

## Evaluation Panel: NATURAL SCIENCES - Biological Sciences, Biodiversity and Ecosystems

### Panel Members

Jan Lindstrom (Chair)	University of Glasgow, United Kingdom
Andreja Ristov	University of Zagreb, Croatia
Jan Lindstrom	University of Glasgow, United Kingdom
Jesper Givskov Sørensen	University of Aarhus, Denmark
Laura Orian	University of Padova, Italy
Stuart Bearshop	University of Exeter, United Kingdom
Ulrika Candolin	University of Helsinki, Finland
Ville Friman	University of York, United Kingdom

### R&D Units

Centre for Functional Ecology - Science for People & the Planet (CFE)	Universidade de Coimbra (UC)
Centro de Biologia Molecular e Ambiental (CBMA)	Universidade do Minho (UM)
Centro de Ecologia, Evolução e Alterações Ambientais (cE3c)	FCiências.ID - Associação para a Investigação e Desenvolvimento de Ciências (FCiências.ID)
Laboratório de Espectrometria de Massa de Ressonância Ciclométrica de Ião com Transformada de Fourier e Espectrometria de Massa Estrutural (FTICR-MS-Lisboa)	FCiências.ID - Associação para a Investigação e Desenvolvimento de Ciências (FCiências.ID)
Microbiologia Molecular, Estrutural e Celular - Instituto de Tecnologia Química e Biológica António Xavier – MOSTMICRO (ITQB)	ITQB NOVA - Instituto de Tecnologia Química e Biológica António Xavier (ITQB NOVA/UNL)
Rede de Investigação em Biodiversidade e Biologia Evolutiva (InBIO)	ICETA - Instituto de Ciências, Tecnologias e Agroambiente da Universidade do Porto (ICETA)
Unidade de Ciências Biomoleculares Aplicadas (UCIBIO)	REQUIMTE - Rede de Química e Tecnologia - Associação (REQUIMTE-P)



## Evaluation Panel: NATURAL SCIENCES - Biological Sciences, Biodiversity and Ecosystems

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**R&D Unit:** Centre for Functional Ecology – Science for People & the Planet (CFE)

**Coordinator:** Helena Maria de Oliveira Freitas

**Integrated PhD Researchers:** 88

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**Overall Quality Grade:** VERY GOOD

### Evaluation Criteria Ratings

- (A) Quality, merit, relevance and internationalization of the R&D activities of the Integrated Researchers in the R&D Unit Application: 4
- (B) Merit of the team of Integrated Researchers: 5
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 3

**Base Funding for (2020-2023):** 1286 K€

### Recommended Programmatic Support

PhD Fellowships: 4

Programmatic Funding: 396 K€, including for 1 (Auxiliar) New PhD Researcher Contract.

### Justification, Comments and Recommendations

The Unit comprises over 100 Integrated PhD Researchers. It looks to have doubled in size during the review period. The level of internationalisation is good with members of the centre collaborating with researchers from over 80 countries, but while some of these links are very clearly substantial, the Panel felt that it was not clear how deep many of the others are. The centre has hosted 4 international meetings and researchers have delivered 30 plenaries at international meetings. There is also evidence of CFE members sitting on a number of important international regulatory and advisory bodies.

The UNESCO Chair in Biodiversity Safeguard for Sustainable Development is a highly prestigious award and also reflective of an important international reputation in this research area (quite rightly this features heavily in the proposal). However the Panel felt that it was a bit unclear how this and the other thematic line around science communication improved the profile of the Unit as a whole, because a proportion of the research lies outside these areas. Having said this, sustainability and outreach activities (with big programmes in Angola, Mozambique etc) are clear strengths of this Unit and the Panel was very impressed with these activities. The work around invasive plants and the national and the international MSc programmes are potentially a very important contribution in this respect. The teams have also advised on policy in this respect.

The outreach work around sustainability is comprehensive as is the capacity building and training for developing countries in Africa. There is also a range of resources in the form of publications, data and specimens archived and freely available via open access. The invasive species work has resulted in major biocontrol programmes (where centre staff have played a key role), reference databases and a spin out company for the detection of plant pests and diseases and the development of rapid tailored to outbreaks. This looks like it is significantly contributing to national capacity in this area. There is also a contribution to the sustainable management of a seine netting fishery and while this is of some importance nationally and a source of income for the centre, it has rather limited applicability.

The listed publications are of variable quality (but none are below average). However the Panel were concerned that among these highlight publications centre staff appear to be participants rather than drivers of the really big outputs. Moreover the Panel felt that the link between these publications (and the R&D highlights) and the six major research groupings was not always clear.

The level of post-graduate training offered appears to be good, summer schools and capacity building are offered in a number of countries.

