PORTFOLIO INSTITUTO POLITÉCNICO DE BRAGANÇA - IPB

http://portal3.ipb.pt/index.php/pt/ipb/investigacao/unidades-de-investigacao

1. Saúde, Alterações Demográficas e Bem-Estar (SC1)

http://portal3.ipb.pt/index.php/pt/ipb/investigacao/unidades-de-investigacao/sc1

Topics	Target Sectors/Organisations
Plants, traditional knowledge, agroecosystems and new trends in rural development. Flora diversity, traditional plant use, management and conservation. Interdisciplinary study of plants and human cultures, including past and present relationships between people and environment. Management and conservation of plant genetic resources. Medicinal plants, wild edibles, local food and medicine, nutraceuticals and mediterranean food. Safeguarding of intangible cultural heritage, valorization of underutilized and underexploited plants and crops and impacts in rural development. **Contato:** Ana Maria Carvalho anacarv@ipt.pt	Authorities and institutions for biodiversity management and conservation; Educational and promotional initiatives on sustainable agriculture and rural development; Institutions and networks linking cultural heritage and new approaches for rural development.
Chemistry of natural products: extraction, identification, fractionation and isolation of chemical compounds in natural matrices (focused on food matrices). Chromatographic and spectrometric techniques: GC-FID, GC-MS, HPLC-DAD, HPLC-RI, HPLC-FL, LC-MS, NMR. Nutraceuticals and functional foods: development of nutraceuticals and innovative food formulations with functional properties. Evaluation of antioxidant properties by chemical and biochemical assays with animal cells. Evaluation of antitumor properties though screening in human tumor cell lines, cell cycle and apoptosis analysis; Hepatotoxicity assays. Incorporation of natural extracts/fractions/compounds (free or protected) in food formulations. Technology of natural products: emergent technologies for conservation of food matrices (guaranteeing food quality, safety and security). Gamma and electron beam irradiation of food products. Application of natural preserving ingredients. **Contato:** Isabel C. F. R. Ferreira iferreira@ipb.pt	Agro-Food Industry; Pharmaceutical Industry; Cosmetics Industry.
Development of new products, namely fermented, development of probiotics, natural products for food preservation, determination of the nutritional and bioactive properties (antimicrobial, antioxidant, anti-inflammatory, antitumoral and action mechanisms) of natural and synthesized products, development of electrochemical sensors to assess the physicochemical properties of food, evaluation of food safety and quality. **Contato:** Maria Leticia Miranda Fernandes leticia@ipb.pt	Food and Pharmaceutical Industries; Catering companies; Companies of food transaction.
Intelligent systems on a chip: creating intelligent algorithmic solutions suitable to run on inexpensive microprocessors. This approach allows us to develop standalone devices that show intelligent behaviors and help in the daily tasks, saving energy or giving support to the elderly people. **Contato:** Pedro João Soares Rodrigues pjsr@ipb.pt	Health sector; Electric power companies; Communications companies.
Econometric methods, promoting the evaluation of labor market policies, the market of health and the promotion of businesses policies and regional development policies. Acting on reality implies its knowledge. Only then is it possible to design and promote policies and measures that act on reality and could be effective in that role. **Contato:** Alcina Nunes alcina@ipb.pt	Consultancy agencies and companies; Employment Centres; Healthcare institutions; Development agencies.
Organic horticulture: plant physiology, nutrition and crop protection. Technology: climatic conditions and ecology. Social and therapeutic horticulture. **Contato:** Isabel de Maria Mourão isabelmourao@esa.ipvc.pt	Farms; Horticultural production organizations; Social farms and care organizations (disabled, children, elderly, others).
Electrochemical sensors for food analysis and health applications: development of new portable potentiometric and voltammetric multi-sensor devices for cost-effective, fast and in-situ applications. Qualitative (PCA and LDA), semi-quantitative and quantitative (MLRM and PLS) analysis: honey classification according to its colour and pollen profile, dentification of goat milk adulterations with bovine milk, juice level evaluation in non-alcoholic beverages, semi-quantitative and quantitative analysis of soft drinks,	Food industry and retailers: authentication and/or adulteration evaluations; Health sector: early detection of tumor activity.

