SCIENCE BY WOMEN

VISITING SENIOR RESEARCH FELLOWSHIPS

7th Edition

Rules and Guidelines

1. Overview

The Science by Women programme will fund several visiting senior research fellowships for experienced African women researchers in any of the following research centres of excellence based in Spain.

Institute of Photonic Sciences (ICFO, www.icfo.eu) is specialised in the science and technology of harnessing light as a pervasive and universal tool that benefits health, energy, information as well as safety, security and environment

Vall d´Hebron Institut de Recerca (VHIR, http://en.vhir.org) is a public-sector institution that promotes and develops the research, innovation and biosanitary teaching of the Vall d'Hebron University Hospital inside Vall d'Hebron Barcelona Hospital Campus. Through the excellence of their research, they identify and apply new solutions to the health problems of society contributing to spread them around the world.

Centre for Genomics Regulation (CRG, http://crg.eu). The CRG is an international biomedical research institute of excellence whose mission is to discover and advance knowledge for the benefit of society, public health and economic prosperity. The CRG believes that the medicine of the future depends on the groundbreaking science of today. This requires an interdisciplinary scientific team focused on understanding the complexity of life from the genome to the cell to a whole organism and its interaction with the environment, offering an integrated view of genetic diseases.

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Barcelona Graduate School of Economics (Barcelona GSE, http://www.barcelonagse.eu/) is an institution for scientific cooperation in research and graduate education in economics and social sciences, and draws on the strengths and noteworthy reputations of its four academic units.

Spanish National Center of Biotechnology (CNB) (http://www.cnb.csic.es/index.php/en/) is located in Madrid and forms part of the Spanish National Research Council (CSIC). The center stands out for its broad and interdisciplinary approach, combining gene-based technologies with frontier research in computational, structural, cell and synthetic biology, to discover novel biological entities, decipher their functional interplay in individual organisms and larger communities, ranging from virus and bacteria to plants, animals and humans.

Kronikgune (www.kronikgune.org/en/) is an Institute for Health Services Research that promotes and carries out management and organization research on health and socio-health services. Its scientific research programme is aligned with the policies of the Basque Department of Health, that pursue the continuous adaptation and transformation of the health system by keeping people at the center of the system and addressing the challenges derived from aging, chronicity and dependency

Biocruces Bizkaia (BC) (https://www.biocrucesbizkaia.org) is a Health Research Institute of Bizkaia Region. BBHRI was established in 2008 and it aims to promote, unite and support the research groups to develop a quality translational research and enhance the effective innovation and collaboration with other organizations; all this in order to provide new tools, practices, and knowledge to contribute to the improvement of health care, population health, wealth creation, and economic development. Five important organisations in the Basque Country (Health Department of the Basque Government, Public Health Provider Organization (OSA), Basque Public University and Basque Foundation for Health Innovation and Research (BIOEF) and Foundation BBK.

The legal agreement between BBHRI and the Basque Health System in fact provides the framework for the cooperation between the two institutions, with the goal of translating research results into medical practice. There are close to 900 professionals with complementary

basic and clinical profiles divided into more than 60 research groups. BBHRI is taking part in close to 150 clinical trials and offers a long-running close relationship with the University of the Basque Country and other hospitals of the Basque Country.

Deusto Institute of Technology (DeustoTech) (https://deustotech.deusto.es/) is the Technology Research Institute at the University of Deusto. It conducts research mainly in the field of Information and Communication Technologies (ICTs), with a special focus on areas such as Artificial Intelligence, Internet of Things, Smart Robotics, Advanced Computing Systems, HealthTech and Circular Economy applied to different sectors such as Industry, Transport, Energy, Environment and Societal Challenges.

Spanish National Cancer Research Centre (CNIO) (www.cnio.es) is an international cancer research centre of excellence with the mission of fostering translation of scientific breakthroughs into novel and more effective ways to prevent, diagnose and treat cancer.

Institute of Health Carlos III (ISCIII https://eng.isciii.es/eng.isciii.es/Paginas/Inicio.html**)** is one of the implementing agents of the Spanish Science, Technology and Innovation System, either as Research and innovation funder and performer. The performing R&I activities done by ISCIII is carried out through its national centers, institutes and research units by contributing decisively to preserving the health of all citizens. ISCIII´s national centers, institutes and units carry out functions, always aimed at improving health and focused on the needs of the citizens as well as offering scientific and technical advisory services that provide a basis for decision-making by the Spanish National Health System, in particular in the field of public health.

Donostia International Physics Center (dipc.ehu.es) is a research center located in Donostia – San Sebastián (Spain). The mission of DIPC is to perform and catalyze cutting-edge research in physics and related disciplines, as well as to convey scientific culture to society. DIPC was conceived and planned based on the idea that an advanced society needs advanced scientific research.

Principe Felipe Research Center (CIPF) (www.cipf.es) is a cutting-edge biomedical research center located in Valencia. Investigators at the CIPF use a range of model systems to pursue key biological questions related to human health problems including rare diseases, cancer, neurodegeneration and metabolic diseases. Our mission is to enhance basic knowledge about human diseases with the goal of applying our results to the development of new drugs and therapies.

Institute of Mathematical Sciences (ICMAT) (www.icmat.es) is a joint research center of the Consejo Superior de Investigaciones Científicas - CSIC (Spanish National Research Council) and three Madrid universities: the Universidad Autónoma de Madrid (UAM), the Universidad Carlos III de Madrid (UC3M), and the Universidad Complutense de Madrid (UCM). The ICMAT is located on the UAM Campus in Madrid, its facilities are exceptional in the field of mathematical research. Its goal is to generate knowledge in all the areas of mathematics,

particularly in Algebraic Geometry, Mathematical Physics, Differential Geometry, Geometric Mechanics, Mathematical Analysis, Differential Equations and Applications, Number Theory, Group theory, Statistics, Probability, Operations Research and Mathematics of Quantum Information.

Institute for Sustainable Agriculture (IAS) (www.ias.csic.es<http://www.ias.csic.es>) is focused on providing scientific knowledge and technological transfer that enhances the harmonization of food production with the conservation of natural resources and environmental protection. The IAS covers agronomy, crop breeding and crop protection profiting from modern tools and methodologies tested in Europe and Africa.