### Recommendations:

- 1) Many of the highlight publications are not obviously being driven by the CFE. The Panel felt that there could be a substantial and important contribution to the various fields of expertise in papers that are published in more specialised journals. The Panel agreed that a focus on the work that the centre leads and excels in would be much more useful when reporting R&D highlights and key publications.
- 2) The Panel recognised that the work in Africa and the UNESCO chairs are very good markers of international activity. However they felt that there is considerable scope, given the size of the team and the areas of expertise, for building

more international links outside other Portuguese speaking nations, particularly around Europe. There are many excellent examples of good practice combining science with policy advice that could be exemplars for other countries.

3) The Panel felt that it would be nice to see more activities focussed on generating and fostering collaborations between the units (workshops, away days etc).

The Panel agreed that the highlighted CVs are generally good. Some PIs have very good numbers of citations, reflecting the international standing of some of the work being produced (Freitas and Pardal were of note in this respect). Although there are some publications in very high quality multidisciplinary journals the bulk of the work from the majority of PIs is located in more specialised high quality publications. Some of the highlighted CVs hint at waning output and citation rates in recent years (of course others do clearly show rising outputs and Freitas, Loureiro, Helena, Vieira and Rodriguez-Echeverria are noteworthy in this respect) and in some cases the author roles are not particularly clear. All of the key CVs have international profiles and show good evidence of research leadership and securing and managing funds (although the funds associated with named grants are often absent). However, the bulk of the publication activity falls heavily on a subset of researchers and a lot of the supporting CVs are weaker with low levels of output, many without the centre as an address on their ORCID accounts or dead links to ORCID accounts. The Panel noted that several of these non-nuclear CVs are from candidates that show real promise, often early career researchers with rising outputs and citations and these are the ones that should be developed and highlighted as future stars.

Recommendations:

1) The Panel recognised that not all people in the Unit need to be international research stars. However there are lot of Unit members that are publishing at fairly low rates and the Unit should find ways of encouraging at least some of these individuals to publish more of their work (this would also help increase the international profile of the centre and boost citation rates).

2) The Panel recommends that the Unit considers how the careers of young researchers may be better supported there are a lot of CVs of people that have not been able to sustain a research career in terms of driving and publishing work. Likewise there are some ERCs that are showing real promise, the centre should be investing in these individuals (maybe they are, but the evidence is not in the application).

3) The Panel agreed that given the talent within the centre, there should be initiatives in place for cross-fostering ideas among research groups with an attempt to get published work (driven by CFE researchers) hitting more of the big multi-disciplinary journals.

The Panel felt that the weakest element of the proposal is related to evaluation criterion (C). In many places the writing is rather impenetrable and full of jargon. The summary talks largely of consolidation and a commitment to develop more outreach and sustainable development, which although is important and clearly key to the ethos and aims of the centre, the Panel felt that there was little evidence as to how success in these endeavours will be measured/assessed. High quality science, policy and outreach are not mutually exclusive. The Panel also felt that some of the future priority areas were not well justified (some have not really featured in the application up until this point), however they commended the Unit on placing training at the heart of the plans.

While it is clear the UNESCO chair is clearly a key element of the future and the development of the centre, the Panel felt that clear plans on how to better align the research groupings with the future research lines were needed. While targeted hires are clearly one way of building research power, the Panel felt that the strategy was lacking plans on how to develop and encourage more engagement in research and publication activity among the less productive researchers.

Recommendations:

1) It would help to have much clearer plans for integrating the research groups into the key themes for future development

2) There should be some clear plans for developing and building research power within the Unit.

It is clear that Prof. Freitas is central and fundamental to the work and success of the Unit. She is supported by Profs. Pardal and Loureiro and this comprises a great team to run this Unit. However, the Panel felt that given the range of activities that Prof. Freitas is involved the Unit may be served better by a flatter management structure (this would also reduce the risk to the group should Prof. Freitas choose to leave for any reason). This is exemplified in the network of collaborations with the head of the Unit at the centre. Of course this is something to celebrate, but it does hint at collaborations within the Unit going through her, rather than between research groups.

Given the interest in securing new Auxiliar researchers the Panel devoted the bulk of the budget to to hiring one of these with rest being allocated between support for internationalisation and support for other activities (including hiring) within the Unit.

## Evaluation Panel: NATURAL SCIENCES – Biological Sciences, Biodiversity and Ecosystems

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**R&D Unit:** Centro de Biologia Molecular e Ambiental (CBMA)

**Coordinator:** Fernanda Maria Fraga Mimoso Gouveia e Cássio

**Integrated PhD Researchers:** 48

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**Overall Quality Grade:** VERY GOOD

### Evaluation Criteria Ratings

- (A) Quality, merit, relevance and internationalization of the R&D activities of the Integrated Researchers in the R&D Unit Application: 4
- (B) Merit of the team of Integrated Researchers: 5
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 4

**Base Funding for (2020-2023):** 686 K€

### Recommended Programmatic Support

PhD Fellowships: 6

Programmatic Funding: 225 K€ for 1 (Auxiliar) New PhD Researcher Contract.