gliadins semi-quantitative detection in foodstuffs, quantification of 2,4,6-trichloroanisole at ppt level in aqueous industrial cork solutions, development of aptasensors for detection of protein biomarkers for tumor activity assessment. **Contato:** António M. Peres peres@ipb.pt	
Performance assessments, data mining, data analysis and statistical methods and demand planning. **Contato:** Clara Vaz clvaz@ipb.pt	Health, Retail, Energy, Mobility and Manufacturing.
Polymer reaction engineering: experimental and theoretical studies with linear/non-linear polymerizations: free radical polymerizations involving transfer to polymer, terminal double bonds/multifunctional monomers, ionic polymerizations of multifunctional monomers, coordination polymerizations with crosslinking and terminal branching. Synthesis, characterization, testing of polymer networks and gels. Controlled radical polymerization (NMRP, ATRP, RAFT): batch, semi-batch and continuous reactors (micro-reactors), characterization of the products using Size Exclusion Chromatography (SEC) with refractive index (RI) and Multi-Angle Laser Light Scattering (MALLS) detectors. Fourier Transform Infra-Red (FTIR) Spectrophotometry with Attenuated Total Reflection (ATR): FTIR-ATR. Assessment of hydrogels/molecularly imprinted polymers (MIPs)/interpenetrating polymer networks (IPN) for controlled drug release and biomolecules immobilization. **Contato:** Rolando Carlos Pereira Simões Dias rdias@ipb.pt	Chemical Industries; Pharmaceutical Industries; Environmental Industry

2. Bioeconomia, Segurança Alimentar, Agricultura e Silvicultura Sustentáveis, Investigação Marinha e Marítima, Águas Interiores (SC2)

http://portal3.ipb.pt/index.php/pt/ipb/investigacao/unidades-de-investigacao/sc2

Topics	Target Sectors/Organisations
Plants, traditional knowledge, agroecosystems and new trends in rural development. Flora diversity, traditional plant use, management and conservation. Interdisciplinary study of plants and human cultures, including past and present relationships between people and environment. Management and conservation of plant genetic resources. Medicinal plants, wild edibles, local food and medicine, nutraceuticals and mediterranean food. Safeguarding of intangible cultural heritage, valorization of underutilized and underexploited plants and crops and impacts in rural development. **Contato:** Ana Maria Carvalho anacarv@ipb.pt	Authorities and institutions for biodiversity management and conservation; Educational and promotional initiatives on sustainable agriculture and rural development; Institutions and networks linking cultural heritage and new approaches for rural development.
Chemistry of natural products: extraction, identification, fractionation and isolation of chemical compounds in natural matrices (focused on food matrices). Chromatographic and spectrometric techniques: GC-FID, GC-MS, HPLC-DAD, HPLC-RI, HPLC-FL, LC-MS, NMR. Nutraceuticals and functional foods: development of nutraceuticals and innovative food formulations with functional properties. Evaluation of antioxidant properties by chemical and biochemical assays with animal cells. Evaluation of antitumor properties though screening in human tumor cell lines, cell cycle and apoptosis analysis; Hepatotoxicity assays. Incorporation of natural extracts/fractions/compounds (free or protected) in food formulations. Technology of natural products: emergent technologies for conservation of food matrices (guaranteeing food quality, safety and security). Gamma and electron beam irradiation of food products. Application of natural preserving ingredients. **Contato:** Isabel C. F. R. Ferreira iferreira@ipb.pt	Agro-Food Industry; Pharmaceutical Industry; Cosmetics Industry.
Development of new products, namely fermented, development of probiotics, natural products for food preservation, determination of the nutritional and bioactive properties (antimicrobial, antioxidant, anti-inflammatory, antitumoral and action mechanisms) of natural and synthesized products, development of electrochemical sensors to assess the physicochemical properties of food, evaluation of food safety and quality. **Contato:** Maria Leticia Miranda Fernandes leticia@ipb.pt	Food and Pharmaceutical Industries; Catering companies; Companies of food transaction.
Functional biodiversity and soil food-webs in sustainable agroecosystems: development of sustainable management of agroecosystems based on the conservation and enhancement of functional biodiversity (developing and validating ecological and biodiversity indicators (using arthropods and trait based approaches) to assess changes in quality and sustainability resulting from agricultural practices in agroecosystems; developing strategies and habitat manipulation programmes to enhance functional biodiversity in agroecosystems). **Contato:** Sónia Alexandre Paiva Santos saps@ipb.pt	Agriculture; Farmers Associations; Policy makers.
Methodologies to develop the tourism capabilities of the actors involved in wine industry: transferring best practices from countries where the wine tourism is already well connected to wine producers and a source of regional development to countries where wine producers are still focused in wine producing. **Contato:** Ricardo Alexandre Fontes Correia Ricardocorreia@ipt.pt	Wine regions communities; Wine-producing industry; Wine tourism organizations.
Organic horticulture: plant physiology, nutrition and crop protection. Technology: climatic conditions and ecology. Social and therapeutic horticulture. **Contato:** Isabel de Maria Mourão isabelmourao@esa.ipvc.pt	Farms; Horticultural production organizations; Social farms and care organizations (disabled, children, elderly, others).