Biomedical and Health Research Institute (https://www.iuibs.ulpgc.es/) at the **University of Las Palmas de Gran Canaria** (https://www.ulpgc.es/) concentrates the University research in the fields of biomedicine, biotechnology, biomedical technology, hospital systems and public health, with the participation of university and hospital reseach groups and a wide array of external collaborators. Among its many areas of activity, the Institute hosts the **Medical Technology for Sustainable Development** effort (http://medtec4susdev.org/), a multidisciplinary program with collaborators across the World to bring affordable advanced medical technology to all.

The **Instituto de Astrofísica de Canarias (**IAC https://www.iac.es/en/) is a science and technology center dedicated to research in astronomy and astrophysics. It is a public consortium made up of the Central Administration (Ministry of Science, Innovation and Universities), the Canary Islands Autonomous Community, the University of La Laguna and the Higher Council for Scientific Research. The IAC's mission is to perform excellent research and technological developments in astrophysics, securing the appropriate training of graduate students, young researchers and engineers, promoting outreach and technology transfer in many different areas and fostering a fruitful and stable environment of international collaboration. IAC aims to achieve major advances in the understanding of the laws that govern the origin and evolution of the various forms of matter/energy in the Universe. The center aims to use a large variety of cutting edge ground/space facilities and attract new very talented young/senior researchers to develop advances and breakthroughs in physical modelling, computer simulations and technology. The IAC hosts and operates two astrophysical observatories on Tenerife and La Palma islands, where more than 40 telescopes and telescopic installations are run by institutions from a large number of countries, including the world largest optical and infrared telescope currently in operation

PLOCAN (Oceanic Platform of the Canary Islands) is a Unique Scientific-Technical Infrastructure (ICTS) whose mission is to promote the development of knowledge and technologies for the responsible and sustainable use of the ocean. PLOCAN offers offshore and on land infrastructures to test new technologies, materials, concepts or methodologies, providing services to users in the public and private sectors. It comprises a fixed offshore platform with a net area of 2,500 m2 located near the coast at a depth of 30 m; a testsite with an area of 23 Km2

that offers progressive depths from the coast to 600 meters, and constitutes an optimal ecosystem in terms of data, operational models, logistics, compatible infrastructures and connection to the electricity grid; an electrical and communications infrastructure for evacuation of the energy produced during the experimental tests; a base of autonomous underwater vehicles; an observatory aimed at monitoring global change processes, ocean health, exploration and environmental monitoring of the marine environment and biodiversity; and an onshore headquarters with workshops and laboratories.

The Basque Center for Applied Mathematics - BCAM (www.bcamath.org) is an international research center in the field of Applied Mathematics that was founded in 2008 by the Basque Government, the UVP/EHU and Ikerbasque. It is also supported by the Provincial Council of Bizkaia and Innobasque. One of its main objectives is to put mathematics at the service of society through the transfer of knowledge, making the results of its research available to sectors such as biosciences, health, energy or advanced manufacturing, and working together with local and international institutions and companies.

Basque Center for Macromolecular Design and Engineering POLYMAT Fundazioa (www.polymat.eu) is a research center of international excellence located in Donostia-San Sebastián linked to the University of the Basque Country UPV/EHU. It is a multidisciplinary research center which includes a wide variety of research teams working in the fields of polymer synthesis, polymerization reaction engineering, membranes, polymers for electronics, energy storage, biomedical applications, rheology and polymer processing. The main objective is to contribute to societal challenges of the 21st century such as energy, sustainability and health. Specifically, it works on the development of polymers to respond to these challenges.

The "Fundación para la Investigación del Hospital Clínico de la Comunidad Valenciana"-INCLIVA (https://www.incliva.es/) is the institution managing the research for Health of the University of Valencia (School of Medicine) and the University Clinic Hospital that include a Department providing healthcare to the 350.000 inhabitants with a EHR that virtually covers the whole population of the department. INCLIVA is a top 10 biomedical research institute in Spain INCLIVA is organized around four priority areas of research: Oncology, Cardiovascular diseases, Healthy ageing and Reproductive medicine.

Institut de Ciència de Materials de Barcelona, ICMAB (www.icmab.es) is an institute of the Spanish National Research Council (CSIC), the largest public institution dedicated to research in Spain and the third largest in Europe, whose main objective is to develop and promote basic and applied research. ICMAB focuses on generating new knowledge in Materials Science and transferring it to the society. Cutting edge activities in materials science are now deeply rooted in the nanoscience revolution and ICMAB's research is strongly related to new developments in this area. ICMAB is one of the top research institutions named as a "Severo Ochoa Research Centre", a distinction that recognizes excellence at the highest international level in terms of research, training, human resources, outreach and technology transfer

Biodonostia Health Research Institute (Biodonostia HRI) is a national and international centre of reference in the field of health research located in Donostia-San Sebastian. BiodonostiaHRI preferentially boosts translational research focusing on the patient; it covers all research carried out in Gipuzkoa within the framework of the Basque Health Service (Osakidetza – SVS) and aims to improve people's health through its multi-institutional and inter-disciplinary collaborative structure. The priority of Biodonostia is to promote translational research basing part of its effort on innovation development in both medical and health technologies which lead to improvements in health care system by converting inventions into products.

Each centre will host 1 researcher.

The preferred areas of research include:

1. Health and Bio-medicine

2. Energy, Water and Climate Change

3. Sustainable Agriculture and Food Safety

Mathematics, information and communication technologies, as well as physics, astrophysics and materials physics and all STEM disciplines are instrumental to research in the above areas.

2. Eligibility requirements

- Being a woman
- Nationality of an African country.
- PhD with at least 3 years of post-doctoral professional experience
- Contractual relationship with a university or a public or private organization based in Africa dedicated to significant scientific research in the areas indicated
- Excellent academic record and proven track of relevant research experience
- Solid working knowledge of English
- Proven experience leading a research group

Beneficiaries of previous editions are not eligible.
Candidates must have already identified the principal Investigador in the prospective host centre to confirm that the research proposal can be carried out in collaboration with those research groups and their laboratories.