### Justification, Comments and Recommendations

This is a Research Unit with an integrative approach to molecular biology and sustainability, incorporating biodiversity, functional ecology, cellular responses to biostressors and functional genomics (including molecular biotech, applied microbiology and bioinformatics). It comprises 48 researchers publishing in a broad range of international journals. The level of internationalisation within the Unit is somewhat variable but is increasing and therefore CBMA members are ready to apply for competitive funding which will increase the quality of publications. The encouragement of postdocs to carry out part of their postgraduate education in top world institutions can further accelerate this process. In conclusion CBMA output is very good.

There are four main R&D areas listed. The first one is Biodiversity loss & gain. This covers the effects of invasive species to ecosystem functioning (EU, Africa & SE Asia), and biodiversity loss and the degradation of nutrient cycling in aquatic systems. The work here seems very good but not excellent. There is also a group working on biomonitoring, which has identified interactions between fungicide and host parasite systems and the effect of nanoparticles on biodiversity (interacting with temp etc). This latter theme feels a bit more marginal. The second area is Population dynamics. It looks like this theme is mostly about cooperation, common goods and sustainability. There is also some work on quorum sensing. Some of this looks like very good fundamental science, but there are also suggested links to climate. The third area is about New targets for biotech. This theme is highlighted as identifying pathways associated with environmental stressors. There are some practical results highlighted (e.g. acetic acid stress pathway identified and others important for biofuel and biochemical production), but as with some of the activity outlined above it is a bit opaque. The links to application need to be clarified. Finally, the fourth area is Bioinspired systems with novel functions. The team working on this theme are using biotech and hi throughput sequencing to build more efficient microbial cell factories. The links to society, spin outs and patents etc. are very clear with potential novel anti-microbial treatments identified.

The scientific merit of the team of Integrated Researchers in the application is excellent. The work of the group is published mostly in internationally respected journals, which are high quality, but generally of a specialised nature. However, there are also publications in high ranking journals. Most of the nuclear CVs have a very good international profile and are generally of high quality, with good numbers of outputs and reasonable numbers of citations. Publications are published in different areas i.e. Environmental Science, Agricultural and Biological Sciences, Genetics and Molecular Biology. The synergy between these areas is a strong goal of CBMA. Their key outputs include development of metabarcoding technology to study aquatic biodiversity, linking changes in diversity to ecosystem functioning, using game theory and mathematical modelling to investigate how we can preserve common goods in populations. Moreover, their research has identified novel targets and pathways for biotechnology using omics approaches and developed multiple biotechnological processes by improving system yield and biocatalysis and to develop highly interesting antimicrobial recombinant protein-based polymers. Contributions to national and international projects (e.g. EU projects), patents and spin-off companies, as well as international education and scientific dissemination (conferences, teaching and co-publication) attests to the achievements of the integrated members. Researchers at the centre have organised 34 international conferences and 25 national conferences, which is an astonishing amount of effort and must have had some impact on the reputation of the CBMA.

The strategy of the Unit is well described and the Unit appears to have a clear view of where and how it needs to develop. The strategy for Funding request for 2018-2022 is RESEARCH, ADVANCED TRAINING, and SOCIETY. How to implement the strategy is also well described.

The strategy for RESEARCH involves two goals which are clear and complement each other, i.e., the first goal is environmental monitoring and management tools for protection, while the second one is developmental of bio-based products and processes to minimise environmental impact. They identified clear objectives and actions for assessing these goals. They are based on previous achievements and therefore they are feasible. There are some nice and ambitious elements to this strategy the plans for training and lifelong learning activities are particularly impressive. Likewise, are the outward and inward internationalisation initiatives (collaborations, keynotes, EU networking etc), these are forward thinking particularly in the current climate and likely to deliver. There are also very clear ideas on where expertise is needed in terms of future appointments. However, new ideas which would lead the centre into new research areas or spawn new collaborations. The plans for further development of monitoring and bio-based products are very good (with some good ideas), however with lacking information on how this builds on what has been achieved thus far, no how the centre and collaborators facilitates this activity. There are mentions of the spin-off companies in several places in the application, but this is not really developed. The new advanced computing facility (MACC) seems central to several of the objectives and as such more detail is needed on how this is accessed, what is the availability buy in/charging etc. The organization seems appropriate and it is encouraging to see regular meetings. There is very good access to PhD programmes (reflected in the numbers of studentships in previous years).