Electrochemical sensors for food analysis and health applications: development of new portable potentiometric and voltammetric multi-sensor devices for cost-effective, fast and in-situ applications. Qualitative (PCA and LDA), semi-quantitative and quantitative (MLRM and PLS) analysis: honey classification according to its colour and pollen profile, dentification of goat milk adulterations with bovine milk, juice level evaluation in non-alcoholic beverages, semi-quantitative and quantitative analysis of soft drinks, gliadins semi-quantitative detection in foodstuffs, quantification of 2,4,6-trichloroanisole at ppt level in aqueous industrial cork solutions, development of aptasensors for detection of protein biomarkers for tumor activity assessment. **Contato:** António M. Peres peres@ipb.pt	Food industry and retailers: authentication and/or adulteration evaluations; Health sector: early detection of tumor activity.
Studies on soil fertility, plant nutrition, waste recovery: sustainable agriculture in farming systems located mainly in mountain areas (soil quality (physical, chemical and biological), soil fertility, nutritional status of crops, reuse of organic wastes, nutrient use efficiency). **Contato:** Margarida Arrobas marrobas@ipb.pt	Agriculture; Farmers; Agro-industrial; Farmers' organizations.
Biotechnological application of fungi as biocontrol agents: fungi application as biological control agents against plant pathogens and insect pests, and as plant growth promoter and disease suppressor, for sustainable agriculture (isolation, molecular identification and in the screening of native entomopathogenic and endophytic fungi to be used as BCAs against pests and diseases, respectively; application of BCAs into integrated pest management and sustainable agriculture systems; mechanisms of biological control of plant pathogens by endophytic fungi and of pests by entomopathogenic fungi; effect of ectomycorrhizal fungi on plant growth and plant health). **Contato:** Paula Baptista pbaptista@ipb.pt	Agro-chemical sector (biopesticides); Agricultural companies; Farmer associations; the Government; Consumers.
Genetic diversity and conservation of genetic resources: next generation sequencing technologies on honey bees to address a multitude of evolutionary questions with an application on breeding, management and conservation of honey bee genetic resources. **Contato:** Maria Alice Pinto apinto@ipb.pt	Beekeeping companies and associations.
Soil management and plant nutrition: cover cropping in perennial tree crops and vines; nitrogen and phosphorus management in agroecosystems; creation of standards for leaf analysis results interpretation in medicinal and aromatic plants. **Contato:** Manuel Ângelo Rodrigues agelor@ipb.pt	Agriculture; Farmers; Agro-industrial; Farmers' organizations.
Development of sustainable materials from renewable sources and/or with functional properties: polymer synthesis and characterization, materials and chemicals from biomass, microencapsulation, functional coatings, biodegradable products. **Contato:** Filomena Barreiro barreiro@ipb.pt	Food; Cosmetics;
Urban environmental quality, including monitoring using multiple sensors that provide data that is later analysed with GIS Software. Land Use Planning and Urban Issues such as: urban climate, noise, air pollution and waste management. Environmental management: energy and materials balances, life cycle analysis. **Contato:** Artur Gonçalves ajg@ipb.pt	Local and Regional Administration; Consulting; Food Production Industry; General Industry.
Measuring GHG and air pollutants fluxes through the atmosphere/vegetation/soil system, by means of micrometeorological (eddy covariance, concentration gradient) and chamber methods. Monitoring and modeling air pollution and air quality. Studies on carbon cycle and dynamics, especially related to CO2 and H2O exchange measurements in soil/vegetation/atmosphere system, both in urban and rural environments. Studies on urban system issues, with special focus on environmental functions of urban green spaces. life cycle analysis of food products. **Contato:** Manuel Feliciano msabenca@ipb.pt	Local and Regional Administration; Food Industries; Industry in general.