3. General Conditions
In general, the duration of the research stays will be of six continuous months to be completed within two years from the publication of final selection of beneficiaries. Exceptionally, some centers admit to split the six-month fellowship in two periods to be completed within two years

from the publication of final selection of beneficiaries. However, some centers apply special conditions[1]

Successful candidates will have access to the following benefits:

- Return flight from their centre of origin to the host institution
- Living allowance of 2.400 Euros gross per month to cover accommodation, personal expense and health and occupational accident insurance coverage. Some centers apply different conditions [2]

Beneficiaries must devote themselves entirely to research at the assigned research centre and may not be beneficiaries of any other fellowship, grant, stipend or regular income during their research stay.
Beneficiaries might be asked to formalise their relationship with the research centre in writing. In compliance with the local laws, the Woman for Africa Foundation or the research centre (as the case may be) will, if so required in each particular circumstance by the tax and/or social security regime, retain or withhold the compulsory amounts from the living allowances.
Women for Africa Foundation, in collaboration with the research centre, will help beneficiaries with the compulsory formalities in order to obtain the visa with Spanish Embassies and Consulates.

The Women for Africa Foundation strongly discourages final beneficiaries to take along their families, since we cannot assure any financial, logistic or administrative support for families.

4. Deadline for applications

Deadline for applications is September 30, 2021.
Only applications submitted in English via the Science by Women microsite at www.mujeresporafrica.es will be accepted. They must include the following documents:

- Letter of Interest (max. 1 page)
- Full curriculum vitae (Europass format is recommended)
- Fully filled form
- Passport or NID
- PhD Diploma
- Research proposal (Brief and clear description of the project to be developed in the Spanish host centre (max. 2 pages)

5. Selection process

Applications will be subjected to a highly competitive selection process by the Women for Africa Foundation's Scientific Committee. The jury will evaluate the following criteria:

[1] Check conditions in the application form for each associated center
[2] Check conditions in the application form for each associated center

- The candidate's research career, curriculum vitae and experience as independent research group leader.
- The project's scientific -technical quality and innovative potential.
- The expected and measurable economic or social impact of the research project.
- The candidate's plan to communicate and disseminate the project's results.
- The proper consideration of ethical issues where appropriate.

Successful applicants will present innovative research projects that respond to the needs of African populations and that are likely to be transferred into products or patents for commercial exploitation, or services and public policies which have a social impact in terms of people's welfare and quality of life, as well as an economic impact in terms of companies' productivity and competitiveness.

6. Research proposals

Research proposals shall cover the following lines:

Institute of Photonic Sciences (ICFO)

- Light for Health: medical optical devices, photonics for clean food and clean water, in particular, portable photonic technologies for quantitative fast diagnosis of COVID and non-invasive management of COVID patients.
- Light for Energy: optical sensors, photovoltaic energies, new materials, graphene
- Light for Information: optical telecommunications, quantum information, optical sensors Laser Technologies: new lasers
- Light-based technologies for industrial processes

Vall d´Hebron Institut de Recerca

- **Pediatric Neurology** (Dr Alfons Macaya)

  The Pediatric Neurology Research group is mainly involved in the study of genetic diseases of the developing nervous system. The main emphasis is on paroxysmal neurological disorders and neuromuscular disorders. A common theme across the different projects, besides the identification of the molecular basis of several of these rare disorders, is the investigation of molecules involved in their pathophysiological mechanisms and the effective translation of these findings into the fields of molecular diagnosis, genetic counselling and newly developed gene or drug therapies.

- **Translational Research in Child and Adolescent Cancer** (Dr Lucas Moreno)

  The Group for Translational Research into Childhood and Adolescent Cancer is focused on research for new treatment targets or molecule targets (the place in the organism a drug acts on), based on the most advanced knowledge available on the biology of

paediatric cancers. The Group has identified and will continue to work on new molecular targets for sarcomas (cancer that originates in connective tissue cells) and tumours of the nervous system. The group applies the knowledge acquired from basic research to the prevention and treatment of clinical cases in childhood cancer and haematological diseases, which contributes to better diagnosis, prognosis, treatment and control of such diseases

- **Growth and Development** (Dr. Yeste)

  Dedicated to paediatric research. Interested in rare respiratory and endocrinologic diseases, but also in common paediatric problems like growth in normal children, asthma, neonatal problems and imaging. The research in rare diseases is focused on identifying genetic mutations, and understanding how these mutations adversely affect the activity of cells that ultimately result in rare diseases. For patients and families suffering these disorders is very important to have a correct diagnosis. Improving diagnosis and creating new tools should allow genomic testing to become part of National Health Service healthcare and will help identify patients suitable for treatment with new therapies.

- **Cardiac Surgery and Pediatric Cardiology** Service (Dr. Rosés)

  The Cardiac Surgery and Pediatric Cardiology Service of Vall d'Hebron has participated in more than one hundred research projects. Among the research carried out are the study of the neurological repercussions of fetuses and newborns with congenital heart disease; new cardiac surgery techniques; the program in interventional and pediatric hemodynamics with the use of new devices for percutaneous treatment; the development of new drugs for heart failure and severe pulmonary arterial hypertension and of new ventricular assist devices for treatment bridging cardiac transplantation; the creation of a home monitoring system for children with heart disease and the development of new imaging techniques with cardiac echocardiography. In addition, in the field of genetic studies, the service participate in international research on hereditary diseases of the aorta and hereditary heart diseases with risk of sudden death.

- **HIV Translational Laboratory** (Dra Buzón)

  The HIV Translational Laboratory is focused on the characterization of the latent HIV reservoir and the development of new therapeutic strategies directed to deplete this latent reservoir with the ultimate goal of curing HIV. The lab is located within the Infectious Disease unit of the Vall d´Hebrón Hospital, and has access to clinical samples of more than 2100 HIV-infected patients. The priority research lines are: i) Understanding the viral mechanisms involved in the long-term maintenance of viral latency, ii) Assessing the impact of new drugs to purge the latent reservoir, iii) Exploring new synergistic approaches to deplete the latent reservoir with bi-specific nanoparticles, and iv) Targeting specific sites of viral replication. Moreover, we are working with samples from SARS-CoV-2 infected patients in two different lines of

research: i) identification of repurposing drugs using lung tissue models, and ii) predicting long-term immunity.

