ASSOCIAÇÃO BIOPOLIS

Annual Activity Report

2021

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SUMMARY

This document provides the Activity Report of the BIOPOLIS Association for 2021 as the managing institution of CIBIO - Research Centre in Biodiversity and Genetic Resource in the key components of BIOPOLIS/CIBIO operation, including Scientific Activities and Achievements, Education &Training, Building and Facilities; Knowledge, Technology Transfer & Services, Communication & Dissemination, Fundraising, and Sustainability and Social Responsibility.

A brief overview of the activities performed by the BIOPOLIS Installation Committee conducting to the establishment of BIOPOLIS Association since the project official start in the 1st of October 2019 is also presented.

BIOPOLIS AT A GLANCE

The Association BIOPOLIS (hereafter referred to as BIOPOLIS) is a scientific and technical, independent, non-profit association governed by private law, constituted on July 31, 2020, within the scope of the BIOPOLIS – Teaming to Upgrade to Excellence in Environmental Biology, Ecosystem Research and AgroBiodiversity project, which was submitted to the H2020-Widespread-Teaming program and approved by the European Commission on April 2, 2019. The overarching goal of the Teaming project, which is pursued by the Association BIOPOLIS, is to upgrade the research unit CIBIO - Research Centre in Biodiversity and Genetic Resources, to a Centre of Excellence (CoE) for R&D&I in Environmental Biology, Ecosystem Research and AgroBiodiversity, through a Teaming with the University of Montpellier (UM), a partner from an advanced performing Member Country (France), and with the participation of a business partner, the Porto Business School (PBS) of the University of Porto (Portugal).

The Promoter Founding Associates are the University of Porto and the three partner institutions of the project, ICETA (Instituto of Sciences, Technologies and Agroenvironment of the University of Porto), UM and PBS. Other founding and ordinary members of the Association are being recruited and will include business corporations, research funding agencies and organizations, bodies from the public administration, non-governmental organizations, and other institutions representative of stakeholders sharing the research and innovation objectives of BIOPOLIS, or that are end-users of such research and innovation.

The object of BIOPOLIS is the development of scientific and technological activities in the fields of biodiversity, ecosystems, ecology, genomics, computational biology, bioinformatics, environmental monitoring and others for which the Association will consider itself dedicated, as well as the as advanced training of human resources, knowledge transfer, communication and dissemination, and the provision of services in its areas of intervention.

Vision and Mission

To accomplish this goal, BIOPOLIS assumed as its Vision

To firmly establish BIOPOLIS as one of the best international Centres of Excellence in Environmental Biology,Ecosystem Research and AgroBiodiversity, with the capacity for spreading excellence towards innovation in the areas of Environment, Biodiversity and Agriculture, and thereby contributing to socioeconomic development at the regional and national levels.

To achieve this Vision, the partners produced the Mission of BIOPOLIS, which defines its broad goals, its research and innovation focus, and a commitment to knowledge transfer and to address pressing societal challenges.

To advance biological understanding from genes to ecosystems, and to use this knowledge to address pressing societal challenges in the areas of environment, biodiversity and agriculture through the development of world-leading research, the establishment of long-term strategic partnerships, the engagement of stakeholders, and the transfer and exploitation of research outputs.

THE FOUNDING YEAR OF 2021

Following its formal creation in 2020, BIOPOLIS had its first full operational year in 2021. During this year, the Association underwent major transformative changes, setting up the main governing bodies, building its initial administration, technical and research staff, starting to implement the daily management activities of the organisation, and assuming the development of a large portfolio of research projects and other activities that had been previously managed by ICETA. In practice, 2021 was the founding year of BIOPOLIS.

A key step in the inception of BIOPOLIS involved the progressive transference of its management from the IC, to a full operational BoD. The IC was established on October 1, 2019, and developed all the activities required to create the Association, establish its statutory bodies and its by-laws, and recruit the Board of Directors (BoD) through international, independent calls. Following the selection process conducted by the IC together with external expert panels, the members of the BoD were formally designated on the first meetings of the General Assembly and the Supervisory Board, which took place on November 26, 2020. The IC then contributed to ensure the coordination of daily management activities of BIOPOLIS, in articulation with the Supervisory Board, while the members of the BoD progressively took office throughout 2021. With all its tasks concluded, and all the duties and responsibilities successfully handed over to the statutory bodies of BIOPOLIS, the IC had its final meeting on July 29, 2021.

Another milestone of the activities of BIOPOLIS was the transference of all the assets and liabilities of CIBIO, as well as most of its human resources, from its former hosting institution, ICETA, to BIOPOLIS. The process was started by the IC in 2020, and concluded with the signing of the Unit Transmission Agreement on December 17, 2021, by the BoD of ICETA and BIOPOLIS. This was a lengthy and complex process, which involved laborious negotiations with ICETA, but also with the agencies (FCT, European Commission, CCDRN) that funded the research projects and human resources of CIBIO, which had to be transferred to BIOPOLIS. In the end, this process was conducted successfully, leading in 2021 to the transference to Association BIOPOLIS of 24 administration and technical staff, 129 research staff, 80 research projects and other contracts, and a provisional amount of 53 M€.

Alongside these major tasks, BIOPOLIS started the implementation of the Teaming

project, and strived to obtain the complementary funding committed to the project by CCDRN. These have been challenging processes, due to a large extent to the direct and indirect consequences of the COVID pandemic, which effects started to be felt in March 2020, and were pervasive throughout the rest of 2020 and most of 2021. Because of the pandemic, strict health and safety rules had to be enforced at BIOPOLIS facilities of Campus de Vairão, including periods when the facilities had to be closed or the access severely restricted due to national lockdown rules, and other periods when the number of people working in person had to be severely reduced, and the labs were working well below their capacity. The pandemic also hindered or otherwise delayed many of the tasks and administrative procedures, including the selection of the Board of Directors, the creation of the Association and the establishment of its statutory bodies, the negotiation with the funding agencies regarding the procedures for transferring the activity of CIBIO from ICETA to BIOPOLIS, among many other issues. Moreover, there were major delays in the attribution of the complementary funding by CCDRN, and the economic crisis associated with the pandemic made it more difficult to establish new Invited Chairs and Programmes funded by private partners.

