

Evaluation Panel: THEMATIC AREAS - Sustainable Energy Systems, Circular Economy and Technologies for the Environment

Panel Members

David Dowling (Chair)	Institute of Technology Carlow, Ireland
Evangelos Gerasopoulos	National Observatory of Athens, Institute of Environmental Research and Sustainability , Greece
J J Leaky	Dept of Chemical Sciences, University of Limerick, Ireland
Mirella Di Lorenzo	Dept. of Chemical Engineering University of Bath, United Kingdom
Rory Doherty	School of Natural and Built Environment, Queen's University Belfast, United Kingdom
Tomas Macek	University of Chemistry and Technology Prague, Czech Republic
Ulrich Bay Gosewinkel	Aarhus University, Denmark

R&D Units

Centro Bio: Biorefinarias, Bioindústrias e Bioprodutos (Centre Bio)	Associação BLC3 - Campus de Tecnologia e Inovação
Centro de Inovação em Engenharia e Tecnologia Industrial (CIETI)	Instituto Superior de Engenharia do Porto (ISEP/IPP)
Centro de Investigação em Ambiente e Sustentabilidade (CENSE)	NOVA.ID.FCT - Associação para a Inovação e Desenvolvimento da FCT (NOVA.ID.FCT/FCTUNL/UNL)
Centro de Investigação em Cidades Inteligentes (C2I2)	Instituto Politécnico de Tomar (IPT)
Centro de Investigação em Energia e Ambiente (CINEA-IPS)	Instituto Politécnico de Setúbal (IPSetúbal)
Centro de Investigação para a Valorização de Recursos Endógenos (VALORIZA)	Instituto Politécnico de Portalegre (IPPortalegre)
Centro de Recursos Naturais e Ambiente (CERENA)	Associação do Instituto Superior Técnico para a Investigação e o Desenvolvimento (IST-ID)
Centro Interdisciplinar de Desenvolvimento e Investigação em Ambiente, Gestão Aplicada e Espaço (DREAMS)	COFAC, Cooperativa de Formação e Animação Cultural, CRL (COFAC)
Unidade de Investigação em Materiais, Energia e Ambiente para a Sustentabilidade (proMetheus)	Instituto Politécnico de Viana do Castelo (IPVC)

Evaluation Panel: THEMATIC AREAS - Sustainable Energy Systems, Circular Economy and Technologies for the Environment

R&D Unit: Centro Bio: Biorefinarias, Bioindústrias e Bioprodutos (Centre Bio)

Coordinator: João Miguel dos Santos Almeida Nunes

Integrated PhD Researchers: 12

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: 4
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 5

Base Funding for (2020-2023): 150 K€

Recommended Programmatic Support

PhD Fellowships: 2

Programmatic Funding: 165 K€, including for 1 (Auxiliar) New PhD Researcher Contract.

Justification, Comments and Recommendations

The Unit is pursuing the right balance between applied research, scale-up and business development, which is reflected in the personnel structure of its leading body. The Unit's short track record already includes (a) high speed of getting their ideas ready for the market, (b) high potential for societal impact regionally by valorisation of local natural resources and waste products, (c) supporting local enterprises in creation of local employment through upskilling. The Unit's infrastructure is impressive for an operation of this small size, ranging from analytical facilities to machine shops for making equipment. The Panel wishes to support the human resource through the allocation of an Auxiliar researcher to the support the supervision of PhD students.

The Panel recommends 2 PhD students to join the Unit in order to add to the critical mass of researchers. This recommendation is based on the Panel's evaluation during the site visit, irrespective of the Unit's funding request.

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R&D Unit: Centro de Inovação em Engenharia e Tecnologia Industrial (CIETI)

Coordinator: António Alfredo Crispim Ribeiro

Integrated PhD Researchers: 35

Overall Quality Grade: 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: 3
- (B) Merit of the team of Integrated Researchers: 3
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 3

Base Funding for (2020-2023): 434 K€

Recommended Programmatic Support

PhD Fellowships: 4

Programmatic Funding: 275 K€ .

Justification, Comments and Recommendations

The quality of the research performed by CIETI activities is good, the scientific merit can be considered good as well. The Research Unit is involved in many areas of leather technology, biofuels, solid waste valorisation, active carbon production and air quality, biomaterials, thin film application, remote experimentation in engineering education and electronics systems design. This wide range of interests has good relevance. The cooperations and contacts are mostly oriented to Spain and Portugal, CIETI research work results from the collaboration with industrial companies, particularly in applied research projects,

The team of 35 Integrated PhD Researchers is supported by 8 collaborators. The team consists of people having performed innovative research and development activities of recognized quality advancement of knowledge and application in areas of their activity in the national perspective. Further internationalization is recommended for the R&D activities of the Integrated Researchers in the R&D Unit, that will need widening of contacts also to other countries than only neighbouring Spain.