Carlos III Health Institute (ISCIII)

Knowledge Area	Centre involved	Persons in charge at the Centre	e-mail for contact
Basic and preclinical research: A better knowledge of the disease by SARS-COVI-2 prevention. Diagnosis and treatment.	Microbiology National Centre CNM	Dr. Jesús Oteo Iglesias Dra. Isabel Jado Garcia Director/Directora	jesus.oteo@isciii.es ijado@isciii.es
Epidemiological research: COVID-19 surveillance of risk factors and health determinants: Monitoring behavioral insights related to COVID-19: a population survey".	Epidemiological National Centre CNE	Dra. Marina Pollan Directora	mpollan@isciii.es
Research capacity: building, evidence analysis, implementation research, new diagnostics development on Research on Neglected Tropical and Poverty Related Diseases.	National School of Public Health ENS	Dr. Israel Cruz Mata Head of International Health Department	cruzi@isciii.es

Centre for Genomic Regulation (CRG)

(Contact person : Michela Bartero michela.bertero@crg.eu)

The CRG will offer the successful candidates training and learning of specific skills and competencies in one or more of the research areas outlined below.

- **Medical Genomics**: dissecting human genome variation and its role in human rare and common diseases; applying genomics and disease models to define causal mechanisms and new therapies.

- **Bioinformatics and Genomics**: computational biology of RNA processing; comparative bioinformatics and genomics; gene function and evolution; genomic and epigenomic variation in disease; genomics and biodiversity.
- **Cell and Developmental Biology**: cell trafficking and secretion; microtubules function and cell division; cell and tissue dynamics; intra-cellular cell organization; oocyte biology and cellular dormancy.
- **Gene Regulation Stem Cells and Cancer**: mechanisms of gene expression and epigenetic regulation (from chromatin organization, alternative splicing, RNA modifications to mRNA translation); molecular basis of cellular decisions involved in tissue homeostasis and diseases, such as cancer; cell reprogramming and tissue regeneration.
- **Systems Biology**: dynamic gene regulatory networks; development and evolution (genomics, single cell approaches); systems neuroscience; combining systematic and quantitative data collection with computational models, to reach a deeper dynamic understanding of complex biological processes.
- **Core Technologies Programme**: offering services and training in advanced technologies such as light microscopy (including super-resolution microscopy), proteomics, genomics, tissue engineering, FACS, biomolecular screening and protein technologies.

Barcelona Graduate School of Economics (Barcelona GSE)

•Macroeconomic & Microeconomic Challenges for Development
• Economics and politics of conflict
• Private and social returns to education and education policies
• Financial markets and regulation.
• Firm structure, innovation and growth
• International trade and globalization
• Fiscal policy, tax structure and infrastructure investment.
• Economic impact of health and health policies
• Migration flows and migration policies

Kronikgune Research Center

Kronikgune's area of expertise comprises the development and implementation ICT enabled solutions for integrated care and evaluation of health services.

Integrated healthcare systems

- Healthcare organisational models and pathways innovation
- Healthcare implementation and scaling up strategies and methodologies
- Patient empowerment strategies and interventions

e-Health systems

- ICT systems and services requirements for integrated care.
- Design, deployment and evaluation of ICT enabled personalized care plans.
- Risk stratification models, to predict patients' and population needs and resource´s allocation.
- Innovative ways of using ICTs and digital technologies to enhance knowledge management and knowledge transfer among stakeholders to accelerate efforts towards achieving targets and indicators for SDG3 (on ensuring healthy lives and promoting well being for all at all ages).

Healthcare evaluation

- Healthcare Process and Outcome evaluation
- Patient Reported Outcomes"-PROMs
- Healthcare maturity assessment
- Budget impact analysis

BioCruces Bizkaia Health Research Institute

Biocruces HRI is constituted by different research groups integrated in 7 research scientific areas. Each research group and area are supervised by a coordinator, being Dr Castaño, the Scientific Director of Biocruces, the scientific areas are the following:

- **Covid 19** : Research on the molecular/genetic aspects, both of the virus itself and of genetic polymorphisms associated with clinical evolution. The approach is epidemiological, but also diagnostic and therapeutic.
- **Primary Health Care, Prevention and Chronic Diseases:** Primary healthcare provides a unique opportunity for clinical research at the population level focused on the promotion of health and primary, secondary and tertiary prevention of the chronic illnesses that are most common and which have the most effect on health, including cancer, cardiovascular diseases and mental disorders. The research groups in this area design and evaluate innovative interventions to address the main determinants of health, including lifestyle and other risk factors associated with these illnesses. Primary care researchers focus on how to improve the quality of life of patients, their adaptive capacity and their self-care ability.
- **Cancer:** All aspects of all types of solid malignant tumours and blood cancers, from epidemiological characteristics to biological and clinical features are included. The aim of the different research units is to carry out research on cancer at the basic, applied and clinical levels. Given the nature of our institution as a healthcare provider, most of the activity is to be focused on translational research, promoting a rich and productive interaction between basic biomedical sciences and applied oncology, in order that results directly benefit patients and society as a whole.

- **Endocrinology, Metabolism, Nutrition and Renal Diseases:** Different research groups work together on the characterisation of the etiopathogenesis and the epidemiology of these conditions and the identification of new diagnostic and therapeutic strategies, seeking to translate scientific progress to patients. Diabetes, obesity, and coeliac disease are key areas in endocrinology and nutrition, and we focus on the genetic and environmental causes and on disease control, as well as new therapeutic approaches including prevention, new drugs and technologies, and cell therapy.
- **Autoimmune, Inflammatory and Infectious Diseases:** we focus on tend to have an inflammatory basis and an environmental, infectious, metabolic, or autoimmune cause, and be chronic in nature. Translation of our results to clinical practice should be immediate, the main objective being to improve the prognosis and quality of life of our patients. Further, clinical research in this area should contribute to ameliorating the growing social and economic impact of these medical conditions
- **Nervous Systems Diseases:** Neurodegenerative diseases, epilepsy, demyelinating diseases (multiple sclerosis), stroke, and other neurological diseases account for a significant percentage of mortality and disability, with severe social consequences. Research groups will pursue in-depth work along established research lines such as the study of the causes of diseases, their genetic nature, clinical and behavioral profiles of patients, and the epidemiology of diseases. Research on clinical and pathological correlates by means of neuroimaging techniques that enable the assessment of brain functioning in normal and diseased states, as well as more detailed analysis of biological markers.
- **Maternal Child Healthcare and Assisted Reproduction:** The objective is to innovate and provide answers to the fertility problems, to improve the health of pregnant women and to increase the safety of the mother and child at birth. We focus our efforts on caring for foetal health, the analysis of congenital, and improving the diagnosis of certain genetic disorders, especially in relation to intellectual disability and diseases linked to the X chromosome. We aim to improve our understanding of paediatric cancer, especially brain tumours and genetic predisposition to cancer, and some rare diseases to develop better diagnostic methods and new treatments. Health problems of children and adolescents, in particular conditions related to prematurity and those associated with severe conditions or requiring urgent intervention.