Post-harvest technologies applied to regional vegetable products and their influence on product characteristics. **Contato:** Elsa Ramalhosa elsa@ipt.pt	Industries of vegetable products that perform storage and/or transformation.
Food mycology and mycotoxicology: fungal isolation and identification from various matrices, mostly food, by polyphasic approach (morphological, molecular, spectral, physiological; mycotoxin detection from food matrices, by TLC, HPLC and ELISA. **Contato:** Paula Rodrigues prodrigues@ipb.pt	Food industry; Food biotechnology industries.
Food safety and quality in the production of traditional products: microbiological characterization; evaluation of microbiological conditions of food operators, utensils, equipments and surfaces; evaluation of the biotechnological potential of isolated yeasts during fermentation of table olives. **Contato:** Ermelinda L. Pereira epereira@ipb.pt	Food industry.

3. Energia Segura, Não Poluente e Eficiente (SC3)

http://portal3.ipb.pt/index.php/pt/ipb-en/research-and-innovation/research-topics-and-units/sc3

Topics	Target Sectors/ Organizations
Bioclimatic solutions on traditional architecture. Buildings energetic performance. Rehabilitation and maintenance for bio constructive diversity. Analysis of the Bioclimatic constructive solutions on traditional buildings and its future integration on contemporary construction techniques. **Contato:** António Jorge Ferreira Vaz jfv@ipb.pt	Construction companies.
Intelligent and adaptive complex cyber-physical systems: the application of distributed artificial intelligence systems, such as multi-agent systems allows introducing some important and demanding features in large-scale complex engineering problems, such as flexibility, robustness, reconfigurability, adaptation and responsiveness. These approaches shift the control paradigm from typical centralized approaches, which are no longer enough to address the requirements imposed by emergent and global environments, to an alternative way to design such systems based on the decentralization and self-organization of individual intelligent and self-adaptive entities. **Contato:** Paulo Leitão pleitao@ipb.pt	Manufacturing; Smart grids, Logistics; Automation; Robotics.
Intelligent systems on a chip: creating intelligent algorithmic solutions suitable to run on inexpensive microprocessors. This approach allows us to develop standalone devices that show intelligent behaviors and help in the daily tasks, saving energy or giving support to the elderly people. **Contato:** Pedro João Soares Rodrigues pjsr@ipt.pt	Health sector; Electric power companies; Communication companies.
Performance assessments, data mining, data analysis and statistical methods and demand planning. **Contato:** Clara Vaz clvaz@ipt.pt	Health; Retail; Energy; Mobility; Manufacturing.

4.Transportes Inteligentes, Ecológicos e Integrados (SC4)

http://portal3.ipb.pt/index.php/pt/ipb-en/research-and-innovation/research-topics-and-units/sc4

Topics	**Target Sectors/Organisations**
Urban environmental quality, including monitoring using multiple sensors that provide data that is later analysed with GIS Software. Land Use Planning and Urban Issues such as: urban climate, noise, air pollution and waste management. Environmental management: energy and materials balances, life cycle analysis. **Contato:** Artur Gonçalves ajg.ipb.pt	Local and Regional Administration; Food Industries; Industry in general.
Performance assessments, data mining, data analysis and statistic methods and demand planning. **Contato:** Clara Vaz clvaz@ipb.pt	Health; Retail; Energy; Mobility; Manufacturing.
Measuring GHG and air pollutants fluxes through the atmosphere/vegetation/soil system, by means of micrometeorological (eddy covariance, concentration gradient) and chamber methods. Monitoring and modeling air pollution and air quality. Studies on carbon cycle and dynamics, especially related to CO2 and H2O exchange measurements in soil/vegetation/atmosphere system, both in urban and rural environments. Studies on urban system issues, with special focus on environmental functions of urban green spaces. life cycle analysis of food products. **Contato:** Manuel Feliciano msabenca@ipb.pt	Local and Regional Administration; Food Industries; Industry in general.