These difficulties and delays were discussed with the Project Officer and two external evaluators during the review meeting of the Teaming project that was made on March 30, 2021. As a consequence, a programme was defined to recover the delays and overcome the pending issues, which was implemented in the next several months. In a new review meeting made in October 14, 2021, the PO and the external evaluators recognised the major advances achieved, with particular relevance for the award of the complementary funding by CCDRN, and the submission of most of the pending deliverables due until that date. It was recognised, however, that many of the problems in the implementation of the project were due to external factors and thus beyond the control of BIOPOLIS, and so an one-year extension to the implementation of the Teaming project requested by the BoD was considered positively by the panel. As a consequence, an amendment to the Grant Agreement was launched, involving a re-scheduling of the projects tasks, including the timeline of the deliveries and milestones. The exact changes to be introduced required a lengthy work with the project officer and the financial services of the commission, and so the amendment will only be concluded and ready for signing in the first half of 2022.

GOVERNANCE

Installation Committee

The BIOPOLIS Installation Committee was composed by: Paulo Azevedo, Chairman of the IC and President of the Board of SONAE; Pedro Rodrigues, Vice-Rector for Research, Innovation and Internationalization of the University of Porto; Pedro Beja, Member of the Board of ICETA and Vice-Director of CIBIO; Patrícia Teixeira Lopes, Associate Dean of Porto Business School, Pierre Boursot, Research Director at the Institut des Sciences de l'Évolution Montpellier (ISEM) at the University of Montpellier. Until the end of its activity in July 2021, the IC ensured the coordination of BIOPOLIS activities, with support from administrative staff from the partner institutions, and progressively also by the staff transferred to BIOPOLIS.

Board of Directors

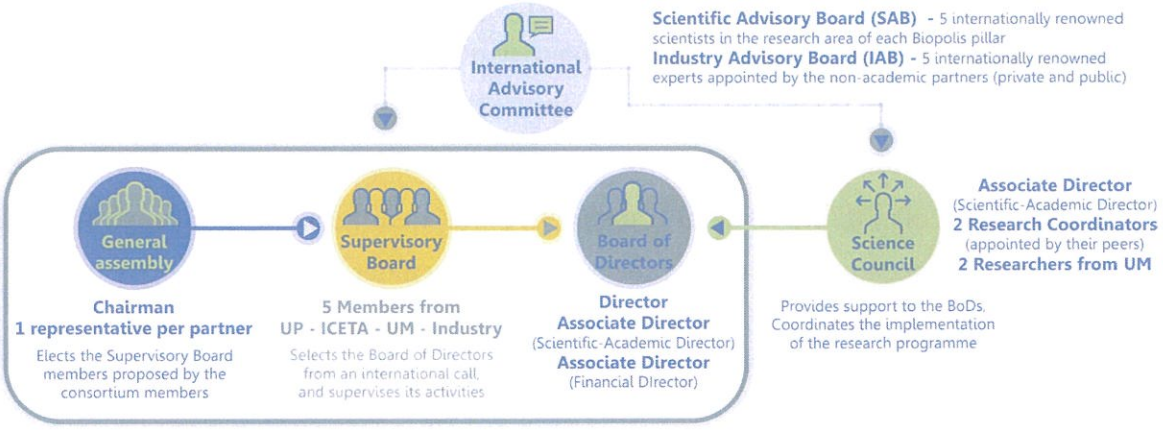
Following the selection process by the IC, and the formal designation by the General Assembly and the Supervisory Board, the Board of Directors of BIOPOLIS was composed in 2021 by: Nuno Ferrand de Almeida (Director), Cláudia Ribeiro (Associate Director for Administration and Finances), and Gabriel Marais (Associate Director for Research & Innovation). Following the scrutiny of initial activities of BIOPOLIS in meetings that took place on August 5, 2021, the Supervisory Board and the General Assembly decided to designate a fourth member of the BoD, with Pedro Beja taking the functions of Associate Director for Operations, Fundraising and Knowledge Transfer.

Supervisory Board

The Supervisory Board was composed in 2021 by representatives of the four Promoter Founding Associates of BIOPOLIS: Luís Filipe Reis (chairman), from Porto Business School, Pedro Rodrigues, from University of Porto, Patrick Caron, from University of Montpellier, and Baltazar de Castro, from ICETA. The three additional members that are needed to complete the SB according to the by-laws will be designated in 2022, once additional associates are admitted to BIOPOLIS.

General Assembly

The General Assembly of Association BIOPOLIS was composed in 2021 by the four Promoter Founding Associates: the University of Porto, represented by its Rector, Prof. António de Sousa Pereira (President of the General Assembly); the University of Montpellier, represented by Prof. Patrick Caron; ICETA – Instituto de Ciências, Tecnologias e Agroambiente, represented by its President, Prof. Baltazar de Castro and Associação Porto Business School (PBS) – U. Porto, represented by the Chairman of its Supervisory Board, Dr. Luís Filipe Reis.



Scheme of the Governance Model of BIOPOLIS CoE.

TRANSFERENCE OF CIBIO FROM ICETA TO BIOPOLIS

The transference of CIBIO activity from ICETA to BIOPOLIS started in 2020, under the coordination of the IC. The process started by a detailed identification of CIBIO´s staff, assets and liabilities, as well as all contractual obligations, that needed to be transferred. This task transcended the competences of the consortium members, requiring specific knowledge and expertise. In this regard, in order to guarantee that a certified process was being followed, an independent consultancy company, Crowe, was hired for this assessment. As part of this work, a full inventory of all equipment of CIBIO was carried out. This resulted in the preparation of a protocol between ICETA and BIOPOLIS to establish the conditions of transference of all assets and liabilities of CIBIO, which was signed on April 30, 2021. The final transference was then formalized through the Unit Transmission Agreement, signed by the parties on December 17, 2021.

Transference of Projects and Contracts

Around 78 projects of CIBIO running at ICETA were identified (funded by: Portuguese Foundation for Science and Technology (FCT); Norte Portugal Regional Coordination and Development Commission (CCDR-N); European Commission (EC), among others). Sixty-three of these projects were identified as transferable, while it was decided to close the remaining 15 at ICETA, due to the short closing date or small remaining budget to be executed. For the projects to be transferred, it was prepared the necessary documentation, including budget revisions, to proceed with the transference process. The characteristics and timeline of project's transference to BIOPOLIS are provided in the Table below.