Deusto Institute of Technology (DeustoTech)

DeustoTech is structured in different research groups specialized in the areas of:

- **Artificial Intelligence**: Machine Learning, Deep Learning, Reinforcement Learning, Data Science, Predictive Analytics, Optimization, Natural Language Processing, …
- **Pervasive Computing**: Internet of Things/People, Human Computer Interaction, Collaborative Robotics, …

- **Advanced Computer Systems**: Quantum Computing, Blockchain, Edge Computing, High-Performance Computing, …

DeustoTech carries our research project in collaboration with industrial and social partners in the following sectors:

Energy & Environment:

This application area aims to design ICT-based solutions that will allow to move towards more sustainable and efficient environments and cities, working collaborately with companies and public administrations. Our scientific-technological capabilities include: environment, smart grids for the supply and management of urban services, and advanced maintenance and operation systems.

Mobility and transport:

This application area focuses on ICT research applied to transport, mobility of people and logistics. Our transfer activity related to the development ITS Intelligent Transport Systems and Smart Mobility Platforms, contributes to making the mobility of individuals and objects more sustainable, smarter and more comfortable. Our scientific-technological capabilities include: soft computing applied to ITS, smart mobility and seamless positioning systems

Industry:

This application area is focused on transformation into a digital, smart and safe industry. We question the state of the art in order to meet the challenges faced by industry in its transformation towards a more sustainable and competitive model. Our scientific-technological capabilities include: data analytics and cyberphysical systems.

CCM:

The Chair of Computational Mathematics of DeustoTech aims to develop an active research, training and outreach agenda in Applied Mathematics. It is committed with the development of ground-breaking research in the areas of Partial Differential Equations, Control Theory, Numerical Analysis and Scientific Computing; key tools for technological transfer and for the interaction of mathematics with other scientific disciplines such as biology, engineering, social, earth and climate sciences.

Societal Challenges:

This application area aims at using basic and applied research to make ITCs available to society and citizens, and contribute to building a better world. Our scientific/technological capabilities are: heterogeneous data management, intelligent environment enablement and user-driven

computing. This year the COVID19 boosts us to look for solutions focused on fostering older adults to live safely and independently at home for longer.

Spanish National Cancer Research Centre (CNIO)

- Basic Research – As the main activity of the CNIO, basic research is carried out in two Research Programmes: Molecular Oncology and Structural Biology. At least three groups of the Molecular Oncology Programme are also envolved developing projects related with SARS-COV-2, such as 1) SARS-COV-2 diagnostic test by phi 29 polymerase amplification, aimed to develop novel detection kit (COVI-PHI) for the diagnosis of SARS-CoV-2 infection. 2) Study of pulmonary fibrosis associated to OVID-19 infection, which is one of the most important sequels of the disease 3) Systematic evaluation of ACE2 modulation by drugs approved for medical use.

Research proposals in basic research should be focused on generating knowledge and discoveries that can advance the fields of molecular oncology, structural biology and biocomputing.

Donostia International Physics Center

Scientific activity at DIPC addresses fundamental topics that take place on very different length scales, from elementary particles to atoms, nanostructures, mesoscopic systems, and galaxies. DIPC's research activity will be structured in three thematic areas, QUANTUM, NANO, and COSMOS, that are representative of the problems and domains in which DIPC is currently active. Specific areas of research in which the applicants can work follow:

The three research areas that will drive DIPC's research effort in the period 2019-2022 are:

QUANTUM

The QUANTUM area includes research activity on systems in which quantum effects determine the electronic, optical, and magnetic properties. Research is performed on quantum systems, quantum information, topological materials, tensor networks, theoretical and computational quantum chemistry, attosecond physics and electronic excitations and dynamics, among other topics.

NANO

The NANO area includes research activity on nanoscale systems for which emergent properties arise and interdisciplinary approaches are needed. Research is performed on the experimental characterization of self-assembled and low-dimensional systems, on nano-photonics and nano-optics, on the photoactivation of nanosystems, on the theory of electronic transport in the nanoscale and on nanoconfined polymers, among other topics.

COSMOS

The COSMOS area includes research activity on very fundamental problems linked to the origin, composition, structure, and evolution of the Universe. Research is performed on matter-antimatter asymmetry through experimental particle physics, neutrino physics, computational cosmology and the nature of dark energy and dark matter.

Principe Felipe Research Center (CIPF) is multidisciplinary institute organized in 4 interconnected programmes

Molecular Basis of Human Disease: this programme is focused on identification of the molecular causes and mechanisms of several human diseases with emphasis in rare diseases, metabolic diseases and cancer. It aims to generate knowledge that will improve the diagnosis and the development of specific therapeutic strategies. It promotes a model of translational research and biomedical innovation to drive the development of new tools, biomarkers and therapeutic targets.

Neuroinflamation and Neurological Impairment: This programme performs basic and translational research on the mechanisms, diagnosis and treatment of neurological impairment in different pathological situations, including minimal and clinical hepatic encephalopathy in liver cirrhosis, acute liver failure, hyperammonemias, chronic alcohol consumption, alcohol abuse in adolescence and adulthood and perinatal exposure to ethanol (fetal alcohol syndrome) or to food or environmental contaminants.