The strategy of ADVANCED TRAINING includes reinforcement of pre-doc, PhD and post-doc training in biology and bioinformatics and transferable competencies. It is a very good idea to reinforce training in transferable competencies that presumably include management, people, planning and similar skills and which will help students to be competitive for new positions, either in research or industry.

In order to influence SOCIETY CBMA will reinforce networking with the media, general public and industry. The employment of one science manager is justified because this might ensure continuity of actions in CBMA and help researchers to articulate their data for presentation to general public. CBMA emphasize that they will foster collaboration with companies through knowledge transfer initiatives that will boost innovation and value creation. I believe that innovation and creation is preceded with excellent science. Therefore, the priority has to be the excellent science which will, in a right, encouraging, atmosphere for innovation and creation lead to strengthening the cooperation with industry.

The organisation of CBMA (Board of Directors, Internal Consulting Board, Scientific Council and External Advisory Board) is very good, logically organised and clear and should be efficacious.

It is significant that the activities of CBMA are supported by the offices for Science Funding and Project Management, and for Science Communication and Outreach. The third office that will support CBMA activities represent Laboratory and Administrative staff. It is not clear whether those 4 technicians are only technical staff in CBMA or is there more technical staff in the individual laboratories.

## Evaluation Panel: NATURAL SCIENCES – Biological Sciences, Biodiversity and Ecosystems

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**R&D Unit:** Centro de Ecologia, Evolução e Alterações Ambientais (cE3C)

**Coordinator:** Cristina Maria Filipe Maguas Silva Hanson

**Integrated PhD Researchers:** 123

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**Overall Quality Grade:** EXCELLENT

### Evaluation Criteria Ratings

- (A) Quality, merit, relevance and internationalization of the R&D activities of the Integrated Researchers in the R&D Unit Application: 5
- (B) Merit of the team of Integrated Researchers: 5
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 4

**Base Funding for (2020-2023):** 2148 K€

### Recommended Programmatic Support

PhD Fellowships: 12

Programmatic Funding: 865 K€, including for 3 (1 Junior, 1 Auxiliar, 1 Principal) New PhD Researchers Contracts.

### Justification, Comments and Recommendations

The Centre for Ecology, Evolution and Environmental Sciences (cE3c) was recently created by linking three units working within the field. The unification has been successful and the track record of collaborative research is excellent. The five main contributions are all relevant for the major themes and address a wide range of issues from fundamental research to monitoring and societal advising. They differ in their relative contribution to the success of the Unit, with the fourth contribution “Evolution in face of environmental changes” standing out in excellence.

The number of fully integrated researchers has grown during the survey period, but the total amount of funding received has not increased at the same rate and is relatively small compared to similar-sized successful international units. Yet, there has been an increase in funds secured through competitive calls and from the EU. The ERC consolidator grant is a notable highlight. The Unit should strive to continue to increase the amount of funds received.

The centre has a strong collaborative and international character. The international profile is evidenced in the publications and in the participation on a number of EU projects and international networks. This part of the activity of the Unit is excellent. Another strength is the training profile. This is excellent with good numbers of MSc and PhD students (also with international collaboration), including several graduate schools and high course activity. Open access policies are adapted, including data sharing as well as software sharing.

The centre is strongly involved in applied science, contributes to policy making, and is active in outreach activities. These components are well developed and strengths of the centre.

The six thematic lines tackle important research questions.

All in all, the main achievements of the Unit in the assessment period are excellent taken into account the size of the Unit and its main research area.

Recommendation: To reach the commendable aims, the Unit needs to involve engineers, social scientists, mathematicians, in addition to ecologists, evolutionary biologists and environmental scientists in the work. The Panel also believes that the Unit could benefit from being more active in organising conferences and workshops. This would showcase the science to the international community, raise the centre’s profile and build its international reputation. The Panel also encourage the centre to concentrate more efforts on building the international profile of the centre. It needs to attract more international collaborators to boost the scientific impact of the centre.

A key strength of the team of integrated researchers is bridging basic and applied research. The scientific quality of the team of researchers is excellent, but does not reach the highest international level of excellence. Publication rate is relatively high, but the proportion of publications that is of high quality and have significantly contributed to advance science is on the lower side when compared to internationally successful units. The variation in merits among

researchers is high, and the success in publishing mostly relies on a few successful researchers. One of these is Sara Magalhães, with an excellent CV and who has received an ERC Consolidator award and is doing innovative science of high quality. In general, the quality of the publications has increased over the years, but more researchers need to publish in high quality journals. The atmosphere at the Unit is very good

The integrated researchers are involved in a lot of international collaboration, and such activities are actively promoted by the Unit. A large proportion of the publications are authored with other national and international research groups. Yet, the contribution of the researchers of the Unit to these could be stronger in terms of more first and last authored papers. The participation in international projects, particularly in European projects is excellent, but the Unit could be stronger in initiating and leading such activities. The researchers are also active in contributing to conferences with plenary talks, as well as serving on various research grant Panels and as referees for prestigious journals. They are also active in knowledge transfer to industry, have initiated start-up companies, marketed new products, and produced patents.