01/07/2021	01/08/2021	01/10/2021	01/11/2021	01/12/2021
FCT - research unit funding • FUI Base 2020-2023 • FUI Programatic 2020-2023 **CCDR-N funding:** • BIOPOLIS (TEAMING – phase II) • TROPIBIO **EC funding:** • BIOPOLIS (TEAMING– phase II) *TBC*	**FCT – individual projects** • IC&DT2020 (CIBIO as proponent): 8 projects	**FCT – individual projects** • IC&DT2020 (CIBIO as participant): 3 projects • IC&DT2017 (CIBIO as proponent): 8 projects **FCT – scientific employment programs** • Institutional CEEC 2018: 2 contractual programs • Individual CEEC: 3 contractual programs (1st, 2nd, and 3rd editions) • Norma transitória DL57: 2 contractual programs	**FCT – individual projects** • IC&DT2017 (CIBIO as proponent and only participant): 17 projects **EC funding** • H2020: 6 projects • COST: 1 project • ERC : 1 grant **Applied Research | Protocols | Services** • 17 contracts	**FCT – individual projects** • IC&DT2017 (CIBIO as proponent and finishing after June 2022): 7 projects

The FCT funding of the research center/unit was transferred on July 1, 2021. Due to the several specificities of the other FCT funded projects, their transference proceeded in three phases. Phase 1 involved 8 projects approved in 2020 with little execution in ICETA and funded entirely by the State Budget; the process was submitted to FCT on July 20, 2021, the transference had effect on August 1, 2021. Phase 2 involved 3 projects approved in 2020 and another 8 projects approved in 2017 and funded entirely by State budget; the process was submitted to FCT on October 1, 2021, and the transference was effective on the same date. Phase 3, involved 17 projects approved in 2017, funded by different European Regional Development Funds; the process is pending approval and will have effect on November 1, 2021. Phase 4, involved 7 projects approved in 2017, also funded by different European Regional Development Funds; the process is pending approval and will have effect on December 1, 2021.

The transference also involved two major projects funded by CCDRN, which are detailed in the section on Fundraising. Briefly, one of the projects referred to the complementary funding to the Teaming project (NORTE-01-0246-FEDER-000063,) submitted by ICETA in 2020, but for which the Acceptance Term was already signed with BIOPOLIS on June 23, 2021. The second project refers to the complementary funding to the ERA Chair TROPIBIO (NORTE-01-0145-FEDER-000046) which was also submitted by ICETA on behalf of BIOPOLIS, and approved by CCDRN in 2020. The transference process was submitted on June 29, 2021, and approved by CCDRN on July 28, 2021.

As for the European projects, CIBIO coordinates four projects that were requested to be transferred from ICETA to BIOPOLIS, including the Teaming BIOPOLIS (GA nº 857251),

the ERA Chair TROPIBIO (GA nº 854248), the ERC Cooperative Partner (GA nº 866489) and the Grant Evocolorisla (GA nº 101038059). These Amendment processes were launched at the Participant Portal and are concluded together with the respective Project Officers, except form the BIOPOLIS which is under signatures. Transfer date requested for BIOPOLIS was the 1st of July 2021, and for the other three was the 1st of November 2021.

In addition, CIBIO participates in another four European projects: URBiNAT (GA nº 776783), EuropaBON (GA nº 101003553), FutureMARES (GA nº 869300) and eLTER PLUS (GA nº 66899). The amendments for the transference of these projects were closed for all but the eLTER PLUS which is pending from a meeting between all the partners. The requested transfer date for the four projects was the November 1, 2021.

It is worth mentioning that recently obtained funds, including the EYESPOT ERC (GA nº101000504), have been directly contracted with Associação BIOPOLIS. Likewise, the contract of the Associate Laboratory funding, as well as the FCT most recently obtained Project Grants in all Scientific Domains (4 projects) and the Exploratory Research Projects in all Scientific Domains (6 projects) are being directly contracted with BIOPOLIS.

In addition, CIBIO has currently 21 services provision protocols running. These include consultancy and services provision by the Centre for Molecular Analysis (CTM) and the Applied Ecology Services (GEPE). From these 6 will be ended at ICETA (due to the close deadlines), and 15 are already transferred.

Transference of Human Resources

Regarding the human resources, the transference also occurred during 2021, involving direct negotiations with the funding agencies and with each member of the administration, technical and research staff. The transference of contracts was supported by a Law Firm (PRA), to assure compliance with all labour laws and regulations. The staff transferred maintained all the conditions that had at ICETA. Altogether, the contracts of 153 people were transferred from ICETA to BIOPOLIS, as summarised in the Table below.

Type	Funding	01/07/2021	01/08/2021	01/10/2021	01/11/2021	01/11/2021	Total
Work contracts	FCT	7	2	67	9	3	88
	EC	-	-	-	11	-	11
	CCDRN	18	-	-	-	-	18
	Other	13	-	-	-	-	13
Fellowships	FCT	7	-	1	1	1	10
	EC	-	-	-	2	-	2
	Other	-	-	-	11	-	11
TOTAL		45	2	68	34	4	153

Transference of other duties and obligations

The transference of the technical and scientific equipment maintenance contracts (including copy machines and printers, sequencers, ...), waste treatment contract, proprietorship contracts of cars, boat and trailer, house rents contracts, services contracts (including telecommunications, electricity, water, garden, security) was concluded by November 1, 2021.

More recently, the University of Porto Social Action Services, the entity responsible for the food facilities across the University campuses proceed with the identification of the equipment and material of the campus de Vairão cafeteria to elaborate the transfer agreement of these assets from University of Porto to Associação BIOPOLIS. Once the transfer agreement is signed and BIOPOLIS is the legal possessor of the cafeteria, a public procedure will be launched to call for tenders, and re-open the cafeteria, closed since the beginning of the pandemics.

SCIENTIFIC ACTIVITIES AND ACHIEVEMENTS

Highlights

BIOPOLIS´ researchers have made significant contributions in different research fields including finding the gene responsible for creating sexual dichromatism in birds. Sexual dichromatism, a difference in coloration between males and females, may be due to sexual selection for ornamentation and mate choice. Miguel Carneiro showed that carotenoid-based dichromatism in mosaic canaries, a hybrid phenotype that arises in offspring of the sexually dichromatic red siskin and monochromatic canaries, is controlled by the gene that encodes the carotenoid-cleaving enzyme β-carotene oxygenase 2 (BCO2). Dichromatism in mosaic canaries is explained by differential carotenoid degradation in the integument, rather than sex-specific variation in physiological functions such as pigment uptake or transport. Transcriptome analyses suggest that carotenoid degradation in the integument might be a common mechanism contributing to sexual dichromatism across finches. These results suggest that differences in ornamental coloration between sexes can evolve through simple molecular mechanisms controlled by genes of major effect. This paper made the cover of the Science Magazine. Miguel Carneiro research group has also first describe a gene involved with eye pigmentation in birds and presented evidence for a developmental link between the iris of birds and the skin of ectothermic vertebrate.