New Technologies in Biomedical Research: Investigators in this programme develop methodologies for high-throughput data analysis and provides software tools for omics studies to understand the functional aspects across different organisms and its relationship with diseases and traits.

Advanced Therapies: The objective of this research area is the development of new diagnostic and therapeutic approaches for health problems through the application of nanotechnology, cell therapy, and medicinal chemistry. This program addressed tools for neoplastic processes, spinal cord injury, musculoskeletal injury, neurodegenerative diseases, inflammatory processes and cardiomyopathies.

Recently, CIPF has created a transversal programme to integrate **Gender Research** in our institute and to promote the elimination of gender bias in the research community. Precision medicine must include assessment of relevant sex differences and analysis of gender effects in biomedical research.

Institute of Mathematical Sciences (ICMAT) (www.icmat.es)

Algebra and Geometry. The group conducts research in a broad variety of topics, in the areas of abstract algebra (group theory, commutative algebra), algebraic geometry (arithmetic geometry, number theory, moduli spaces of bundles), differential geometry (geometric analysis, geometric mechanics, dynamical systems and the geometry of PDEs) and topology (topological fluid dynamics, symplectic and contact topology, low-

dimensional topology). As such, the research is naturally interdisciplinary, fostering an important level of cross-fertilization between the different areas. In addition, a number of the themes finds their motivation in ideas stemming from physics, such as special metrics, gauge theories and their algebro-geometric counterparts.

Mathematical Analysis and Differential equations. These are very active, deeply interrelated fields of research with a preponderant position within the mathematical sciences. This line deals with fundamental problems in the fields of harmonic analysis, partial differential equations, geometric group theory, functional analysis, geometric measure theory, operator algebra, differential geometry and probability, and has been awarded with a total of 7 ERC grants. The topics of interest in this line are classical problems around the Kakeya conjecture and Bochner-Riesz multipliers, the Schrödinger and wave equations, elliptic PDE in rough domains and connections with geometric measure theory, harmonic analysis and geometric group theory for nonamenable groups, classical and abstract Calderón-Zygmund theory and problems around the invariant subspace problem, operator theory, geometry of Banach spaces, complex analysis, quantum probability, and analytic number theory. Also, this group considers differential equations arising in fluid mechanics, spectral theory, mathematical physics and mathematical biology. This is an interdisciplinary subject, with significant applications to engineering, biology and physics.

Applied Mathematics. This research group works to develop the mathematical foundations and models needed to deal with the main new societal challenges, with a focus on Data Science, Machine Learning and Quantum Technologies. In particular they consider a wide variety of mathematical problems which are motivated by quantum technologies, such as condense matter and many body systems, quantum control, foundational aspects of quantum mechanics and the theory of operator algebras. In the field of Machine Learning and Data science, they consider Bayesian approaches to treat adversarial risk analysis and adversarial machine learning, and work in the areas of security and cybersecurity, and the tracking of fake news. Finally, other topics of interest are mathematical modelling, simulation, and numerical computation with applications in microfluidics modelling and technological applications, geophysical fluid dynamics, etc.

Spanish National Center of Biotechnology (CNB)

Microbial Biotechnology. Microbiologists at the CNB aim at gaining knowledge on key aspects of microbial biology with environmental, clinical or biotechnological relevance through approaches that include molecular genetics, genomics, proteomics, metagenomics and synthetic biology. The subjects studied include environmental microbiology, microbial responses to hostile environments, microbial pathogens, microbial engineering, microbial resistance to antibiotics and search for new antimicrobials.

Plant Molecular Genetics. Research in this area aims at elucidating signaling pathways in growth and adaptive responses of plants to environmental changes and pathogenic diseases. Besides the intrinsic fundamental interest in understanding key biological processes in plants, the ultimate goal is to develop new tools and methods to improve crop production and quality. Biotechnological applications such as the use of plants as biopharmaceutical factories or as tools to fight environmental problems arising from spillages and the accumulation of toxic substances are also being studied.

Systems Biology. A more recent focus of research at the CNB is on the application of emerging concepts and tools in the fields of systems biology, evolutionary biology, computational biology and synthetic biology to biologically relevant questions. The biotechnological side of this approach includes novel strategies to re-program bacteria for the efficient production of chemicals, biodegradation of toxic pollutants or as biosensors to monitor the presence of given chemicals. Metagenomics, metatranscriptomics and mathematic modeling techniques are used to evaluate changes in composition, function and activity of bacteria in response to environmental perturbations, as well as to determine the conditions that favor combinations of species for specific tasks in biotechnological, clinical and ecological scenarios.

Institute of Sustainable Agriculture (IAS)

- Development of management systems and technologies that optimize the conservation and efficient use of resources, mainly soil and water. Efficient use of water in irrigated agriculture systems under wáter scarce conditions. Use of models and remote sensing to facilitate sustainable management of agricultural systems.
- Crop breeding for resistance to biotic and abiotic stresses. Promotion of biodiversity in agriculture through conservation and enhancement of plant genetic resources. Development of cultivars with enhanced qualities oriented to the market demand.
- Co-designing cropping systems for improving food security, land and water productivity, soil quality and climate change mitigation in Africa. Analysis of strategies for the adaptation of agriculture systems to future scenarios of climate change. Development of innovative and environmentally friendly strategies for the integrated management of pests, diseases and weeds.

Biomedical and Health Research Institute (IUIBS) at the University of Las Palmas de Gran Canaria (ULPGC)

- Medical image computing for COVID-19 screening and diagnosis. Possible topics include but are not limited to multimodal (eg. Computed Tomography, X-Ray, Ultrasound,…) chest image analysis using artificial intelligence, data annotation for algorithm training, infrared thermal imaging, etc. Computer vision for social-distancing monitoring.
- Construction of digital anatomy atlases for patient information, medical education and therapy planning. Advanced visualization. Use of the digital atlases in remote training and telemedicine applications.

- Affordable image guided therapy (IGT) systems based on point-of-care ultrasound (POCUS). Percutaneous procedures. Deployment of training systems. Virtual surgical simulation for minimally invasive surgery.
- Digital content creation for medical and biomedical engineering remote education and training. Management of remote education technology platforms.

