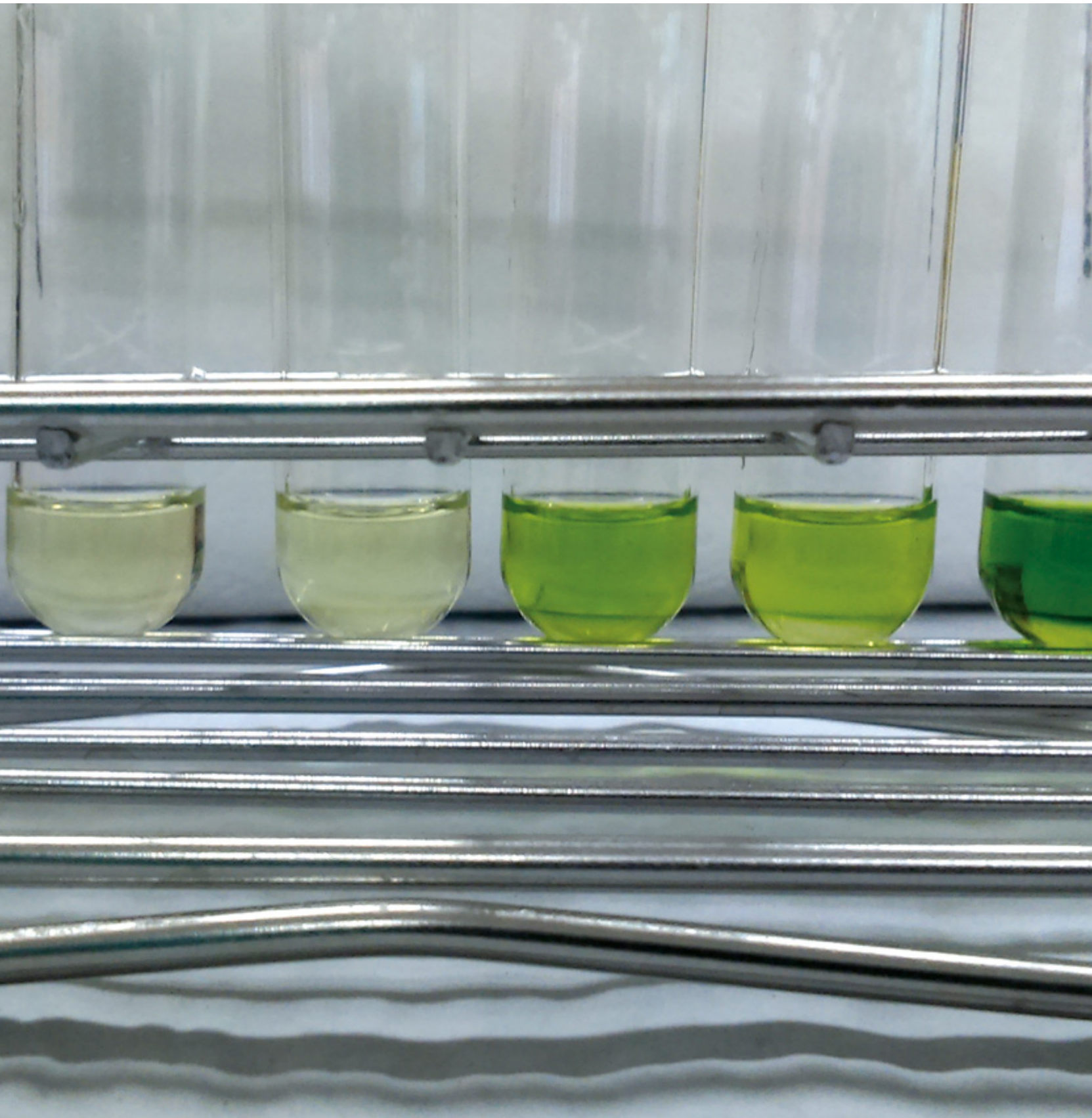
Strategic projects



Integrated projects

2017 marked the start of 6 strategic projects for UA, of particular relevance both because of the research themes and because they reinforce the UA's role and relationship with the Centro region. These are interdisciplinary, basic research-oriented projects, aiming the development of research lines aligned with the strategy of the region and to potentiate UA's research capacity in pivotal research areas (Energy; Agrofood; Sea; Health; IT and Territorial Innovation). These IC&DT integrated programmes are expected to have profound impact in terms of attraction and fixation of highly skilled researchers. They represent 7.5 M€ of funding and 68 new hirings to the university.

cENTER – Community-led Networks for Territorial Innovation
3 years; 1.2 M€; 11 Human Resources hired