BIOPOLIS´ researchers also proposed the application of a farming systems approach as a cost-effective tool for linking policy design and expected biodiversity and ecosystem services outcomes, using the European Agricultural Policy as an example. This approach will collect information that can help to support applied ecological research and relevant policy, and call for these data to be made available across Europe and elsewhere. This work made the central cover photo of the journal Frontiers in Ecology and the Environment.

In another study, published in Nature Plants and carried out by an international team, led by Ana Assunção and other BIOPOLIS researchers, it was found the first molecular Zn sensor identified in plants, and the first known plant micronutrient sensor that functions upstream of a transcriptional regulatory network. This finding may help the development

of crops that are better adapted to Zn-deficient soils and that produce seeds with improved zinc nutritional value.

Luis P. da Silva was one of the co-authors of the study "Limited potential for bird migration to disperse plants to cooler latitudes" published in the journal Nature. The new study, with the participation of 18 researchers from 13 European institutions, has concluded that the majority of plant species in Europe that are dispersed by migratory birds do so mainly when they migrate towards warmer latitudes in the south, which is counterproductive to adapt to current climate change scenarios.

Networking

BIOPOLIS team members have been approaching entities from the R&D&I landscape of Portugal and abroad, organizing and participating in several meetings as well as cross-visits to present the BIOPOLIS and evaluate common interests and future research activities. These included visits and a meetings with the President of ICNF - National Institute of Forest and Nature Conservation, Nuno Banza, and the Alentejo Regional Director, Olga Martins; with the president of INIAV- National Institute for Agrarian and Veterinary Research, Nuno Canada; with the President of the International Iberian Nanotechnology Laboratory, Lars Montelius, among others. These meetings with Portuguese R&D centres have strongly contributed to the BIOPOLIS Strategic Research Plan.

BIOPOLIS has also developed an intense networking activity at the international level, involving contacts, and the preparation and implementation of collaborative projects with a range of institutions in Europe and elsewhere. In this respect, it is noteworthy the participation of CIBIO/BIOPOLIS in a number of International and European research networks and infrastructures. These include the national representation in LifeWatch, the participation in other ERIC and ESFRI such as DISSCO (https://www.dissco.eu) and eLTER ESFRI (https://www.lter-europe.net/elter-esfri), and the involvement in intergovernmental organizations such as IPBES (https://ipbes.net) and GBIF (https://www.gbif.org). More recently, BIOPOLIS has consolidated or expanded the engagement in other international organisations and networks, such as the Air Centre - Atlantic International Research Centre (https://www.aircentre.org/about-us/),

EMPHASIS (https://emphasis.plant-phenotyping.eu), ERGA – European Reference Genome Atlas, (https://www.erga-biodiversity.eu/) and BIOSCAN Europe (https://www.bioscaneurope.org/), among others.

Collaborative Research and Capacity Building in Africa

BIOPOLIS has maintained and continues to expand the previous efforts of CIBIO to consolidate and expand collaborative research in Africa, namely through the implementation of the innovative concept of TwinLab (https://cibio.up.pt/twinlabs-unesco). TwinLabs are designed to formalize partnerships for research, advanced training and capacity building with institutions from Angola, Mozambique, Cape Verde, Namibia, Zimbabwe and South Africa, which among other achievements has resulted in the awarding to InBIO of the UNESCO Chair Life on Land (https://cibio.up.pt/media-clippings/details/unesco-chair-life-on-land-awarded-to-university-of-porto). Recent advances have involved the development of the existing TwinLab network, and through the establishment of new TwinLabs, including a second TwinLab in Angola (at Universidade 11 de Novembro, Cabinda) and in Botswana (at University of Botswana). Recently, BIOPOLIS contributed for the adaptation of the Molecular Biology Laboratories of UNAM (Namibia) and Mandume Ya Ndemufayo University (Angola) to carry out screening tests; with the shipment of scientific equipment including RT-PCRs, personal protection equipment, laboratory consumables and reagents (https://cibio.up.pt/en/media/cibio-inbio-contributes-to-the-fight-against-covid-19-in-angola/).

Besides, BIOPOLIS is a partner in Centro Ciência LP20, which is the outcome of an agreement sealed between the Portuguese State and UNESCO, that establishes the "International Centre for Advanced Training of Scientists from Portuguese Speaking Countries in Basic Sciences, as a category 2 centre, under the auspices of UNESCO", in Lisbon. BIOPOLIS contributes with its considerable experience of work in Portuguese-speaking countries, namely through the robust network of TwinLabs. In addition, BIOPOLIS is developing for submission during 2022 the application aiming the upgrade of UNESCO Chair Life on Land to a UNESCO Category 2 Center.

BIOPOLIS is also developing a set of joint processes related to the area of biology conservation, in collaboration with several Angolan institutions, thereby contributing to capacity building. Among these processes, a broad scheme of collaboration between BIOPOLIS and three of the main museums in Angola (Lubango, Luanda and Dundo) is worth mentioning. Research collaboration, conservation and restoration, training, and scientific publications and catalogues are among the activities to be jointly developed in the coming years. In parallel, it is under discussion the possibility of, together with the Geology Museum of the Faculty of Sciences of the University Agostinho Neto, organizing an international exhibition on Angola's dinosaurs, such as the event still held at the Smithsonian, as well as collaboration at the training level, and the organization of a broad MSC scheme on museology in Angola. In addition, the director of the National Museum of Natural History, in Luanda Belmira Gumbe, expressed her interest in research collaboration and joint activities with Associação BIOPOLIS. She also arranged the meeting with the Angolan Minister of Culture, who agreed with a broader collaboration between Associação BIOPOLIS and the three main museums in Angola: Lubango, Luanda and Dundo.

EDUCATION AND TRAINING

The BIODIV Doctoral Programme

The doctoral Program in Biodiversity, Genetics & Evolution (BIODIV) is one of the cornerstones of BIOPOLIS education and training strategy. BIODIV is organized by the two largest Portuguese universities – the University of Porto (UP) and the University of Lisbon (UL), in partnership with CIBIO/BIOPOLIS and the Centre for Ecology, Evolution and Environmental Changes (cE3c). BIODV PhD Programme is certified by A3ES "Agência de Avaliação e Acreditação do Ensino Superior" (Agency for Assessment and Accreditation of Higher Education) and provides a solid scientific background in the fields of biodiversity, evolutionary biology and genetics. As an important part of curricular training, doctoral students attend advanced courses at both CIBIO/BIOPOLIS and cE3c.