The objectives can be considered as appropriate, the strategy and the plan of activities are good and well organized. Unique in comparison to other applicants is the covering the field of leather industry. There is limited contact with foreign researchers and students. To improve number of foreign students (Erasmus), more topics should be taught in English language, too.

The evaluation Panel does consider that the allocation of 4 PhD students will consolidate the current activities within the centre and provide a strong platform for stronger growth. The Programmatic Funding can also be applied for a multiwavelength refractometer for biophotonics.

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R&D Unit: Centro de Investigação em Ambiente e Sustentabilidade (CENSE)

Coordinator: Rui Jorge Fernandes Ferreira dos Santos

Integrated PhD Researchers: 27

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: 4
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 5

Base Funding for (2020-2023): 482 K€

Recommended Programmatic Support

PhD Fellowships: 7

Programmatic Funding: 261 K€, including for 1 (Junior) New PhD Researcher Contract.

Justification, Comments and Recommendations

The vast majority of the research group are actively performing and leading research of an international quality with research areas of international reputation.

The Unit provided evidence of high quality contributions that would be viewed as either internationally excellent or leading in their respective fields with evidence that research area around electrokinetics is an international reference.

The Unit has produced clear impacts on policy and science communication with active participation by researchers in national and international Panels across several areas including climate change, the circular economy and water.

The merit of the researchers was evidenced with editorships of leading international journals, memberships of international expert committees and project evaluation Panels. There is evidence that many alumni are now continuing careers in leading institutions internationally and driving policy through local NGOs nationally. Leadership has been demonstrated through the Climate KIC hub Portugal and development of Eco.nomia web platform for government. The Unit also provided evidence of impact awards and popular science dissemination.

The Unit has a clear organizational structure with good representation at all levels (including PhD students). A very collegiate environment is promoted with frequent opportunities for interaction with rapid integration of new researchers in 'Melting Pot' meetings.

The site visit evidenced that disagreement about future plans is tolerated by CENSE's management, highlighting the existence of academic freedom in practice. At the same time, this is also a weakness of the Unit and explains the apparent absence of a targeted research strategy.

The TRL range of projects is biased towards higher end where expected societal impact might be expected to be more immediate than was apparent from report.

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R&D Unit: Centro de Investigação em Cidades Inteligentes (C212)

Coordinator: João Manuel Mourão Patrício

Integrated PhD Researchers: 13

Overall Quality Grade: 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: 3
- (B) Merit of the team of Integrated Researchers: 3
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 4

Base Funding for (2020-2023): 151 K€

Recommended Programmatic Support

Programmatic Funding: 219 K€, including for 1 (Auxiliar) New PhD Researcher Contract.

Justification, Comments and Recommendations

C212 is a relatively small Unit, newly established that has not received any FCT support yet. The two existing groups have dealt with interesting topics, mostly via project participation (not leading), e.g. with significant benefit for the urban societies, as soon as it is feasible to be placed under a smart city concept.

A well articulated relation with companies (e.g. IBM, Mitsubishi, Siemens) that provides by-directional opportunities for both sides and especially for C212 Unit researchers, in addition to the advantage of the proximity to some of them. The interaction is further assisted by invitation to company staff to deliver lectures. The Unit is also close to the markets they are targeting for and other key players, while quite good engagement exists with local authorities, which is essential for smart city applications. The strategy of hosting industrial companies on site facilitates leveraging of joint projects.

Quite a fresh Unit with respect to the number of researchers having acquired their PhDs in the last period, providing momentum well framed by the experience of its more mature colleagues. Yet, there are no adequate international projects evidencing leadership of the Unit.

A unique laboratory dealing with “Robotics” including the deployment of UAVs for water surface applications among other applications, is certainly one of the strong assets of the Unit and should be brought forward. A mature application providing information to the elderly people via TV sets about house conditions and other personalized information was of real interest, with unambiguously high societal impact, and should show the way for high TRL applications. Aquaponics is also a research activity of the Unit that can really be brought forward at the national level.

The field of big data and machine learning toward artificial intelligence systems for supporting smart city management is a direction that the Unit has the competence to pursue, and it certainly worth as it is indeed an emerging field that steadily becomes a necessity, yet the maturity of the Unit in doing so has not yet been demonstrated. In the same context, the cyber-security challenges for different source data utilization (including IoT) is an element that needs further investment and could make the difference with respect to added value.

As far as internationalization is concerned, it is not that extended, even though there is involvement in projects and an ongoing collaboration with Kiev, but there is not much indication of engagement with international networks especially those of “smart cities”, an element necessary to upscale activities and increase opportunities for collaborations, leading to project attraction. The European Innovation Partnership for Smart Cities and Communities (EIP-SCC, <https://eu-smartcities.eu/clusters>) is one of the European partnership that the Unit can refer to, in order to waive its path towards collaboration opportunities outside Portugal. EIP-SCC and other relevant initiatives can pave the ground for attracting more funds from the private sector, in and outside Portugal, which is something that is markedly missing from the Unit.