5.Ação Climática, Ambiente, Eficiência na Utilização de Recursos e Matérias-Primas (SC-5)

http://portal3.ipb.pt/index.php/pt/ipb-en/research-and-innovation/research-topics-and-units/sc5

Topics	Target Sectors/Organisations
Urban environmental quality, including monitoring using multiple sensors that provide data that is later analysed with GIS Software. Land Use Planning and Urban Issues such as: urban climate, noise, air pollution and waste management. Environmental management: energy and materials balances, life cycle analysis. **Contato:** Artur Gonçalves ajg@ipb.pt	Local and Regional Administration; Food Industries; Industry in general.
Bioclimatic solutions on traditional architecture. Buildings energetic performance. Rehabilitation and maintenance for bioconstructive diversity. Analisis of the Bioclimatic constructive solutions on traditional buildings and its future integration on contemporary construction techniques. **Contato:** António Jorge Ferreira Vaz jfv@ipb.pt	Construction companies.
Structural Engineering: solid mechanics, computational mechanics and structures, use of different numerical and analytical models, and advanced computational simulation. Safety engineering. **Contato:** Elza Maria Moraes Fonseca efonseca@ipb.pt	Mechanical Engineering; Structural Engineering; Civil Engineering.
Development of sustainable materials from renewable sources and/or with functional properties: polymer synthesis and characterization, materials and chemicals from biomass, microencapsulation, functional coatings, biodegradable products. **Contato:** Filomena Barreiro barreiro@ipb.pt	Footwear; Food; Cosmetic; Textile; Adhesives.
Nanostructured materials and heterogeneous catalysis. Development and characterization of catalysts for application in environmental catalysis and energy production (biofuels). Development of new liquid-phase treatment technologies based in advanced oxidation processes. **Contato:** Helder Gomes htgomes@ipb.pt	
Soil processes monitoring and sustainability in uplands: assessment and monitoring of soil degradation processes, including physical degradation, erosion, quantitative and qualitative runoff water losses, soil carbon stocks, quality and resilience, for sustainable management of upland agroecosystems, with field appraisal methods, model and lab supported. **Contato:** Tomás de Figueiredo tomasfig@ipb.pt	Viticulture; Olive production and forest sectors; Animal roduction sector (authoctonous cattle breeds).
Wildlife management and public welfare: wildlife-habitat relationships in mediterranean areas, ungulate feeding behaviour and diet. Forest and land birds comunities characterisation, bird ringing, environmental education and human activity impacts on wild areas. **Contato:** José Paulo Cortez pcortez@ipb.pt	
Performance assessments, data mining, data analysis and statistic methods and demand planning. **Contato:** Clara Vaz clavaz@ipb.pt	Health; Retail; Energy; Mobility; Manufacturing.
Measuring GHG and air pollutants fluxes through the atmosphere/vegetation/soil system, by means of micrometeorological (eddy covariance, concentration gradient) and chamber methods. Monitoring and modeling air pollution and air quality. Studies on carbon cycle and dynamics, especially related to CO2 and H2O exchange measurements in soil/vegetation/atmosphere system, both in urban and rural environments. Studies on urban system issues, with special focus on environmental functions of urban green spaces. life cycle analysis of food products. **Contato:** Manuel Feliciano msabenca@ipb.pt	Local and Regional Administration; Food Industries; Industry in general.