This successful programme has been enrolling a large number of students since its creation, and there has been a continuous flow of thesis produced. During the 2019-20 academic year, 15 new students were registered in BIODIV, totalizing 109 students, 25% from foreign countries, Brazil , Ecuador , Italy , Iran , Peru, Spain, Namibia, The Netherlands, UK, Costa Rica, Germany, Turkey, USA, Colombia, Mozambique, Nepal. In 2020, 13 students concluded the thesis and finish the PhD, 4 students from UL and 9 from UP. During the 2020-21 academic year, 29 new students were registered in BIODIV. In 2021 8 students concluded the thesis and finish the PhD, while 6 other students already delivered the thesis and are waiting for the public defense to conclude their PhD.

The vast majority of students have been carrying out their theses in collaboration with international research centers and Universities. Moreover, more than 15 PhD thesis are taking place in African countries, namely in the TwinLab network within the scope of the UNESCO Chair "Life on Land". Some of the PhD thesis focus on important issues for planning biodiversity conservation in Portuguese speaking countries, and are articulated with local authorities. Also, many of the PhD thesis developed in Portugal address important issues of conservation, management, sustainability and ecosystem services, thus making an important contribution to various policies considered central to the development of Portugal and Europe.

At present there is an on-going process for renewing the accreditation of the cycle of studies. The renewal process began in 2020 with the completion and submission of the required forms to the accreditation agency (A3ES), and will be concluded during 2022 after the visit by an evaluation panel. In this context, a draft regulation for the doctoral programme was prepared, defining the management entities, structure and mode of operation of the doctoral programme. It was also proposed to adjust the curricular plan to the current norms of the 3rd cycle of studies, as well as to enable students to have a possibility and greater freedom to adapt the academic part to the scientific component they intend to develop in their doctoral thesis. Accordingly, it was proposed to increase the connectivity of the doctoral students across the various CIBIO/BIOPOLIS and cE3c research groups (for example, through internships in the different groups), as well as to allow practical (laboratory, field) or theoretical work (data analysis) to be carried out to enhance an adequate preparation of their doctoral project. Students may thus choose to acquire or deepen knowledge in certain areas and/or develop practical or theoretical work necessary for their doctoral work.

Transnational Master Course in Biodiversity, Genetics and Conservation

A new Transnational Master Course in Biodiversity, Genetics and Conservation started to be organised and its implementation is expected to start in 2022. This is an advanced training programme, in Association, double degree, expected to be applied in the TwinLabs of Angola and Namibia, and that will be included in the Education and Training programme of BIOPOLIS. The academic degrees will be conferred by the University of Porto and the University Mandume Ya Ndemufayo (Angola), and by the University of Porto and the University of Namibia (Namibia). The programme fits into the scientific area of the Biological Sciences, with special emphasis on the area of biodiversity conservation, and is organized in a way that allows students to acquire a solid background in the area of biodiversity research and its importance in the context of preserving the natural environment and of the sustainable development. It intends to promote and enhance the use of analytic tools and methodologies to answer more specific questions related to the complexity of biological processes, and the management and conservation of biodiversity. This training programme will provide students with the development of a solid professional career not only in academia, but also in industry or entrepreneurial sectors, thus contributing to the country's scientific, technological, social and cultural progress. In

Namibia, the Master Course will be taught in English; in Angola, due to some difficulties with the English language, the Course will be taught in Portuguese Language.

The first phases of the Masters' application were approved during 2020 at University of Porto and University Mandume Ya Ndemufayo (Pedagogical and Scientific Boards and institutional national authorizations), and the Accreditation processes, both in Portugal and Angola, are in its final stages. Regarding Namibia, the process is still ongoing, in a slightly less advanced stage, due to the reformulation of some logistical issues; in any case, no difficulties are expected in its implementation.

New PhD Grants for Lusophone African Countries

CIBIO/BIOPOLIS has concluded the negotiations with the Portuguese funding agency FCT (Foundation for Science and Technology) to guarante a regular annual flow of 20 PhD grants, for students from Portuguese-speaking African countries (PALOP), namely those from institutions integrating the Network of TwinLabs of CIBIO in Africa, via the Consortium of Biodiversity and Natural Sciences Schools (institutional programme, supported by the Portuguese Ministry of Science, Technology and Higher Education, for the sustainable and continuous development of R&D activities in PALOP). The call was launched in August and closed in September 30, 2021. The selection process is being conducted. A similar mechanism for other SADC and Western Africa countries (integrating the TwinLabs Network, as the case of Namibia) is under negotiation.

BUILDING & FACILITIES

BIOPOLIS is established at Campus de Vairão, Vila do Conde, where the headquarters of CIBIO are located. The Campus was owned by UP, which conceded access to the facilities and equipment available through a protocol developed by the BIOPOLIS Installation Committee and signed on the 28th of October 2020. This document defines the terms and rights of concession of UP properties, at Campus de Vairão, to the BIOPOLIS Association.

In this context, a full inventory of equipment to be transferred from ICETA to BIOPOLIS was conducted. In addition the Committees responsible for implementing the BIOPOLIS Infrastructures and Equipment Plan were established.

The Infrastructures and Equipment Committee (IEC) includes two technicians and three researchers. At present, the IEC is composed of the following BIOPOLIS researchers and technicians:

- Paulo Célio Alves, Researcher (Chair);
- Rita Araújo (Executive coordinator)
- Fernando Lima, Researcher;
- Sara João, Technician
- Diana Castro, Technician

The Information Technology (IT) Committee includes the IT Officer(s) and senior researchers with expertise in bioinformatics and computational biology. The IT Committee will deal with all the aspects of the computational infrastructure.
At present, the IT Committee is composed of the following researchers and technicians:

- António Múrias, Researcher
- Luís Fonseca, IT Expert
- Albano Beja Pereira, Researcher;

In this context it is important to mention that through the Portuguese E-Infrastructure for Information and Research on Biodiversity – PORBIOTA, scientific and technical instruments and equipment were acquired enabling the implementation for a monitoring system to assess status and trends of genetic diversity, species, ecosystems and

environmental quality, which includes fieldwork equipment, and DNA sequencing portable system. Constructive adaptation was also completed to allow a Datacenter infrastructure for implementation of the computational cluster (with network switches, servers and standalone database servers) for data models, transformation, integration and interoperability data.

