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UAB Research Park

R&D Capabilities

Departments, centres and research institutes of the UAB[CIE] Sphere have demonstrated excellence in their field of R&D, promoting multi-disciplinary research and knowledge transfer.

Therefore, we promote collaboration, information sharing and the creation of agreements between research centres and companies with the aim of increasing innovation and business competitiveness.

In this section we present the scientific and technological capacities of the research groups of the Esfera (Sphere) UAB[CIE] organized by subject.

Food technologies & animal health

APLICATIONS	SOLUTIONS
Food production	Design of fermentation processes for the production of "starters", additives and biocides
	Creation of functional foods
	agro-ecological production
	Development of new public policy agricultural production or livestock, marketing and consumption
Food Quality Control	Food composition Studies (proteins, peptides, amino acids, fats, carbohydrates, vitamins, minerals ...)
	Food texture studies
	Food colour studies
	Calculation the shelf-life of foods
	Determination of the physical, chemical, and microbiological parameters of food
	Vision system for the analysis of the size, colour, distribution, food, etc.
	Optical system for quality control of various types of fruit
	Vision system to guide the selection and placement of robotic arms on random position high-speed product lines using 3D orientation
	Computer vision system to automatically detect the presence or absence of items in a container and item defects
	Computer vision system to automatically detect and verify the contents of a pallet
	Computer vision System to automatically detect the presence of contaminants in bottles and other containers
	System to detect the presence of material in packaging
	Electronic tongue to classify wines according to grape variety, vintage year and Denomination of Origin
	Electronic tongue to identify varieties of beer
Preservation and packaging of food	Improve the preservation of packaged food using carbon dioxide and other gases that can reduce or eliminate the use of other "additives"
	Bottling system in aseptic conditions using ultraviolet irradiation to replace chemicals commonly used to ensure sterility
	System able to stabilize and sterilize food using by high pressure liquid to ensure long-term preservation at room temperature and reduce the use of additives to preserve organoleptic characteristics.
	Stability analysis and the deterioration of the organoleptic quality and shelf-life of foods
	Ecological packaging

Improving food security	Application of new technologies to improve food safety and its organoleptic and nutritional characteristics
	Chemical separation techniques to ensure the traceability of foods
	Animal identification systems for cattle, sheep, goats and pigs to ensure the traceability of the animals and their products
	Aplicació de noves tecnologies per a la millora de la seguretat alimentària i característiques nutricionals i organolèptiques
	Tècniques de separació en química per fer la traçabilitat dels aliments
	Sistemes d'identificació animal per a les espècies bovina, ovina, caprina i porcina, amb l'objectiu d'aconseguir un sistema que garanteixi la traçabilitat animal i dels seus productes
Animal nutrition	Evaluation of the incorporation of additives to optimize the synergy between production efficiency and meat in ruminants, pigs and sows
	Evaluation of the influence of raw materials and nutrients on production animal behaviour in piglets, lactating sows and broilers
	Assessment and treatment of pain in cows and sows
	Effect of inclusion of different additives on rumen microbial fermentation in vitro
	Assessing animal welfare, assisted therapy and behaviour in pets and wild animals held in captivity
	Studies for acceptance, tolerance, efficiency and suitability of ingredients and products in dogs
	Milk production in ruminants
	Feeding strategies for preventing diseases and zoonoses
Consumption	Prevention of overweight and obesity and eating disorders such as anorexia nervosa, bulimia nervosa, among others.
	Reduce risk factors issues related to food and weight
	Create new food distribution channels
	Evaluation of the environmental and economic impacts of regional and rural development projects
	Preparation of demographic projections, production and energy consumption, waste and CO_2
	Design and sustainability of development projects
	Market research for the food industry

Biotechnology & health

APLICATIONS	SOLUTIONS
Cell biology	Regenerative medicine
	Cancer
	Cloning and Stem Cells
	Cytotoxic effects of physical, chemical or biological agents
	Cell death and senescence
Immunology	Cellular immunology
	Molecular immunology
	Immunology of reproduction
Bioinformatics	Computational Biology
	Theoretical Molecular Biology
	Evolutionary bioinformatics
Proteomics	Identification of proteins
	Molecular weight analysis of proteins and peptides
	Caracteritzación and protein modification
	Protein Sequencing
	Protein engineering and Enzymology
	Structure, development and stability of proteins
Genetics	Chromosomal rearrangements
	Evolutionary Genetics
	Genotoxicity
	Genetic diseases
	mutagenesis
	Anemia
	Genetics
	Cytogenetics
	Bacterial molecular genetics