The allocation of a new PhD Researcher (Auxiliar) will provide the newly established Unit with a dedicated resource to support one of its activities. Programmatic Funding can be partially applied for spares and consumables including specific components requested like remote sensor devices for IoT, equipment for aquaculture studies, robotic vehicles components.

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R&D Unit: Centro de Investigação em Energia e Ambiente (CINEA-IPS)

Coordinator: João Nuno Pinto Miranda Garcia

Integrated PhD Researchers: 12

Overall Quality Grade: WEAK

Evaluation Criteria Ratings

- (A) Quality, merit, relevance and internationalization of the R&D activities of the Integrated Researchers in the R&D Unit Application: 2
- (B) Merit of the team of Integrated Researchers: 4
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 4

Justification, Comments and Recommendations

CINEA is a single Unit in energy management, including heat pumps, which is backed by industry collaboration. The leader of the Unit is the coordinator of a relevant H2020 research project, and it must be stated that he is a strong asset for this Unit. The Unit needs to increase the number of its integrated researchers who actively pursue research of an international quality. The Unit should further promote international activities and opportunities for all researchers.

The Unit has some impact in terms of its work with business and should continue to strengthen this aspect. The ecosystem they interact with is indeed the companies in the region and the model is to transfer good practices via international projects.

The Unit's factual management structure, as demonstrated during the site visit, could be improved substantially. Further promotion of collegial activities across all levels should be considered. The Unit also appears to lack an internal strategy for optimizing their own potential, as e.g. an internal process to stimulate brainstorming between the Unit members appears to be absent. Formal or informal meetings should be drastically increased to provide further opportunities to all researchers for getting involved and develop initiatives.

The Unit should also consider ethical issues such as management of data.

Their plans for their own future development are appropriate and consistent with the Panel's prediction that this Unit will receive higher ratings in the next FCT call for proposals.

The Panel would like to recognise and commend the effort of staff who have undertaken and completed PhD research in addition to full time teaching and family commitments.

There is a clear gap in the geographical area to support Air Quality Monitoring activities, thus it would be desirable to find some funding to support the Unit's relevant requests. The societal impact of this would be really large in terms of awareness and cohesion.

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R&D Unit: Centro de Investigação para a Valorização de Recursos Endógenos (VALORIZA)

Coordinator: Paulo Sérgio Duque de Brito

Integrated PhD Researchers: 23

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: 3
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 5

Base Funding for (2020-2023): 330 K€

Recommended Programmatic Support

PhD Fellowships: 4

Programmatic Funding: 185 K€, including for 1 (Auxiliar) New PhD Researcher Contract.

Justification, Comments and Recommendations

Overall the Panel was positively impressed by VALORIZA's vision and mission, frame of objectives and societal impact, which are focused on the sustainable valorisation of endogenous resources in low-density territories. This is a centre that has great potential and that we expect it to flourish in the next five years. The facilities available are very good and allow pilot-scale testing that can be readily scalable at industrial level. This is remarkable and not usual in research. The centre can take advantage of an ideal geographical location, which is at the border with Spain and areas that suffer from similar challenges. They have now to grow in terms of scientific impact and increase the number of scientific publications in peer reviewed international journals as well as raise their international profile. On the other hand, this may be challenging in a technology-driven centre that may prioritise patenting and IP protection. The international links are weak but this is acknowledged by the centre and there is a good internationalisation plan to enhance this aspect.

The centre had remarkably increased the number of fellow researchers during the past year, from 4 to 17 and of collaborative researchers from 28 to 36, which looks very positive and shows that the centre is growing. The plan for the next five years is sound and shows a very good level of ambition. The centre well embeds circular economy in their research activities, building national leadership in the field (e.g. via the circular economy forum). The research activities show a very highly interdisciplinary mix. The research activities are considered excellent by the Panel in terms of merit and societal impact, with a very good involvement of local entrepreneurs and companies that surely feed into local esteem, thanks to a local challenge-driven approach. Although focusing on local issues, the solutions developed can be extrapolated to other territories that suffer from similar challenges. Recommendations for enhancing the PhD/Post Doc experience and enhance opportunities for career development: maximise training opportunities in transferable skills; encourage international short internships to enhance the student experience as well as rise the international profile of the centre.

The centre recognises that the major investment should go into human resources. On these premises, we allocate 4 PhD scholarships and 1 Auxiliary Researcher with PhD. With regard to application of Programmatic Funding, the Panel recommends its partial use for networking events that can help achieve the internationalisation strategy of the team, as well as the participation in international conferences, and also for the purchase of equipment and consumables for the research activities.