Rehabilitation of facilities at Campus de Vairão

The focus of BIOPOLIS activity regarding the upgrade of infrastructures was concentrated on the preparation of the technical plans (Topographic surveys; Architectural surveys; Inspection and Diagnosis Report; Diagnostic Study and Intervention Methodology, and Previous study) for the interventions required to rehabilitate Quinta do Crasto and associated buildings, and to prepare a funding proposal to be submitted to CCDRN (see section on fundraising). These interventions are crucial for the development of the physical conditions that will: i) attract and maintain in the campus a continuous presence of the multiple corporations with whom CIBIO has been engaged with and that expressed the will to collaborate with BIOPOLIS, mainly through the Invited Chairs programme; ii) to promote the development of demonstration actions and proof of concept activities with these business companies; iii) promoting in this way the transference of scientific and technological knowledge, by developing targeted and streamlined demonstration and pilot projects, sectoral action of experimentation and seed projects; and iv) to establish at Campus de Vairão an interaction hub with external stakeholders, which will be pivotal for the success of the Affiliates Programme (see section on Knowledge Transfer). This application was submitted in due course and its final approval was received on April 8, 2022.

The rehabilitation program to be implemented in 2022/23 will mostly consist of demonstration labs, offices and complementary work spaces, such as meeting rooms, training rooms, open space work zones, as well as other complementary areas including prototypes exhibition areas. The interventions will also be targeted at upgrading of the experimental laboratories, and for the accommodation of the upgraded research platforms including the Animal Platform, Ecology Platform, Environmental and Ancient Genomics Platform, Omics Platform, Plant and microbiology platform, among others. The interventions will also correct a range of diagnosed construction problems, improving the

level of comfort, focusing on finishes, networks and electrical systems. All networks and electrical systems will be replaced - in order to support the installation of the instruments and equipment of the different platforms - with the necessary modernization of buildings expected with regard to electrical/telecommunications installations, ventilation, heating and cooling, etc. The interventions will also include a rehabilitation of the surrounding outdoor spaces in order to implement a landscape intervention aimed at increasing the ecological and sensory diversity of the place, while preserving some of their original rural matrix.

Biological Station of Mértola

Considerable efforts of BIOPOLIS have been devoted by BIOPOLIS to establish the Biological Station of Mértola, including the establishment of the facilities where it will operate. In this scope, a funding of 2M€ from CCDR-Alentejo has already been obtained, which will be used to support the rehabilitation of the facilities of the former EPAC garners and warehouses. These will serve as the Station headquarters, and they will support municipalities and other public authorities in the management and sustainable use of natural resources, and to increase local scientific capacities and knowledge. BIOPOLIS will continue to pursue similar initiatives in other regions of the country.

KNOWLEDGE, TECHNOLOGY TRANSFER AND SERVICES

CIBIO/BIOPOLIS and SONAE established a collaboration agreement leading to the design and implementation of Sonae's Strategy for Nature and Biodiversity, a partnership based on the knowledge and expertise of CIBIO/BIOPOLIS and which materializes through the training of SONAE teams and the transfer of scientific knowledge in the area of nature and biodiversity to the corporate context, namely: in the selection and adaptation of the methodologies for assessing the impact of business activity in the ecosystem; supporting the establishment of performance targets; in structuring and implementing strategies and action plans for the Group's companies; and respective monitoring and reporting. In the scope of this collaboration, and in order to achieve these goals, a Project Manager has been recruited by CIBIO, and funded by Sonae. This person works directly with CIBIO researchers and SONAE staff, with the overall goal of contributing to enhance SONAE's biodiversity performance. The work includes a thorough evaluation of biodiversity impacts and dependencies of SONAE business activities, and the development of cost-effective solutions to mitigate biodiversity impacts. In liaison with the different companies of the SONAE group, the Project Manager contributes to mainstream biodiversity conservation and sustainable use across business areas (e.g., Food Retail, Fashion, Tourism, Industry and Forests).

Consultancy and services provision

Knowledge produced at BIOPOLIS has been transferred to public and private organizations through research contracts, environmental consulting and provision of services, involving primarily the autonomous units CTM- Molecular Analysis Centre and GEPE - Centre for Studies and Projects in Applied Ecology. The CTM was contracted for a total of 206 services since BIOPOLIS official start, totalizing a total income of EUR 778.473,04. Of these 206 services, 185 were specialized in Molecular Genetics, which include i) Genetic identification and Analysis of biological filiation (paternity/maternity) in domestic species (cattle, horses, donkeys, sheep, pigs, goats and dogs); ii) Assessment of the occurrence of hybridization in game species for repopulation purposes (rabbit, partridge and quail); iii) Molecular sex determination in birds and mammals; iv) Development and analysis of SNPs and Microsatellites; and v) Sanger sequencing. The remaining 14 referred to NGS services: (i) Gene Expression, (ii) Custom Amplicon, (iii)

Genome Sequencing, (iv) Library QC, (v) Chip-Seq, (vi) Metagenomics, (vii) Whole genome sequencing, (viii) Resequencing and Plasmid sequencing. Service provision by GEPE added up to an income of more than EUR 500.000,00 euros since the BIOPOLIS official start. The work involved contracts with a range of entities, mainly target at the development of services related to management, monitoring and conservation of biodiversity.

BIOPOLIS Affiliates Programme

The creation and implementation of an Affiliates Programme is a key aspect of the BIOPOLIS strategy of knowledge transfer and sustainability. Preliminary work in 2021 involved the benchmarking with affiliates programmes of scientific institutions in Europe and the US. The programme has been drafted in consultation with corporate partners and other stakeholders, and it describes the strategies and processes to engage stakeholders and nurture their relationship with BIOPOLIS over time, contributing to align research with societal needs and assuring long term sustainability through continued support of stakeholders. It also includes a detailed definition of the scope of the programme, with the benefits and obligations of affiliates and the modalities of interaction, as well as the implementation of this initiative in the short and long term. Implementation is targeted to start in 2022.

Developing new partnerships

Strong efforts have been developed by BIOPOLIS senior staff and the knowledge transfer officer to engage in new partnerships with business corporations and other stakeholders, aiming at developing new collaborative research projects. The work involved the establishment of contacts and subsequent organization of face-to-face meetings in order to present BIOPOLIS project to the industry, entrepreneurs, government agencies, including local authorities, national authorities and decision makers, as well as other players in order to establish strategic partnerships and secure funding from public and private investors. Most of these meetings and activities have focused on reinforcing and expanding the program of Invited Chairs, which CIBIO/BIOPOLIS has with major national companies of an industrial nature, as well as to disseminate the project both at national and international level.