6. Sociedades Inclusivas, Inovadoras e Reflexivas (SC6)

http://portal3.ipb.pt/index.php/pt/ipb-en/research-and-innovation/research-topics-and-units/sc6

7. Tecnologias de Informação e Comunicação (ICT)

http://portal3.ipb.pt/index.php/pt/ipb-en/research-and-innovation/research-topics-and-units/ict

Tópicos	Target Sectors/Organisations
Intelligent and adaptive complex cyber-physical systems: the application of distributed artificial intelligence systems, such as multi-agent systems allows to introduce some important and demanding features in large-scale complex engineering problems, such as flexibility, robustness, reconfigurability, adaptation and responsiveness. These approaches shift the control paradigm from typical centralized approaches, which are no longer enough to address the requirements imposed by emergent and global environments, to an alternative way to design such systems based on the decentralization and self-organization of individual intelligent and self-adaptive entities. **Contato:** Paulo Leitão pleitão@ipb.pt	Manufacturing; Smart grids; Logistics; Automation; Robotics.
Distributed Systems. Research and development, with a broad scope, of distributed system focusing, particularly, in peer-to-peer and distributed operating systems. **Contato:** Rui Lopes rlopes@ipb.pt	
Expertise in ICT and new collaborative networks concepts, use of Game Theory tools to study markets in which firms have to take decision on quantities to be produced, prices, etc. High experience in the construction of techno-economic models for next generation access networks and decision support systems. **Contato:** João Paulo Ribeiro Pereira jprp@ipt.pt	
Intelligent systems on a chip: creating intelligent algorithmic solutions suitable to run on inexpensive microprocessors. This approach allows us to develop standalone devices that show intelligent behaviors and help in the daily tasks, saving energy or giving support to the elderly people. **Contato:** Pedro João Soares Rodrigues pjrs@ipb.pt	Health sector; Electric power companies; Communications companies.

8. Nanotecnologia, Materiais Avançados, Biotecnologia, Fabrico e Transformação Avançados (KETs)

http://portal3.ipb.pt/index.php/pt/ipb-en/research-and-innovation/research-topics-and-units/kets

Topics	Target Sectors/Organisations
Intelligent and adaptive complex cyber-physical systems: the application of distributed artificial intelligence systems, such as multi-agent systems allows to introduce some important and demanding features in large-scale complex engineering problems, such as flexibility, robustness, reconfigurability, adaptation and responsiveness. These approaches shift the control paradigm from typical centralized approaches, which are no longer enough to address the requirements imposed by emergent and global environments, to an alternative way to design such systems based on the decentralization and self-organization of individual intelligent and self-adaptive entities. **Contato:** Paulo Leitão pleitão@ipb.pt	Manufacturing; Smart grids; Logistics; Automation; Robotics.
Electrochemical sensors for food analysis and health applications: development of new portable potentiometric and voltammetric multi-sensor devices for cost-effective, fast and in-situ applications. Qualitative (PCA and LDA), semi-quantitative and quantitative (MLRM and PLS) analysis: honey classification according to its colour and pollen profile, dentification of goat milk adulterations with bovine milk, juice level evaluation in non-alcoholic beverages, semi-quantitative and quantitative analysis of soft drinks, gliadins semi-quantitative detection in foodstuffs, quantification of 2,4,6-trichloroanisole at ppt level in aqueous industrial cork solutions, development of aptasensors for detection of protein biomarkers for tumor activity assessment. **Contato:** António M. Peres peres@ipb.pt	Food industry and retailers: authentication and/or adulteration evaluations; Health sector: early detection of tumor activity.
Performance assessments, data mining, data analysis and statistic methods and demand planning. **Contato:** Clara Vaz clvaz@ipb.pt	Health; Retail; Energy; Mobility; Manufacturing.
Polymer reaction engineering: experimental and theoretical studies with linear/non-linear polymerizations: free radical polymerizations involving transfer to polymer, terminal double bonds/multifunctional monomers, ionic polymerizations of multifunctional monomers, coordination polymerizations with crosslinking and terminal branching. Synthesis, characterization, testing of polymer networks and gels. Controlled radical polymerization (NMRP, ATRP, RAFT): batch, semi-batch and continuous reactors (micro-reactors), characterization of the products using Size Exclusion Chromatography (SEC) with refractive index (RI) and Multi-Angle Laser Light Scattering (MALLS) detectors. Fourier Transform Infra-Red (FTIR) Spectrophotometry with Attenuated Total Reflection (ATR): FTIR-ATR. Assessment of hydrogels/molecularly imprinted polymers (MIPs)/interpenetrating polymer networks (IPN) for controlled drug release and biomolecules immobilization. **Contato:** Rolando Carlos Pereira Simões Dias rdias@ipb.pt	Chemical industries; Pharmaceutical Industries; Environmental Industries.
Fire Safety and Structural Engineering. Fire testing. Materials characterization. Experimental mechanics. Computational mechanics. Applied mechanics. **Contato:** Paulo Alexandre Gonçalves Piloto piloto@ipb.pt	Building products and construction materials.
Bioclimatic solutions on traditional architecture. Buildings energetic performance. Rehabilitation and maintenance for bioconstructive diversity. Analisis of the Bioclimatic constructive solutions on tradicional buildings and its future integration on contemporary construction techniques. **Contato:** António Jorge Ferreira Vaz jfv@ipb.pt	Construction companies
Structural Engineering: solid mechanics, computational mechanics and structures, use of different numerical and analytical models, and advanced computational simulation. Safety engineering. **Contato:** Elza Maria Morais Fonseca efonseca@ipb.pt	Mechanical Engineering; Structural Engineering; Civil Engineering.
Nanostructured materials and heterogeneous catalysis. Development and	