The main idea behind "CeNTER – Networks and Communities for Territorial Innovation" Integrated Program is that regions are considered as engines of innovation through their communities and local networks, which should be fostered and encouraged. cENTER will contribute to research in the area of Territorial Innovation Systems by studying and analyzing the dynamics between the different regional actors (public institutions, companies and communities) involved in regional development, and propose a new framework for assessing territorial innovation capacities at regional level. It evolves on three main themes: Territory; Mediation and valuation; and Employment and quality of life. The first is focused on people, practices and resources, which means that the study to be conducted in this project will contribute to the identification, characterization and systematization of a wider knowledge of regional innovation practices and resources. The second focus on the analysis of three (selected) vectors of innovative action: public policies, social innovation and digital mediation, which will be considered in the context of this proposal as "mediating platforms". The third explores the impact of innovation on the territory, particularly in areas such as employment, tourism and health, and quality of life. The Program will take advantage of the amplifying potential of digital media, which will be conceived and validated in a Portuguese NUTS II region – with the support of a major regional partner in the TICE sector (Altice Labs, formerly PT Inovação). In addition, the Human Capital Observatory and Performance of Regional Innovation will be created at UA, which will provide a better understanding of the engines and innovation barriers and their support for better policies. The objective is to assist public policy makers and economic operators in the third sector to contribute to the development objectives identified for CENTRO Region, taking into account this specific programming period of European funding.

SmartBioR – Smart Valorization of Biological and Marine Resources
(in collaboration with Leiria Polytechnic Institute – IPL); 3 years; 1.1 M€; 11 Human Resources hired (UA)

Coordinated by UA and developed in partnership with IPL, the SmartBioR program aims at the sustainability, preservation and valorization of endogenous marine resources, using scientific knowledge of excellence and technological innovation for its monitoring and integrated management. The main objective of SmartBioR is to contribute to the enhancement of scientific research skills, technological development and innovation in Portugal Centro-Region, through the recruitment, at national and international level, of highly skilled human resources holding scientific knowledge that complements that already consolidated at UA and IPL. This approach also enhances technology transfer to regional companies in order to promote competitiveness and penetration in new markets. Research and innovation activities are organized according to the two ecosystems corresponding to the territorial action of the members of the consortium: Ria de Aveiro, site of the Natura 2000 Network and Special Protection area of the EU, and Berlengas, UNESCO Biosphere Reserve, and coastal areas along the Midwest region of Portugal. In each ecosystem, specific lines of action are addressed. For instance, at Ria de Aveiro, these lines include 1) Preservation and Sustainability of Endogenous Natural Resources, 2) Monitoring and Integrated Management of Endogenous Natural Resources, and the fostering of more sustainable production practices in line with the principles of circular economy and 3) Development of Products, Processes and Services Targeting the Promotion of Value Chains Associated with Endogenous Natural Resources. SmartBioR will act as a driver that can stimulate a technological based economy, with inherent high added value, promoting an upgrade in the modernization of research units along with the skills of its human resources. By privileging excellence and fostering cooperation, it will be possible to join and/or reinforce the position of the research units enrolled in SmartBioR in international networks for R&D&I.

AgroForWealth – Biorefining of agriculture and forest byproducts

3 years; 1.2 M€, 10 Human Resources hired

AgroForWealth aims to develop a strategy for the valorization of a multitude of agrofood and forest residues within the emerging circular economy concept, calling upon a well-defined set of common and integrated biorefinery approaches implementable in a single unit, and easily extended to any type of by-product, and to create new products with nutraceutical added value, contributing to add value to these key sectors of the Portuguese economy. To achieve this global objective, the project focus on a number of specific objectives related to i) agricultural and forest by-products resources inventory; ii) characterization, biological evaluation, processing and product development technologies; iii) organization/human resources; iv) scientific productivity and intellectual property and v) economic impacts. Strategies that allow by-products valorization using sustainable and environmentally friendly extraction/fractionation processes, (bio)chemical processing techniques, their biological evaluation, followed by formulation/product design methodologies will be used. Also, process design and simulation tools will be used, applied to the knowledge generated with the case study by-products, proceed to the pilot scale demonstration of most promising concepts, and, of utmost importance in a long-term perspective, and In the establishment of the fundamental requirements for the exploitation of any other type of agrofood and forest by-products in a globally integrated process. The progamme brings together expertise in key areas as: a) biomass characterization and fractionation using environmentally friendly processes, b) improvement of potentially valuable fractions/compounds, c) assessment of their biological/nutritional properties, d) product design, and process modelling and scale-up. It will have a strong impact both at national and international level, since its easy application to any agrofood and forest by-product is one of the targets of the project. Nevertheless, it will have a much quicker impact in Centro Region as the development of the project will be based on by-products with regional relevance.