IAC (Instituto de Astrofisica de Canarias)

Research program addresses key problems on:

- very high energy phenomena in the early Universe and around black holes
- the genesis of cosmic and gamma-rays
- the formation and evolution of galaxies
- the life cycles of stars, the physics under strong gravity fields, the physics of magnetic fields in the Sun, and the detection and characterization of Earth-like planets around nearby stars.

PLOCAN (Oceanic Platform of the Canary Islands)

- Acoustics thematic area: "To process, document and prepare acoustic data for noise and bioacoustic measurements" (Matlab or python language very good skills required)

- Ocean sensor thematic area: "To optimise real-time embedded processing algorithm for event detection on an ocean sensor" (very good C language expertise required)

- Ocean data management thematic area: "To develop algorithms in Python for the preparation and formatting of oceanographic data and metadata" (python language skills required)

Basque Center for Applied Mathematics (BCAM)

- **Computational Mathematics (CM):** We analyse modern numerical methods such as advanced Finite Element (AFE) and Finite Volume (FV) techniques applied to stationary and time-dependent problems. In addition, we develop new meshless multi- scale methods such as Smoothed Particle Hydrodynam- ics (SPH) or Dissipative Particle Dynamics (DPD) applied to complex fluids and mesoscopic flow problems.
- **Mathematical Modelling with Multidisciplinary Applications (M3A):** We push the boundaries of mathematics and develop analytical frameworks, multiscale parsimonious models, advanced algorithms and novel measuring techniques to extract invariant patterns hidden within the multi-spatial-temporal scales involved in biological and physical systems. A closed loop between hypothesis testing, HPC, high throughput data and data management, enable quantitative and qualitative knowledge discovery.
- **Mathematical Physics (MP):** We study several questions of classical physics that although long known, are still not understood from the mathematical perspective, microscopic origin of macroscopic laws (like in electricity) and natural phenomena of front motion embedded into random environments. More theoretically, we study the geometry of Singularities appearing in Algebraic Geometry.

- **Analysis of Partial Differential Equations (APDE):** The attempt to efficiently describe real-life phenomena leads to mathematical models, often expressed in terms of PDEs, capturing the essential features of the phenomena. Solving these equations implies the use and development of sophisticated techniques of analysis together with the realisation of numerical simulations to eventually determine the validity of the models.
- **Data Science (DS)**: In the applied statistics field, the main topics of our research are semi-parametric regression, multidimensional smoothing, (Bayesian) hierarchical models, computational statistics... Regarding Machine learning, we work on supervised and unsupervised classification of massive data, probabilistic graphical models, time series, Bayesian optimisation, etc. In optimisation we pursue the developments of efficient metaheuristics methods.
- **Model building and data analysis for COVID:** prediction-evolution models, analysis of RX images, pronostic prediction, traceability analysis.

POLYMAT is a multidisciplinary research center with different research lines that include:

- **Polymer synthesis.** Research groups in this area cover different activities such as organic catalysis, polymer hybrids and robust, efficient and orthogonal synthesis of polymers. They study the most distinctive characteristics of the polymers: the chemical composition distribution (functionality) and the architecture of the polymer chain.
- **Assembly and processing.** Assembly has played a key role in the development of the polymer industry. Thus, high impact polystyrene and semicrystalline polyolefins are based on the assembly of in-situ produced graft copolymers and that of polymer chains by dispersed forces, respectively. Nature shows that more complex interactions (dispersive, polar and charged) can be used to produce hierarchical structures. Biological systems serve as example to extract the basic principles and then develop other materials with functionalities that cannot be achieved otherwise and that are not attainable by the current polymers.
- **Theory and simulations.** Theory and simulations are used to provide understanding of the observed phenomena and to guide the activities in polymer synthesis and assembly. Simulations of polymeric materials and their properties expands over three scale domains, according to the system size to be modeled and to the time scale of the phenomena sought.
- **Energy.** Generation of energy from renewable and CO2-neutral sources is one the greatest 21th Century's challenges. The groups involve in this area work in polymer photovoltaics cells and organic batteries
- **Waterborne dispersed polymers.** The current research topics include Knowledge-based processes for high-performance dispersed polymers, structured nanoparticles and bio and smart materials
- **Tuneable and stimuli responsive membranes.** Within this research area, activities are focused on membranes for gas and vapor separations, stimuli-responsive/biomimicking membranes and membranes in water treatment processes.
- **Polymers for biomedical applications.** This line is focusing on the development of biocompatible and biodegradable polymers from natural resources able to replace synthetic polymers based on non-renewable monomers for biomedical applications such as tissue regeneration, polymer drugs, bio—absorbable materials for vascular stents, polymer carriers for

drug and gene delivery, etc. In addition, this research area also studies the multifunctional polymer-drug conjugates, self-assembling amphiphiles for the controlled delivery of bioactives, new diagnostic technologies as theranostic approaches, and environment-responsive nanogels.

- **Polymer physics.** This research line is devoted to understanding structure, morphology, functionality and properties of semi-crystalline multiphasic polymers**:** Effects of confinement on polymer nucleation, crystallization and morphology, How polymer topology affects crystallization, Melt memory effects on the crystallization of homopolymers and copolymers, etc.

Biodonostia HRI is arranged in 7 subject areas that bring together around 350 researchers in 26 groups.