characterization of catalysts for application in environmental catalysis and energy production (biofuels). Development of new liquid-phase treatment technologies based in advanced oxidation processes. **Contato:** Helder Gomes htgomes@ipb.pt	
Development of sustainable materials from renewable sources and/or with functional properties: polymer synthesis and characterization, materials and chemicals from biomass, microencapsulation, functional coatings, biodegradable products. **Contato:** Filomena Barreiro barreiro@ipb.pt	Food; Cosmetics; Textiles; Adhesives.
Plants, traditional knowledge, agroecosystems and new trends in rural development. Flora diversity, traditional plant use, management and conservation. Interdisciplinary study of plants and human cultures, including past and present relationships between people and environment. Management and conservation of plant genetic resources. Medicinal plants, wild edibles, local food and medicine, nutraceuticals and mediterranean food. Safeguarding of intangible cultural heritage, valorization of underutilized and underexploited plants and crops and impacts in rural development. **Contato:** Ana Maria Carvalho anacarv@ipb.pt	Authorities and institutions for biodiversity management and conservation; Educational and promotional initiatives on sustainable agriculture and rural development; Institutions and networks linking cultural heritage and new approaches for rural development.
Chemistry of natural products: extraction, identification, fractionation and isolation of chemical compounds in natural matrices (focused on food matrices). Chromatographic and spectrometric techniques: GC-FID, GC-MS, HPLC-DAD, HPLC-RI, HPLC-FL, LC-MS, NMR. Nutraceuticals and functional foods: development of nutraceuticals and innovative food formulations with functional properties. Evaluation of antioxidant properties by chemical and biochemical assays with animal cells. Evaluation of antitumor properties though screening in human tumor cell lines, cell cycle and apoptosis analysis; Hepatotoxicity assays. Incorporation of natural extracts/fractions/compounds (free or protected) in food formulations. Technology of natural products: emergent technologies for conservation of food matrices (guaranteeing food quality, safety and security). Gamma and electron beam irradiation of food products. Application of natural preserving ingredients. **Contato:** Isabel C. F. R. Ferreira iferreira@ipb.pt	Agro-Food Industry; Pharmaceutical Industry; Cosmetics Industry.
Development of new products, namely fermented, development of probiotics, natural products for food preservation, determination of the nutritional and bioactive properties (antimicrobial, antioxidant, anti-inflammatory, antitumoral and action mechanisms) of natural and synthesized products, development of electrochemical sensors to assess the physicochemical properties of food, evaluation of food safety and quality. **Contato:** Maria Letícia Miranda Fernandes leticia@ipb.pt	Food and Pharmaceutical Industries; Catering companies; Companies of food transaction.
Functional biodiversity and soil food-webs in sustainable agroecosystems: development of sustainable management of agroecosystems based on the conservation and enhancement of functional biodiversity (developing and validating ecological and biodiversity indicators (using arthropods and trait based approaches) to assess changes in quality and sustainability resulting from agricultural practices in agroecosystems; developing strategies and habitat manipulation programmes to enhance functional biodiversity in agroecosystems). **Contato:** Sónia Alexandra Paiva Santos saps@ipb.pt	Agriculture; Farmers associations; Policy makers.
Separation of high added value products by liquid chromatography: use of adsorption separation processes (HPLC and preparative chromatography) and multicolumn techniques (SMB - simulated moving bed chromatography and related multicolumn hybrid systems) for the separation of amino acids, proteins, sugars and pharmaceutical chiral drugs. Design, operation and optimization of chromatographic processes for binary and multicomponent separations. **Contato:** Luís S. Pais pais@ipb.pt	Pharmaceutical, fine-chemistry and biotechnological industries.
Landscape reclamation using landscape management. **Contato:** André Nascimento andregomesnascimento@gmail.com	
Electrochemical sensors for food analysis and health applications: development of	Food industry and