Building on these efforts, Invited Chairs and Collaborative Programmes are at different stages of development, from full implementation (EDP, TOTAL Angola), through approval and submission to FCT (REN, Fundação Belmiro de Azevedo), to final negotiation (EDIA). An additional Invited Chair by Parques de Sinta e Monte da Lua was approved by FCT, but has been suspended due to economic constraints associated with the COVID pandemic, but is expected to be resumed in due course. Additional negotiations with stakeholders that have already committed to support CIBIO/BIOPOLIS are underway, including LIPOR, Ambatovy, Hoogood Coffee, SONAE MC, ACHLI, GALP, VINCI and the Consortium University of Johannesburg and Bushveld Game Capture. Contacts have also been established with other corporations not previously involved in the Teaming project, including the Navigator Company and Sogrape, among others.

Start-ups and Spinoffs

BIOPOLIS kept the support to the activities of the existent spin-offs (Electric Blue and Movetech), and worked towards the creation of a new spin-off dedicated to ecological assessment and biomonitoring services based on eDNA.

ElectricBlue CRL (https://electricblue.eu) is a non-profit technology transfer start-up created in 2018 at CIBIO, developing electronic instruments to help the scientific community address large-scale issues related to climate change, ecology, and biodiversity loss through application of innovative tools for environmental monitoring and bio-logging. ElectricBlue has a very particular role within CIBIO. Not only it supports internal research through the development of new instruments, data products and software applications (allowing CIBIO scientists and research groups to focus on previously intractable questions), but it also constitutes an excellent platform to disseminate novel technologies towards the external scientific community, both nationally and internationally.

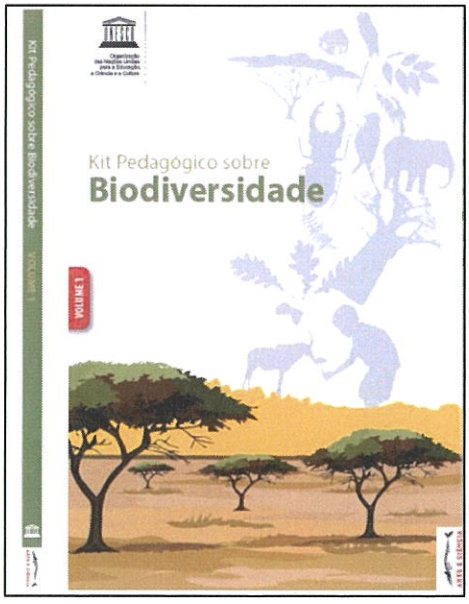
MOVETECH (http://movetech-telemetry.com/) brings together a group of international experts including BIOPOLIS research group AGRODIV members, joined to develop low cost, miniaturized state-of-the-art tracking solutions to study animal movements applicable to ecology studies. The Consortium includes the University of East Anglia, the University of Lisbon, InBIO and the British Trust for Ornithology (BTO). The project aims, among others, (i) to promote scientific research and movement ecology research; (ii) to

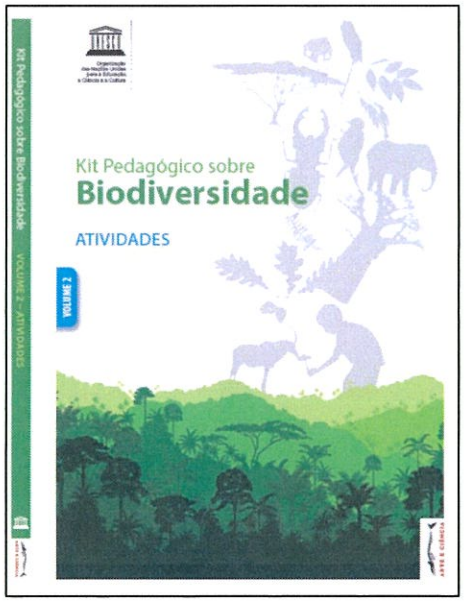
conceptualize and create new state of the art, low cost, tracking devices; (iii) to market, sell and distribute technology developed under the project.

Contacts have been established with the French company SpyGen to create a Joint Venture with CIBIO/BIOPOLIS, targeted at developing and commercialising biomonitoring solutions based on eDNA technologies. A first visit by a SpyGen team was made to CIBIO/BIOPOLIS facilities at Campus Vairão, and the initial terms of collaboration were established, involving the signing of a non-disclosure agreement. Subsequently, joint work has been developed to adjust lab capacities and processes to achieve the analytic requirements of SpyGen services. The work will proceed in 2022, and it is expected that the new joint venture will be established by the end of the year.

COMMUNICATION AND DISSEMINATION

BIOPOLIS assumed the translation and the production of a Portuguese edition of the Biodiversity Learning Kits of UNESCO, in the scope of its Network of TwinLabs in African Portuguese-speaking countries and the UNESCO Chair Life on Land. Considering that these kits were available open-access at UNESCO website in English, French and Spanish versions, and knowing that in the PALOP countries severe difficulties remain in what refers to other languages than Portuguese, the translation and production of the Portuguese edition of these Kits was carried out by CIBIO/BIOPOLIS providing, in this way, students and teachers from Portugal, Angola, Cabo Verde, Guinea-Bissau and Mozambique with a pedagogical tool in the area of biodiversity conservation, with the UNESCO seal. The books were published by Arte & Ciência Publishing, and the activity is completely aligned with the strategy for the implementation of the BIOPOLIS Teaming action, namely concerning the capacity building in both Portugal and African countries as well as with the objective (v). Enhance the appreciation of science, biodiversity and ecosystems by society as a whole, raising awareness regarding the links between the knowledge-based management of social-ecological systems, sustainable socioeconomic development and human health and well-being.





Corporate identity and institutional communication

The logo of BIOPOLIS has been produced and is progressively being used in all communication materials, both online and in print, as well as in business cards, presentations, events, and other materials and occasions.

BIOPOLIS logos

A printed brochure of BIOPOLIS was produced and it has been used to present BIOPOLIS during the contacts and face-to-face meetings with industry, entrepreneurs, government agencies, including local authorities, national authorities and decision makers, as well as other players in order to establish strategic partnerships and secure funding from public and private investors.