- **Neuroscience Area**: The research work carried out by the team in the Neurosciences Area aims to find solutions to neurological problems, coordinating their efforts from a translational perspective. The research is approached from different perspectives: basic molecular research, epidemiological research, clinical research, research into new therapeutic and diagnostic procedures, and research into clinical management.
- **Gastrointestinal and Liver Diseases:** mainly focused on gastrointestinal oncology and genetics. More specifically, the Area invests its efforts in the research in colorectal and pancreatic cancer, being the work aimed also at identifying new therapeutic targets for cholangiocarcinoma, hepatocarcinoma and gastric cancer. The genetic predisposition to gastrointestinal diseases is studied in different areas (inflammatory bowel disease, microscopic colitis, irritable bowel syndrome, etc) in conjunction with the analysis of gut microbiota composition.
- **Infectious Diseases:** divided into three main research fields: (i) vaccine preventable diseases, (ii) respiratoy infection and antimicrobial resistance, and (iii) AIDS and HIV infections. This Area is the one is in charge of carrying out all the clinical trials and studies related to SARS CoV-2.
- **Oncology:** The Oncology Research Area works to promote cancer research by developing an integral programme of translational biomedical research. The Area's research comprehensively covers differing and synergistic aspects of translational cancer research: the study of the molecules and genes involved in cancer (Molecular Oncology group); study of the cancer cell (Cellular Oncology group); and improvements to the treatment and management of cancer patients (Breast Cancer group).
- **Systemic Diseases:** The general objective in this area is to involve professionals at the Donostia University Hospital in research studies, and to establish and strengthen existing lines of research. The activities carried out by this Area can be divided into two parts: (i) surgery, with the line of Obstetrics and Gynaecology, and (ii) the line of research into Heart Failure caused by Hypertension.
- **Epidemiology and Public Health:** The research developed is intended to promote epidemiological, clinical and health services research at both community and hospital level, boost translational research, with a view to transferring knowledge to decision making in Public Health, and to the care practice, and incorporate the advances to the modification of the contextual and individual determinants of health. Identify etiological and phenotypic determinants in the appearance and development of pathological processes and conditions and, lastly, to be a reference in quality research in public health and epidemiology.

- **Bioengineering:** It essentially deals with the design and construction of health products and health technologies, such as medical equipment, prostheses, medical devices, and diagnosis and therapy devices. It also intervenes in the management or administration of technical resources associated with a system of hospitals. It combines the experience of engineering with medical needs to obtain benefits in the field of health care. The discipline is currently also linked to other fields such as genomics and proteomics (computational biology).

In addition to these 7 vertical Research Areas, Biodonostia HRI stands out for having 3 transversal areas based on Aging, Personalized Medicine and Innovation, together with 9 Research Platforms (check it at www.biodonostia.org), where quality research is also carried out and focused on the generation of value in health.

Institut de Ciència de Materials de Barcelona, ICMAB (www.icmab.es)
Sustainable Energy Conversion and Storage System. Developing experimental and theoretical tools to increase our understanding on energy materials, replacing critical materials to boost sustainability, developing conversion and storage technologies.

Superconducting Materials for Emerging Technologies. Developing superconducting tapes or Coated Conductors, which are a unique opportunity to enhance the efficiency and reduce environmental impact in electricity transport, distribution, generation and use.

Oxides for New Generation Electronics. Transition metal oxides are considered to be the building blocks for efficient and energy friendly, data storage, advanced computing and energy harvesting devices.

Tuneable and Low Cost Molecular Electronics. The use of molecules in electronic devices is arousing enormous interest due to their unique advantages for designing tailored functional materials, compatibility with low-cost production processes, biocompatibility and biodegradability.

Bioactive Materials for Therapy and Diagnosis. These materials are developed based on the gathered long-term experience in modeling, obtaining, processing and performing in-vitro studies of nanostructured biomaterials of ICMAB researchers.

INCLIVA is organized around four priority areas of research:

- Oncology: INCLIVA is an international leader in the field of oncology and hematology, with eleven research groups and more than 125 researchers, coordinated by Dr. Andrés Cervantes. The main research lines focus on cancer cell biology, genetic analysis of tumors and development of precision medicine through experimental therapies. INCLIVA belongs to the WIN Consortium "Worldwide Innovative Networking (WIN) Consortium in personalized cancer medicine" and in 2015 the Oncology team had more than 215 clinical trials active. The Pediatric Solid Tumors Translational Research Group is included in this area at Laboratoy of Molecular Pathology, Medical School.

- Cardiovascular diseases: eleven research groups and 120 researchers, coordinated by Dr. Francisco Javier Chorro. The main areas of research focus on experimental cardiac electrophysiology, cardiometabolic and renal risk, diagnosis and treatment of primary hyperlipidemia, diabetes and inflammation. Studies focus on the development of experimental therapies and early diagnosis combining genetic, epigenetic, metabolomics or image analysis techniques. In 2015 the cardiovascular diseases area had 47 clinical trials active.
- Healthy ageing: addresses aging at physical and neurological level, led by Dr. Jose Viña. The research focuses on the influence of oxidative stress and free radicals in aging and neurological deterioration, identification of biomarkers and genetic and epigenetic determinants and in the molecular study of the protective role of physical exercise. In this context it is worth to remark that INCLIVA is one of the founding members of the Spanish group for the study of centenarians.
- Reproductive medicine: INCLIVA is also a part of the Valencia Infertility Institute, IVI, coordinated by Dr. Carlos Simon. The research developed at IVI focuses on two lines of action. Firstly the study of biological functions in the human endometrium, the analysis and development of diagnostic techniques to determine the right time of endometrial reception using genomics. And a second focused on male infertility, particularly in the treatment of azoospermia and seminal breathing.

7. Decision

The jury's final decision, which shall be dictated by the strictest criteria of meticulousness and transparency, will be published by November 20, 2021
Successful candidates are expected to start their research projects at the assigned host institutions not earlier than January 2021, provided that health measures and border restrictions allow so.

8. Successful applicants' commitments

The beneficiaries of the visiting research fellowships agree to respect and comply with the internal academic and legal regulations of the host research centre. The award of fellowships does not generate any statutory or labour relation with FMxA, and candidates commit themselves to return to their places of origin in Africa once they have finalized their research stay.

9. Monitoring of the project
Fellowship recipients are obliged to submit within 2 months after finalization of their research stay to the Women for Africa Foundation a final report containing the results of their research projects as well as propositions to deepen collaboration between the host center and the one of origin.

10. Results and dissemination of the research projects

The Intellectual and Industrial Property (IP) generated by the Beneficiaries throughout the term of the stay at the Host Entity will be regulated by the same terms and conditions which apply to the IP generated by the research personnel of the Host entity.

Submission of applications implies that the fellowship recipients grant to FMxA and the host center, in consideration of the benefits set forth in Section 3, the right to publish and disseminate the results of the chosen research projects in all forms (including, but not limited in form of working papers, electronic documents and books) and in all territories, with no detriment to the publications in scientific journals chosen by the researchers, which should in any case mention the support received by FMxA and the collaborating research centre.