Despite the scope for improvement in the publication activities of the Unit, it does have an excellent output.

Recommendation: To improve the international quality of the Unit, the Panel suggests that the centre aims to find ways of encouraging less active researchers to publish their work in high quality journals. A more even publication rate across the researchers would enhance the research output of the centre

The broad aims of the Unit around the commitment to a sustainable future are good, as is the unification of the research groups. In particular, the contribution to climate change strategies across the world is commendable. The plan to move into new, important research areas, such as urban sustainability and human health, are good initiatives. However, while the centre is well positioned nationally to inform on sustainable development policies, it is not yet an international player in this field. Because of the young age of the Unit, it is too early to clearly decide on the success of the Unit.

The Unit is organised into 13 research groups with specific expertise that are grouped under different thematic research lines coordinated by senior researchers. A secretariat coordinates administrative and outreach activities. The governance structure of the centre appears good. Yet, it is less clear how the division is related to the presented division of research at the centre. The link between present and future activities could be clearer. In particular, which changes will be done and why? What were the strengths in the past, how will these successful lines of research continue, and how will they be promoted?

The plan of activities is vaguely described, particularly when it comes to fundamental science. The description lingers much on achievements during the previous period, while there is no clearly stated overall strategy for the years 2018-2022. Little information is also given on how research training would be developed.

The synergy between the members is ensured by weekly science seminars and an annual scientific and team-building event. The infrastructure is good and fosters both national and international collaborative work.



## Evaluation Panel: NATURAL SCIENCES – Biological Sciences, Biodiversity and Ecosystems

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**R&D Unit:** Laboratório de Espectrometria de Massa de Ressonância Ciclotrónica de Ião com Transformada de Fourier e Espectrometria de Massa Estrutural (FTICR-MS-Lisboa)

**Coordinator:** Carlos Alberto Alves Cordeiro

**Integrated PhD Researchers:** 9

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**Panel Decision:** Not Admitted to the Evaluation.

This is a R&D Unit with less than 10 Integrated PhD Researchers. The Evaluation Panel found that there are no reasons for exception of this R&D Unit of the general requirement of a minimum of 10 Integrated PhD Researchers established in the Evaluation Rules (namely, the possible lack of researchers in the area, or research activities of particular specificity or of a pioneering character).

## Evaluation Panel: NATURAL SCIENCES – Biological Sciences, Biodiversity and Ecosystems

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**R&D Unit:** Microbiologia Molecular, Estrutural e Celular - Instituto de Tecnologia Química e Biológica  
António Xavier (MOSTMICRO-ITQB)

**Coordinator:** Claudio Manuel Simoes Loureiro Nunes Soares

**Integrated PhD Researchers:** 107

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**Overall Quality Grade:** EXCELLENT

### Evaluation Criteria Ratings

- (A) Quality, merit, relevance and internationalization of the  
R&D activities of the Integrated Researchers in the R&D Unit Application: 5
- (B) Merit of the team of Integrated Researchers: 5
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 5

**Base Funding for (2020-2023):** 1793 K€

### Recommended Programmatic Support

PhD Fellowships: 17

Programmatic Funding: 1108 K€, including 4 (Auxiliar) New PhD Researchers Contracts.

### Justification, Comments and Recommendations

MOSTMICRO-ITQB aims to understand biological processes at the Molecular, Structural, Cellular and Population levels, with a focus on microbes important for human health, biotechnology and the environment. MOSTMICRO-ITQB values an excellence in research and training in a multidisciplinary environment.

Their 5 key outputs are excellent. Achievements in structural biology would not be possible without a modern infrastructure and the high level of internationalisation, i.e., access to world-class European facilities. The contributions in molecular and cellular microbiology span from contributions in cell division and peptidoglycan synthesis and control of gene expression to molecular epidemiology and antibiotic resistance. Other important areas are physiology and metabolism of pathogens of environmentally or technologically relevant microbes with emphasis on new discoveries in the field of biotechnology. The interdisciplinary environment has fostered research in drug discovery, small molecular inhibitors or artificial metallated proteins, and led to the foundation of spin-off company Extremochem. MOSTMICRO-ITQB is also active in translation of their research in collaboration with relevant partners which led to unique ONEIDA project with the aim to prevent and control infectious disease and antimicrobial resistance, which has potential to have a remarkable impact in society. The high quality of research is based on 159 research projects, 27 of them funded by international agencies. The Unit was successful in promoting applications to European funding. Results of this strategy are visible since the Unit has been awarded 3 ERC grants (including one consolidator), one FET-Open and 5 COST Actions, among others. In addition, in May 2018 a Twinning project with Universities in Berlin and Florence was approved. All these indicate strong internationalization of MOSTMICRO-ITQB activity in 2013-2017.

