanocarriers for new antimalarial combination therapies
- Engineering of nanovectors for the delivery of antimalarial drugs to Plasmodium transmission forms in the mosquito
- New strategies to combat bacterial infections

TOPIC 5: M-health devices for connected care

- Development of metabolomics data workflows able to fuse data from different origins
- Development of methods to improve the robustness of omics data predictive models: Applications in metabolomics applied to biomarker discovery in food intake
- Multimodal physiological biomarkers for non-invasive monitoring and home healthcare of COPD patients with comorbidities
- Novel m-Health and advanced signal interpretation techniques for improving diagnostic and monitoring of Obstructive Sleep Apnea patients at home

TOPIC 6: Point-of-care diagnostics and prognostics

- Biomarker in NCD. Monitoring neurocognitive deficits in Alzheimer's and Parkinson's diseases by nanotechnology approaches.
- Cell-matrix mechanobiology in bioengineered lungs
- Spleen on a chip system to determine mechanical cell properties of anemia diseases for early diagnosis and prognosis

TOPIC 7: Restoring organ and tissue function

- Chondrogenic Differentiation of Human Mesenchymal Stem Cells on Fibrinogen Composite Nanofibers
- Developing novel strategies for the regeneration of the human kidney
- Development of light-regulated drugs for vision restoration
- Ion-release materials to promote angiogenesis on in situ tissue regeneration strategies
- Optogenetics and Regeneration. Epigenetic modulation of corticospinal neurons by light in axon regeneration therapies of lesioned spinal cord
- Synergistic microenvironments for robust maturation of cardiomyocytes
- Uneven nanopatterns to control cell adhesion and promote cell differentiation for cartilage and tendon tissues regeneration

5. HOW TO APPLY

From 18th January 2016 until 29th February 2016, an online application form will be available through the IBEC International PhD Programme dedicated website. In your application, you will be able to choose whether you want to apply for a "la Caixa"–Severo Ochoa fellowship, a MINECO 'Ayudas para contratos predoctorales para la formación de doctores' fellowship, or both.

You will be required to provide the following information in your application:

- Personal data and CV.
- Covering letter, including motivation for applying.
- A scan of your Certified Academic Record, showing grades obtained (degree and masters). If these are not in Catalan, Spanish or

English, applicants should attach a translation in one of these languages.

- Education experience: what, when and where you have studied.
- Research experience.
- Publications.
- Presentations in conferences.
- Awards/fellowships.
- 2 letters of recommendation from lecturers or researchers with whom you have studied or worked and who can judge your potential as a PhD student. Only letters with official letterhead and signature will be accepted. **Please be sure to inform your referees that their letters must be uploaded in the online application tool before the deadline (29th February 2016).**

6. SELECTION PROCEDURE

In March 2016, applications will be reviewed by a selection committee made up of IBEC group leaders and administration staff.

Applicants' CVs will be reviewed in terms of academic record, research experience, publications, contributions to conferences, scientific and technical skills, reference letters, honours and additional merits.

In April, shortlisted candidates will receive invitations to visit IBEC for interviews with the selection committee and with the group leaders responsible of their preferred potential PhD projects.

Interviews with the selection committee will evaluate motivation, communication skills, independent thinking, autonomy, ability to team work, etc.

After the selection committee interview, candidates will also be interviewed by the group leaders responsible of the PhD projects included in the topics chosen in the application form. These interviews will serve to evaluate the knowledge and expertise of the candidate related to the particular research project and his/her adequacy to the corresponding research group, as well as to offer an opportunity for the candidate to expose any personal requirements or clarify any doubts.

At the end of the interviews, candidates will be asked to make a final ranked list of their preferred PhD research projects and supervisors, while the group leaders will determine whether they would accept or not each of the candidates interviewed in their research groups. As a result, a final ranked list of candidates will be made according to the overall CV and interview evaluations.

In June, offers will be made to the candidates with the highest scores for each of the two types of fellowships.

In order of evaluation score, they will be able to choose their final PhD Project and supervisor, taking into account that each PhD research project can only have one fellowship, so if a candidate with a higher score chooses a particular PhD research project, candidates with lower scores will have to choose another one from their list of preferred PhD projects and supervisors.

"la Caixa"–Severo Ochoa fellows should expect to take up their positions at IBEC in September/October 2016.

MINECO–Severo Ochoa fellows should expect to take up their positions at IBEC in December 2016/January 2017.

Applicants who have not been successful but have received a positive evaluation will be put on a waiting list for future positions.

HR EXCELLENCE IN RESEARCH

In April 2015, IBEC was awarded the 'Human Resources Excellence in Research' seal from the European Commission, in recognition of its commitment to continuously improving its HR policies in line with The European Charter of Researchers and The Code of Conduct for the Recruitment of Researchers.

In line with this recognition, IBEC has set up an international, transparent, equal-opportunities merit-based recruitment procedure to select the most qualified candidates. The selection procedure is governed by the following principles:

- Transparency throughout the whole process.
- Equal opportunities in the selection and hiring of personnel.

- Non-discrimination on grounds of sex, age, ethnic, national or social origin, religion, sexual orientation, language, disability, political opinions or social and economic condition.
- Confidentiality as the cornerstone of the selection process.
- Principle of public dissemination of the selection processes, which must also be internationally comparable.

7. USEFUL DATES

- **18th January 2016:** Launch of the call
- **29th February:** Deadline for submission of applications
- **1st-15th March:** Evaluation of the candidates' CVs
- **16th-18th March:** Communication of results. Invitation of selected candidates to come to Barcelona for an interview
- **25th-29th April:** Interviews in Barcelona with selection committee and group leaders responsible for research projects
- **First half of May:** Final selection of candidates
- **16th-18th May:** Communication of results to candidates
- **19th-24th May:** Letter of acceptance to be signed by candidates
- **September-October 2016:** Start of "la Caixa"–Severo Ochoa Fellowships
- **Approx. January 2017:** Start of MINECO–Severo Ochoa Grants

8. CONTACT

If you have any further questions about IBEC's "la Caixa" · Severo Ochoa IBEC International PhD Programme, or if there are particular issues you'd like to discuss regarding your application, please contact phd@ibecbarcelona.eu.