The website of the Teaming project was upgraded (https://www.biopolis.pt/en/) and a new website of BIOPOLIS/CIBIO was created and launched in September 2021 (https://cibio.up.pt/en/). These websites portraits information for external and internal users regarding the project's and institutional strategies and achievements, research and corporate partners, among others. BIOPOLIS activities, news and outcomes have also been communicated through the Weekly CIBIO-InBIO/BIOPOLIS electronic Newsletter, and via Social Media such as BIOPOLIS LinkedIn (http://linkedin.com/company/biopolispt), Twitter (@CIBIO-InBIO), and Facebook (https://www.facebook.com/biopolis.pt/) profiles.

Developing new media partnerships

The communication and dissemination strategy involves the establishment of long term relationships with the media and writing storylines about BIOPOLIS activities that can attract the interest of journalists on its research and innovation outcomes. Given these general goals, BIOPOLIS started negotiations with one of the national reference newspapers in Portugal to establish a formal, long-term collaboration, and create a dedicated section on biosphere and biodiversity. This section will be composed of a multidisciplinary team of journalists and scientists that will generate up-to-date content on this topic's world developments. Moreover, this section will broadcast and publicize the research produced by BIOPOLIS and its partners in a format carefully designed to maximise knowledge transfer and be understood by the general public. This partnership will generate a wide range of content in the form of written and media content in the form of animations, podcasts, interviews, infographics, newsletters and opinion articles. As a result of this collaboration, BIOPOLIS and its media partner will also develop workshops on science communication and create a bidirectional internship program that will enable scientists to become familiarised with an editorial office while journalists gain hand-on experience in scientific laboratories.

Scientific dissemination

The affiliation of researchers to be used in scientific and technical outputs has been defined, and is now widely used by the BIOPOLIS community. As part of its normal research activities, the scientific community of BIOPOLIS strongly engaged in the dissemination of the results of their research. This involved the publication of more than 900 scientific papers in international journals, many of then open access, thus making the results widely available to the scientific community. Publications have included top journals such as Nature, Science and PNAS, among others. The results of BIOPOLIS research have also been presented in more than 300 scientific and technical seminars, congresses and workshops.

FUNDRAISING

Teaming complementary funding and other CCDRN projects

A considerable effort has been developed by BIOPOLIS staff to obtain the complementary funding to the Teaming project committed by CCDRN. Accordingly, BIOPOLIS submitted the application NORTE-01-0246-FEDER-000063 BIOPOLIS - "Enhancing the transference of scientific and technological knowledge through a new Centre of Excellence in Environmental Biology, Ecosystems and AgroBiodiversity", with and overall amount of 9.7M€. The final approval from CCDRN was received on June 14, 2021, and the respective Acceptance Term was signed on June, 23, 2021. CCDRN proceeded with the first payment, corresponding to 15% of the budget (1.5M€), on July 9, 2021.

Throughout 2021, the BIOPOLIS staff also worked on the preparation of a new application to be submitted to CCDRN, also in the scope of the complementary funding to the Teaming project. This application was intended to cover the costs of rehabilitation of BIOPOLIS facilities at Quinta do Castro and other buildings at Campus de Vairão, as well as equipping such facilities with modern lab equipment. The application, NORTE-01-0246-FEDER-000071 - CIBIOPOLIS -Enhancing the scientific and technological capacity of CIBIO to a Centre of Excellence in Environmental Biology, Ecosystems and AgroBiodiversity, BIOPOLIS, totaling 7.9M€, was finally submitted in February 25, 2022 and approved on the April, 8, 2022.

Finally, another application was submitted to CCDRN, the NORTE-01-0145-FEDER-000046 ("Research Towards the Conservation, Restoration and Sustainble Use of Tropical Biodiversity and Ecossystems"), a 2M€ matching funds to the TROPIBIO ERA Chair already approved and running. The application was submitted on July 30, 2020, and it was approved and the Acceptance Term signed on November 13, 2020. The expenses were eligible since the September 1, 2020, and the first payment (15% of the total budget) was made on April 23, 2021. The project has been executed throughout 2021.

European and National research projects

CIBIO/BIOPOLIS staff, as well as individual researchers, have maintained a regular flow

of applications to research project calls, at both national and international levels, as described in the Table below. Highlights from such effort include the award of 2 ERC consolidator Grants (Miguel Carneiro and Rita Covas), and the selection to the interview stage of a third application (José Melo-Ferreira). Regarding FCT calls, 7 projects were awarded in 2020, and another 10 in 2021 (including 6 exploratory projects). There were also 27 new research contracts approved in the scope of the individual and institutional calls for scientific employment (CEEC). There was also a strong commitment of BIOPOLIS researchers to participate in project calls at the European level, involving a budget for the institution of around 2 M€, but results will only be announced in early 2022.

Funder	Project	Outcome	Budget BIOPOLIS
ERC	1 ERC Consolidator Grant (+2 on-going)	Approved to the 2nd phase	2 M€ (requested)
H. Europe	3 projects just submitted (October 2021)	Under Evaluation	1.8 M€ (requested)
FCT	Renewal of Associate Laboratory	Approved (Score: 15/15)	0.87 M€
FCT	Research projects (2020)	7 projects approved	1.5 M€
FCT	Research and exploratory projects (2021)	4 + 6 approved	1.0 M€
FCT	CEEC Individual (2020)	11 contracts approved	2.5 M€
FCT	CEEC Individual (2021)	14 contracts approved	4.0 M€
FCT	CEEC Institutional (2021)	2 contracts approved	0.5 M€
Biodiversa	Projects submitted	Under Evaluation	0.3 M€ (requested)

BIOPOLIS also submitted to FCT the application for the renewal of the Associate Laboratory (AL) status for InBIO. CIBIO is part of InBIO – Research Network in Biodiversity and Evolutionary Biology, an Associate Laboratory that was established in 2011 upon formal recognition of its key position to advise the Portuguese State in public policies related to biodiversity and the environment. InBIO LA status was renewed with the highest classification 100/100.

(ENVIRONMENTAL) SUSTAINABILITY AND SOCIAL RESPONSIBILITY

BIOPOLIS is committed to have a strong social responsibility and Quality of Life on the workplace politics and will have dedicated staff to design and implement actions accordingly, with a specific focus on solidarity and equity. BIOPOLIS is thus developing and will later implement: a gender equality plan; an environmental management plan as well as actions for quality of life in the workplace.