Genomics	Comparative and functional genomics
	Genome Structure
Microbiology	Mycobacteriology
	Design of microbial sensors
	Effects of pollutants on microbial population
	Design of new vaccines
	Gene expression in pathogenic bacteriostatics
	Antibacterial resistance
	Biological applications of bacteriophages
Neuroscience	Neurodegeneration
	Neuronal regeneration and plasticity
	Behavioural, cognitive and psycho-neuro disorders
	Cellular and molecular basis of the nervous system
	Neurochemistry
	Neuroinflammation
	Neuro-immuno-gastoenterology
	Biology of stress and addictions
	Biología del estrés y les addicciones
Physiology	Medical Physiology
	Ecophysiology
	Cancer and Food
	Cardiovascular risk
Gene Therapy	Production of new viral vectors
	Therapeutic approaches to diabetes mellitus and other diseases
	Autoimmune diseases
	Animal Models

	Bioprocess Engineering
	Study of biomolecules
	Sensors and biosensors
	Study of cell cycle regulation
Biochemistry	Molecular biophysics applied to biomedicine
	Biochemistry of the nervous system
	Biochemistry and molecular biology of plants
	Biochemistry and molecular biology in yeast
	Molecular pathology
	Metabolic regulation
	Neuropharmacology
	Vascular pharmacology
	Basic pharmacology
Pharmacology and toxicology	Clinical Pharmacology
	Asthma and other allergic diseases
	Environmental Toxicology
	Phytotoxins
	Psychopathology
	Medical Psychology
	Psychobiology
Clinical psychology and health	Genetic basis of intellectual disability
	Eating disorders and weight
	Neuroimaging in neuropsychology and neuropsychiatry
	Morphological Sciences
	Human Embryology
	Pathology, dissection and bone library
	Surgery
Medicine and	Legal, Forensic Medicine and Psychiatry
	Paediatrics
	Nursering
	Obstetrics and Gynaecology
	Preventive medicine
	Biomedical research methodology
Biostatistics	Design and statistics in health sciences
	Analysis, processing and data management

Human & social sciences

APLICATIONS	SOLUTIONS
Law and Legal Studies	Legal advice
	Advice on policy and equity plans
	Advice on corporate social responsibility
	Advice on democratic awareness campaigns
	Development of plans for social reintegration
	Advice on policies to prevent crime
	Advice on issues of digital privacy and hackers
	Modelling the right of Internet users
Education and educational policies	Advice on learning methods
	Development of protocols and education plans
	Advice and design of social intervention programs with children and adolescents
	Advice on the integration of ICT in education
	Advice on the effective use of language
	Advice on education policies
	Trainer training
	Psychology counselling
	Design, development and publication of educational materials
	Design and implementation of educational activities
	Assessment and evaluation of social inclusion processes
Business and organizations	Advice on the strategic development of organizations
	Analysis and plans for improving productivity
	Advice on optimizing resource allocation
	Efficiency studies of public enterprises
	Market analysis and sector work
	Advice on corporate social responsibility

Socioeconomic and Public Policy Studies	Development of socio-economic reports
	Advice on labour policies
	Studies on electoral participation and politics
	Advice on international and intercultural policies
	Advice on the management of migration flows
	Consulting, design, implementation and evaluation of social intervention programs
	Consulting, design and evaluation of public policies
	Identification and analysis of social and personal networks
	Advice on research ethics
	Advice on the design of social research and survey analysis
	Designing local development models
	Advice and information about citizen attitudes and values
Environmental management	Design of local development models
	Advice on land management
	Analysis of territorial mobility
	Reconstruction of traditional-historical landscapes
	Studies of environmental and economic impact assessment
	Design of development and sustainability projects
	Geographic Information Systems
Psychological and psychosocial studies	Advice on socio-affective relationships
	Studies of the psychosocial impact of technical innovations
	Consulting services for participatory processes
	Development of affective software
	Advice on the prevention of occupational risk
Health and Society	Advice on the prevention of occupational risks
	Advice on the prevention of harmful traditional practices.
	Indicators of the standard of living of the population
	Social studies of health from a gender perspective

Communication language and translation	Advice and linguistic correctness
	Advice on digital communication
	Development of good practice manuals on linguistic diversity
	Advertising plans and optimization of advertising resources
	Automatic processing of textual information
	Advice on Computer Assisted Translation tools
	Creating, accessing and analyzing databases
	Publication of texts, brochures and promotional material
	Bibliographic information service
	Audiovisual design and production
	Development of guidelines for critical reading
	Legal translations
	Building lexical tools
	Advice on editing and translating works and historical texts
	Advice on the communication of large events
	Development of guidelines for critical reading
	Translation trainer training
	Education and media
Evaluation of historic and cultural heritage	Historical advice
	Valuation of bibliographic and documentary heritage
	Advice on cultural policy
	Cultural management: creation and organization of cultural activities
	Publication of scores and CDs
	Theatrical advice
	Advice to publishers
	Technical analysis and dating of artwork