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R&D Unit: Centro de Recursos Naturais e Ambiente (CERENA)

Coordinator: Maria João Correia Colunas Pereira

Integrated PhD Researchers: 63

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: 4
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 4

Base Funding for (2020-2023): 1092 K€

Recommended Programmatic Support

PhD Fellowships: 7

Programmatic Funding: 685 K€, including for 1 (Junior) New PhD Researcher Contract.

Justification, Comments and Recommendations

CERENA is a well-established research centre with activities spanning several evaluations. The three individual research thematic fields have a good balance between them. The projects undertaken span the entire TRL level with good connectivity between pipe line and application. It has a strong publication record. It graduated 54 PhD students between 2013 and 2017. The high level of publications demonstrates esteem within peer academic community.

All of the post-docs interviewed were very forth-coming and have high degree of independence within their group. All were Portuguese. Internationalisation of post-doctoral research community would demonstrate stronger evidence of international research reputation and esteem.

There is strong evidence of societal impact particularly for the geostatistical methods which have important application in geological risk assessment. This work is also an international reference which has been accepted by the international modelling community. The novelty and application of the work undertaken in biomaterials is very important in a Portuguese context but is readily deployable in an international context. The Unit has very good partnerships with industry, the impacts of these successes (e.g. job creation, funding, collaboration) should be recorded.

The Unit organised 5 conferences and participated as chair in more than 40. It is very active in EU programs particularly COST Actions, and participated in nine H2020 projects and coordinated an FP7 project.

It would be useful for the centre to record and document the impact of their research recognising that the destinations of their PhD graduates are important in establishing reputation of the centre. The PhD students highlighted an open research environment with good links with industrial partners that afforded them an advantage.

Their future strategy is well developed. They recognise and articulate the specific scientific challenges that they face and have a plan to meet these challenges through a series of thematic specific as well as cross cutting actions. The budget request for these is well argued with a plan in place for 50% co-funding.

Programmatic funding can be used to leverage funding from additional sources to develop a comprehensive instrumentation suite materials characterisation and imaging.

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R&D Unit: Centro Interdisciplinar de Desenvolvimento e Investigação em Ambiente, Gestão Aplicada e Espaço (DREAMS)

Coordinator: João Alexandre Medina Corte-Real

Integrated PhD Researchers: 16

Overall Quality Grade: WEAK

Evaluation Criteria Ratings

- (A) Quality, merit, relevance and internationalization of the R&D activities of the Integrated Researchers in the R&D Unit Application: 2
- (B) Merit of the team of Integrated Researchers: 3
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 2

Justification, Comments and Recommendations

DREAMS underwent an unforeseen change in leadership in the last years. This was used to proceed to a significant redirection of its strategy and planning for the next period, deviating markedly from that included in the report. The new strategic planning is aligned with the main directions for Circular Economy and the Unit needs to consolidate its competence in the new areas to be mature to achieve the new targets set.

The Unit needs to align its international level output among all its Integrated Researchers taking this new planning into account.

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R&D Unit: Unidade de Investigação em Materiais, Energia e Ambiente para a Sustentabilidade (proMetheus)

Coordinator: Manuel Joaquim Peixoto Marques Ribeiro

Integrated PhD Researchers: 18

Overall Quality Grade: 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: 3
- (B) Merit of the team of Integrated Researchers: 4
- (C) Appropriateness of objectives, strategy, plan of activities and organization: 4

Base Funding for (2020-2023): 217 K€

Recommended Programmatic Support

Programmatic Funding: 210 K€, including for 1 (Auxiliar) New PhD Researcher Contract.

Justification, Comments and Recommendations

Prometheus brings together strong individual research teams into an integrated centre in order to leverage their activity in a future program. The group recognizes that the formation of Prometheus will give them greater visibility within their Institute and enable them to improve the research ecosystem providing a platform for better engagement with national and international funding agencies as well as local and national industry. They also are highly conscious of the cross-border impact of their research activities.

The academic research output for the 18 PhD researchers is very high considering the strong teaching ethos within the institution. They recognize the value of targeting high impact publications with >7000 citations to date.

The academic output is matched with national, industrial and EU funded projects with high local societal impact but with applicability and internationally.

Prometheus has had considerable recent success in winning competitive infrastructural funding which has allowed it to upgrade its research analytical capability, particularly in materials characterization. This is a very strategic use of funding as the instrumentation suite provides cross-cutting support for the main research thematic areas Prometheus wishes to target.

The future plan and requested budget represents a good blend of human resources and infrastructure and target competencies where they believe they can leverage their existing capacity into new projects with higher impact.

The allocation of a new researcher (Auxiliar) will provide a dedicated resource to the newly formed research centre. This is regarded as important in order to consolidate the work to date and develop for the future.