new portable potentiometric and voltammetric multi-sensor devices for cost-effective, fast and in-situ applications. Qualitative (PCA and LDA), semi-quantitative and quantitative (MLRM and PLS) analysis: honey classification according to its colour and pollen profile, dentification of goat milk adulterations with bovine milk, juice level evaluation in non-alcoholic beverages, semi-quantitative and quantitative analysis of soft drinks, gliadins semi-quantitative detection in foodstuffs, quantification of 2,4,6-trichloroanisole at ppt level in aqueous industrial cork solutions, development of aptasensors for detection of protein biomarkers for tumor activity assessment. **Contato:** António M. Peres peres@ipb.pt	retailers: authentication and/or adulteration evaluations; Health sector: early detection of tumor activity.
Biotechnological application of fungi as biocontrol agents: fungi application as biological control agents against plant pathogens and insect pests, and as plant growth promoter and disease suppressor, for sustainable agriculture (isolation, molecular identification and in the screening of native entomopathogenic and endophytic fungi to be used as BCAs against pests and diseases, respectively; application of BCAs into integrated pest management and sustainable agriculture systems; mechanisms of biological control of plant pathogens by endophytic fungi and of pests by entomopathogenic fungi; effect of ectomycorrhizal fungi on plant growth and plant health). **Contato:** Paula Baptista pbaptista@ipb.pt	Agro-chemical sector (biopesticides); Agricultural companies; Farmer associations; the Government; Consumers.
Genetic diversity and conservation of genetic resources: next generation sequencing technologies on honey bees to address a multitude of evolutionary questions with an application on breeding, management and conservation of honey bee genetic resources. **Contato:** Maria Alice Pinto apinto@ipb.pt	Beekeeping companies and associations.
Food mycology and mycotoxicology: fungal isolation and identification from various matrices, mostly food, by polyphasic approach (morphological, molecular, spectral, physiological; mycotoxin detection from food matrices, by TLC, HPLC and ELISA. **Contato:** Paula Rodrigues prodrigues@ipb.pt	Food industry; Food biotechnology industries.
Food safety and quality in the production of traditional products: microbiological characterization; evaluation of microbiological conditions of food operators, utensils, equipments and surfaces; evaluation of the biotechnological potential of isolated yeasts during fermentation of table olives. **Contato:** Ermelinda L. Pereira eprereira@ipb.pt	Food industry.

As **Unidades de Investigação** instaladas no IPB, reconhecidas pela Fundação para a Ciência e a Tecnologia, são atualmente as seguintes:

CIMO
Centro de Investigação de Montanha

LSRE
Laboratory of Separation and Reaction Engineering (Polo)

CIDESD
Centro de Investigação em Desporto, Saúde e Desenvolvimento Humano (Polo)

Outras **Unidades de Investigação** do IPB:

C3AT
Centro de Competências de Comunicação, Administração e Turismo

NIII
Núcleo de Investigação e Intervenção no Idoso

UNIAG
Unidade de Investigação Aplicada em Gestão