Materials & energy

APLICATIONS	SOLUTIONS
Management of primary sources	Biological processes for the removal of H2S gas content as biogas or natural gas
	Bioelectrochemical hydrogen production
	Reducing net CO_2 emissions
	Bioreactors for biological collection of CO_2
	Biological collection of CO_2
Power generation	Water and waste gas treatment technologies
	Manufacture of power devices
	Systems to improve efficiency and reduce energy consumption, with particular emphasis on applications, transportation, aerospace, renewable energy and automotive power distribution
	Radiation detection in high-energy physics and medical imaging
	Gas detection
	Materials to generate photovoltaic energy
	Materials for storing and converting energy
	Materials for the generation, storage and use of energy
	Plastic-based materials for flexible solar panels
	New sustainable methods for obtaining and storing energy
	Biological transformation of natural products into energy products (Energy recovery from different waste substances created in industrial processes to generate value-added products such as biofuels)
The energy at the point of consumption	Improve the wireless transmission of electrical energy
	Superconductors for application to levitating trains
	Development and construction of superconducting wires
	Microelectronic systems for remote site water / gas / electricity
	Advanced systems for diagnosis of the state of the current electricity and gas infrastructure
	Algorithms for optimal management of electric vehicle top-up
	Advanced systems for diagnosis of the state of existing infrastructures
	Output devices
	Control systems environments and people

Materials & devices	Biomaterials and materials for drug delivery and diagnostics
	Materials for energy and the environment
	Design of materials for communication sciences and electronics
	Optical materials
	High-performance micro and nano devices for biological and biomedical applications.
	BioInterfaces and application of nanomaterials to public health and environmental health
	Portable multiparameter optical system for counting and / or analysis of organic (microorganisms) and inorganic suprananometric particles.
	Material for manufacturing heavy metal sensors that are small, low cost, high sensitivity, and respect the environment.
Nanofabrication	Technology for the fabrication of functional AFM probes
	Methods based on emerging nanolithographies to manufacture nanometre scale structures and devices of interest for integrated micro/nano systems.

Environment and sustainability

APLICATIONS	SOLUTIONS
Environmental prevention	Minimising environmental impact
	Tools for sustainability and environmental prevention
	Tools for the prevention of forest fires
	Tools for studying changes in the territory and territorial planning and management
	Predicting levels of pollens and spore allergens
	Prevention of invasions of exotic vegetable species
	Detection of sick buildings
	Forest regeneration
	Maintaining and improving soil health
Environmental Monitoring	The consequences of human activity on terrestrial ecosystems
	Microsystems and sensors for environmental monitoring
	Microsensors for the diagnosis of allergies
	Analysis of the environmental impact of tourism
	Remote Sensing and Geographic Information Systems
	Forest inventories
	Environmental impact of economic activity
Elimination of pollutants	Nutrient removal wastewater
	Degradation of environmental pollutants by biological processes
	Reuse of waste
Energy generation	Renewable energy sourcess
	Materials for the generation, storage and use of energy

Environmental, governance	Local development strategies that enable rural areas to reach a more sustainable peak
	Management of natural areas
	Environmental analysis and land use using satellite images and GIS, with special attention to the water system
	Improved mobility and territorial transport system management
	Managing mountain areas
	Coastal zone management and marine activities
	Sustainable tourism and local development
	Application of economics and evolutionary models to resources, environmental policy and institutional problems
	Support the definition of climate policies
	Eco-innovation for environmental improvements of products and services

Information & communication technologies

APLICATIONS	SOLUTIONS
Computer Vision	Interactive and Augmented Modelling
	Document Analysis
	Advanced Driver Assistance Systems
	Image Sequence Evaluation
	Machine vision
	Robot Vision
	Colour in Context
	Medical imaging
	Object recognition
Electronics, microelectronics and nanoelectronics	Micro-nano-bio systems
	Devices and Power Systems
	Transducers for chemical and biochemical sensing
	Electronic Circuits and Systems
	Computational nanoelectronics
	Antennas
	High-speed communications
Information processing	Combinatorial and algebraic coding
	Compression
	Cryptography and computer security
Operating Systems	Distributed systems and the Internet
	Parallel and distributed systems
Artificial Intelligence	Logic and reasoning
	Learning Systems
	multiagent systems

Programming	Design, Accessibility and Reception
	Modelling, Virtual Design and Development, Videogames
	Interactivity and Multimedia Platforms
	Speech Technologies
	Computing technologies and Printed Electronics
	Embedded systems
	Apps development