The Unit also contributes to several advisory and evaluation Panels internationally, has an active role in editorial boards of scientific journals and has been involved in organising multiple international conferences and workshops as well as Summer Schools and other activities with the aim to attract young people to scientific careers. In addition, the Unit is committed to scientific outreach activities with schools by offering summer placement opportunities, open labs and providing MSc opportunities for student from other institutions.

Interactions with different industries has led to 11 sponsored contracts, submission of 6 patents of which 4 were granted, and a creation of one spin-off company. The mobility rate of researchers, especially the postdocs, is good. In conclusion, the overall quality grade of research is excellent.

The scientific merit of the team of Integrated Researchers in the application is excellent and according to the list of publications, it is clear that the quality of research is increasing. The list of selected publications reveals a leadership role of the MOSTMICRO-ITQB team while the biography of individual researchers reveals numerous valuable scientific contributions. The MOSTMICRO-ITQB team has recruited four young and highly competitive international lab heads. Pinho is a great example of this with ERC money, a recent Nature paper as senior author and very high citation profile. All of the nuclear CV PIs have good funding records with some exceptional performers (e.g. Pereira CM). In May 2018, a Twinning project with Universities in Berlin and Florence was approved that will additionally improve interdisciplinary

research working with European partners. MOSTMICRO-ITQB are active in patenting. In addition, their members created one spin-off. The scientific merit of the MOSTMICRO-ITQB team of integrated researchers is reflected in extensive international advisory, evaluation and editorial work. List associated institutions the researchers of MOSTMICRO-ITQB participated as Members on Scientific Advisory Boards (Max Planck Institute for Biophysics, Soehngen Institute for Anaerobic Microbiology) or Advisers (WHO, ESF, EC, FEBS, Scientific Committees of major international conferences) confirms scientific excellence and international recognition of the MOSTMICRO-ITQB team. In addition, they participate as Expert Evaluators for international funding calls and as members of editorial boards for internationally recognized scientific journals. They are coordinators in several international scientific societies. As outlined above, the societal impact of the work has huge potential with respect to human health. The cultural impact is also excellent as well with summer schools, internships, open labs, courses for school kids all being run by members of the Unit combined with a host of outreach activities.

The team propose a very good set of objectives namely to: increase the international profile of MOSTMICRO, excel in the relevant field of research and seed innovation, nurture new talent, widen research impact all of which lie at the heart of any successful research grouping. They will not develop any new themes and seek to meet the objectives via 3 core lines of action:

Axis 1 - Scientific Development

Axis 2 - Researcher Training and Career Development

Axis 3 - Wider Impact

Scientific development (Axis 1) will be achieved by fostering internal synergy projects, internationalisation, stimulation of new avenues of research and collaboration between groups. The synergy research projects were launched in 2013-2017 period and were successful in terms of a number of submission of new proposals that are currently under evaluation by FCT. The new equipment will be secured to expand research activities. In the future, period the Research Unit will invest in different areas which altogether represent the state of the art equipment in microbiology. The Unit will continue to foster international grant applications.

Researchers training and career development (Axis 2) aims to nurture talent. MOSTMICRO-ITQB team aim to promote Researcher Training and Career development, particularly at graduate students and junior PIs level. For research training, they plan to reinforce high standards of Doctoral training through selection of excellent students, to launch new post-graduation programme in entrepreneurship and translating science to the market in Cooperation with the NOVA School of Business and Economics, and to attract young people to scientific careers by providing training to undergraduate and high school students. For Career development, they plan to foster new career mentorship at all research levels (postdoc level as a new expansion), to contribute to the wider employability of researchers using TRANSPER initiative and to introduce the development of transferable skills. These efforts to promote the employability of researchers will have impact on society as a whole.

For wider impact (Axis 3) the Unit will continue to invest in Dissemination and Communication in order to develop links between researchers and stakeholders, i.e., all types of social groups like academia, industry, funding agencies, hospitals, patient associations, decision-makers, for example.