SusPhotoSolutions – Sustainable Photovoltaic Solutions

3 years; 1.2 M€, 10 Human Resources hired

The objective of this integrated program is the development of sustainable solutions for photovoltaic energy conversion, including new solar cells based on non-critical materials with low toxicity. The project also addresses the variability and the intermittence of the solar energy through the transformation of green electricity in hydrogen and the energy efficiency of the proposed solutions will be estimated through life-cycle analysis. A large interdisciplinary team of scientists (physicists, chemists, material and environmental engineers) are involved in a common effort to foster the internal cooperation between the three Associated Laboratories (CICECO, I3N-Aveiro and CESAM) and between the University and regional and national industries from the solar energy and agro-industry sectors. The project develops around 5 scientific work packages, related to 1) innovative solar cells with less toxic component layers, 2) extraction and purification of chromophore-containing proteins from algal resources, 3) lightweight and flexible luminescent solar concentrators based on chromophore–containing proteins mimicking natural photosynthesis, 4) variability and intermittence and 5) life-cycle assessment supporting sustainable photovoltaic solutions. SusPhotoSolutions will consolidate the role of UA as an international leading centre in renewable energies (namely solar energy).

SOCA – Smart Open Campus

3 years; 1.2 M€, 14 Human Resources hired

SOCA wants to explore the physical reality of UA Campus, as the substrate to potentiate this living environment. The sensing of the person in physical context enables personalized and predictive responses, and is a major step towards a smarter and safer environment. SOCA's main objective is to create a living environment based on an open innovation ecosystem where data is gathered from multiple sources, processed, integrated, and made available for applications and users, and that is able to create a service sphere able to assist every individual inside it, while supporting continuous innovation. The project borns from the assumption that sensing (the environment and the individual), data transfer (a telecommunications and networking problem), extracting value from the data (a big data problem) and finally services (consuming the data) have to be developed with a dual objective: on one hand assessing and evolving "real" services and on the other promoting the development of technologies and devices for novel systems and services. More specific aims, namely related to 1) sensing the environment: to deploy sensors for environmental data gathering, allowing local and remote processing, classification, storing and alarm generation without intrusion and privacy invasion; 2) sensing the individual: health monitoring by means of wearable systems, allowing automatic alarm generation and/or direct and unattended call for help without human intervention; 3) data transfer: supported by a high-performance communications infrastructure, enabling the transport of large amounts of data to/from the users as well as from diverse sensing devices. Moreover, it will serve as a testbed for most of the concepts and technologies that are currently being developed by the research groups of DETI, as well as an integrated showcase for most of what is DETI's research and high-end training; 4) assistance: deployment of autonomous cooperative robots able to interact with humans in different ways, such as providing several services, assistance in specific (elderly, emergency) situations or even human and space monitoring, while connected to a network of information and processing technologies to assist in autonomous decision counseling. The long-term goal would be to have a multiagent, multidevice integrated system, able to provide different levels of assistance not only to the UA community (e.g., students, teachers, administrative and technical staff) in their studying and/or working environment, but also to visitors and eventually to other members of the society and 5) learning: develop learning methods and strategies that allow the above systems to adapt over time.

pAGE – LifeLong Protein Aggregation

4 years; 1.6 M€, 12 Human Resources hired

The overarching goal of pAGE is to elucidate the role of protein aggregation on aging and aging related diseases. It will also develop sensors and highly sensitive pre-clinical PET technology for early detection of protein clumps and drugs with protein disaggregation activity. To achieve these ambitious objectives, pAGE assembles scientists from 4 multidisciplinary research centers and associated laboratories of the UA: iBiMED, CICECO, QOPNA and I3N. In doing so, pAGE gathers together expertise in Physics, Biomedical, Medical and Chemical Sciences and Engineering to promote translation of knowledge into clinical applications. In particular, the program will develop cell and animal models of aging related protein aggregation (ARPA) and disease associated protein aggregation (DAPA), characterize these protein clumps in humans and mice across the lifespan, develop new technologies for early detection of ARPA/DAPA and chemical chaperones to erase these disease-induced clumps from aging cells. pAGE will advance knowledge on aspects of ARPA and DAPA where existing expertise, technology, research facilities and research context allow us to make progress and will provide multiple opportunities of advanced training to young researchers, trying to answer to specific research questions: 1) when does ARPA start in humans and mice?; 2) which proteins aggregate the most during aging and how? Which biological processes are affected?; 3) which diseases are affected the most by ARPA? 4) what is the impact of ARPA/DAPA on physiology, stress response, genome and epigenome?; 5) can ARPA/DAPA be useful to determine tissue aging and therapeutic outcomes in chronic diseases? 6) can ARPA/DAPA be detected early and controlled by chemical chaperones? pAGE is strategically aligned with Horizon 2020 and the regional intelligent specialization (RIS) strategy.