The configuration and organization model of the MOSTMICRO-ITQB is suitable to its objectives and R&D activities (34 Labs headed by PIs organised into 10 Groups each headed by one PI; one Group is devoted to Science Communication, Funding and Innovation Activities). All groups contribute to the objectives of three Thematic Lines (TL) but some of the Groups contribute to more than one TL. TLs are headed by Senior Scientists, in the role of Coordinator, and by a Vice-Coordinator. This organisation scheme significantly increases multidisciplinary and fosters collaboration between groups since TL hold a meeting once per semester, involving all the Labs PIs. The Dean of MOSTMICRO-ITQB ensures the connection with the rest of NOVA University and other institutions. The Unit has a Committee consisting of the Unit Coordinator and Coordinators and Vice-Coordinators of TLs, and a Science Manager and they meet monthly. The Unit is supported by Scientific Advisory Board (SAB) composed of eminent scientists, who review the Unit annually and has a body of Affiliated Medical Doctors who will support translational research. The MOSTMICRO-ITQB endorses the strategic goal towards Open Science which is in line with FTC requirements. In conclusion, MOSTMICRO-ITQB is an excellent Research Unit with a clear idea to remain a leader in microbiological research in Europe.

We recommend funding of 4 Auxiliar researchers and that part of the Programmatic Funding be applied in patenting and start-up money for 4 Auxiliar researchers to be divided between hired Auxiliar researchers for requested research activities.

## Evaluation Panel: NATURAL SCIENCES – Biological Sciences, Biodiversity and Ecosystems

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**R&D Unit:** Rede de Investigação em Biodiversidade e Biologia Evolutiva (InBIO)

**Coordinator:** Nuno Miguel dos Santos Ferrand de Almeida

**Integrated PhD Researchers:** 180

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**Overall Quality Grade:** EXCELLENT

### Evaluation Criteria Ratings

- (A) Quality, merit, relevance and internationalization of the R&D activities of the Integrated Researchers in the R&D Unit Application: 5
- (B) Merit of the team of Integrated Researchers: 5
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 5

**Base Funding for (2020-2023):** 3140 K€

### Recommended Programmatic Support

PhD Fellowships: 11

Programmatic Funding: 1837 K€, including 3 (Junior) New PhD Researchers Contracts.

### Justification, Comments and Recommendations

InBIO identified and described five contributions considered most important of those finalised in the 2013-2017 period. The first contribution was built on the capacities gained through projects supporting a Next-Generation Sequencing platform (FP7) and a research program on environmental metagenomics (H2020). The research performed in this field has been published in top-ranking journals. Therefore, the results obtained in this area contribute both to basic research and also impact on the wider society. The second highlighted contribution is in the field of understanding speciation and hybridisation. Work in this area is strongly international and has resulted in top-ranking publications as well. The third contribution is in the area of biodiversity and conservation around the world through a number of scientific expeditions to desert and arid regions of the Sahara-Sahel and Iran, again resulting in high-quality publications. The conservation initiatives and advanced training of tens of students from these regions is a very important outcome. The fourth named contribution of InBIO concerns assessing and mitigating impacts of large infrastructures. This task was co-sponsored by private corporations with the aim of understanding the ecological effects of dams, roads, railways, and power lines, and how to mitigate their negative impact. In addition to publications in excellent journals these efforts resulted in a book published by Springer on Railway Ecology. Again, this is impact outside the immediate scientific subject area. Finally, the last contribution selected by InBIO is in the field of designing more sustainable production ecosystems. This research combined natural and social sciences, was published in excellent journals and had influence on the recent Fitness Check of EU Common Agriculture Policy.

The Panel agreed that the achievements of the centre during the period of 2013-2017 are impressive and demonstrate the willingness and ability of the Unit to put their overall vision of “creating an internationally recognized network of excellence in the fields of evolutionary biology, biodiversity and conservation, integrating all levels of biological organization from genes to ecosystems” into practice.

The Panel were impressed that an R&D Unit which is in a position to provide expert views on environmental policies to the Portuguese state, can do so on a platform of solid, interesting science, rather than addressing only small-scale case studies as is often the case for environmental research institutes in such a role.

The degree of internalisation in the Unit’s activities is evident; much of the funding is international, competitive EU schemes are strongly represented, a good proportion of scientific activities is in collaboration with institutes not only in Portugal but in many other countries. The volume of post-graduate training opportunities is at least at a level to be expected from a Research Unit of this size, if not higher.

There are clear societal benefits to some of the work (particularly around the latter 3 R&D highlights) and there are consulting and technical services roles around the areas of molecular ecology and applied ecology along with the three co-funded chairs (FCT & business) and a partnership with University of Johannesburg for provenancing of game species. There is outreach activity going on (museum exhibits and TV broadcasts), but this could be even more substantial given the size and the type of work being carried out.

Although InBIO is a major partner in several data sharing/hosting initiatives, there does not appear to be an open access policy (i.e. hosting material on line).

The level of internationalisation linked directly to research publications is very good (lots of good work published in high quality journals), some major EU funding, some big EU collaborations and what appear to be joint positions. There is also a UNESCO chair in the groups and a lot of work training and investing in a number of African countries. However, there would seem to be scope for even more (researcher hosting, workshops, international conference hosting, etc.). The policies around outreach are very good, but they could be broadened (school visits, activity packs, bioblitzes, etc.)

In InBIO, the Integrated Researchers are typically very experienced in project management and participation, and have often extensive records in post-graduate level supervision. The weakest part of the track records is the relatively narrow top – there is a number of high-profile publications, but relative to the overall publication record volume tends to dominate over distinct highlights. However, the Panel recognised that this culture may be changing with the younger generation of scientists who also have more international experience. For instance, Carneiro has a solid publication record despite being clearly more junior than many of the other integrated researchers.

The large number of collaborations (involving many different countries and continents) denotes high visibility of the Unit abroad; in particular InBIO has strong collaborations with African countries. The impact on society is significant and is characterized, for instance, by policy involvement in EU, Europe and South America.

As described in the application, InBIO researchers were key players in securing EU funding to build in-house capacities. This is particularly visible in genomics and metagenomics and led to publications in top ranking journals. They also established research contracts with the industry.

The mobility of PhD and postdocs is reasonably good already but could be further encouraged in the future. In conclusion, the scientific merit of the team of integrated researchers in the application is excellent.

International collaborations and projects should be actively encouraged. It might be very sensible to start a peer-review support system for grant proposals at all levels to make sure the applications submitted are maximally competitive.

The Panel agreed that the R&D Unit proposed an excellent plan for the future. The Unit has conducted a SWOT analysis to identify gaps and deficiencies rather than just running with “more of the same”. This shows strategic thinking at the top of InBIO. There are four very broad objectives around excelling, strengthening, connecting and impact.

The excelling and strengthening objectives are underpinned by proposed new appointments at both ECR and senior level (which will reduce pressure on the former), additional funding bids outside the FCT (mostly through EU instruments) and a Teaming project with the University of Montpellier (which has one of the best groups of ecologists in the world). It is also great to see plans for the addition of researchers working at the interface between social science and ecology.

The Unit communicates a palpable sense of direction, purpose and ambition, and working with the very good base of human capacity present, is expected to have a solid platform for success in the future as well.

The focus of the connecting objective is very much outward looking. There are some great plans here and although it does not ignore the development of internal connections, it would be nice to see some more detail on these (i.e. how the various research leads interact). The plans for increasing autonomy of research leads is a good idea but the management team should be wary about how progress and welfare of the teams being supervised is assessed externally, ECR training and mentoring should be at the heart of this).

The impact proposals are very good (although there could still be more outreach) and the internationalisation plans have some excellent ideas (e.g. international PhD co-supervision). The training plans are good, particularly the plans for developing countries. The plans for open science are good in general but there was very little detail given on open access publications.

Recommendations:

- 1) Think about how mentoring and monitoring ECRs within research groups might work (external mentors)
- 2) Think about how to increase open access to scientific publications
- 3) Think about how to increase connections within InBIO (and whether this is needed)

## Evaluation Panel: NATURAL SCIENCES – Biological Sciences, Biodiversity and Ecosystems

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**R&D Unit:** Unidade de Ciências Biomoleculares Aplicadas (UCIBIO)

**Coordinator:** Maria João Romão

**Integrated PhD Researchers:** 127

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**Overall Quality Grade:** EXCELLENT

### Evaluation Criteria Ratings

- (A) Quality, merit, relevance and internationalization of the R&D activities of the Integrated Researchers in the R&D Unit Application: 5
- (B) Merit of the team of Integrated Researchers: 5
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 4

**Base Funding for (2020-2023):** 2266 K€

### Recommended Programmatic Support

PhD Fellowships: 16

Programmatic Funding: 972 K€, including for 4 (2 Junior, 1 Auxiliar, 1 Principal) New PhD Researchers Contracts.

### Justification, Comments and Recommendations

UCIBIO is an excellent R&D Unit gathering outstanding scientists who perform collaborative research in biomolecular sciences (novel drugs, glycan function, renewable resources and biotechnologies, microbial diversification and virulence, nanoformulations for therapeutics). In 2013-17, they have published a significant number of papers in top ranking and/or excellent journals. UCIBIO is internationally well recognised, as proved by the large number of international projects and collaborations. UCIBIO is also strongly committed to training and active in education and career development of young researchers. Their excellent interdisciplinary research in chemistry and biology, based on experimental and theoretical work, is also transferred to industry thanks to the collaboration with companies and has impact on society through dissemination activities not only for scientists but also for the general public.

The coordinator stated criteria of success in the coming period including obtaining international competitive grant(s), such as ERC and increasing the funding coming from industrial partners. The Panel strongly support these aims and find that there is a clear potential for making these aims feasible as the Unit harbours exceptional talent including an ERC Starting grant holder.

The Unit has a strong organisation that balances well the freedom of individual researchers and research groups, while keeping a focus and fostering collaboration within the Research Unit as well as with external partners.