

Smart Cities

The UAB is fully committed to making urban areas environmentally more efficient and sustainable, economically more competitive and socially more equitable, inclusive and healthy



Content

The university

UAB Campus Research Centres

UAB Research Groups

R&D&I Capabilities

Technologies

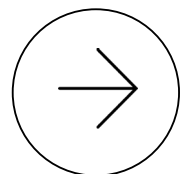
Energy and Environment

Mobility

Governance

Economy

Living and Inclusion



The UAB is a benchmark in the research, training, and transfer of sustainable management of urban environments.

It has a strong research community composed by scientific specialists in areas that cover a wide range of views from the economical and sociological aspects of industrial ecological design or the development of public urban design policies, to the application of specific technologies to innovative solutions for management of mobility and resources like energy, waste and water.

UAB research



UAB Campus Research Centres

Click to visit
their websites

- Centers for Demographic Studies (CED)
- Center for Ecological Research and Forestry Applications (CREAF)
- Computer Vision Center (CVC)
- Institute of Political and Social Sciences (ICPS)
- Artificial Intelligence Research Institute (IIIA)
- Institute of Environmental Science and Technology (ICTA)
- Institute of Government and Public Policies (IGOP)
- Institute of Regional and Metropolitan Studies of Barcelona (IERMB)
- Institute of Materials Science of Barcelona (ICMAB)
- Sports Research Institute (IRE)

- Antenna and Microwave Systems Group (AMS)
- Automation and Advanced Control Systems (ASAC)
- Center for Prototypes and Hardware-Software Solutions (CEPHIS)
- Metamaterials Research Center for Technological Innovation
- Electronics and Communications (CIMITEC)
- High Performance Computing for Efficient Applications and Simulation (HPC4EAS)
- Signal Processing for Communications and Navigation (SPCOMNAV)
- Group of Studies in Mobility, Transport and Territory (GEMOTT)
- Group of biological treatment and of liquid and gaseous effluents, nutrient removal, and odors and Volatile Organic Compounds (GENOCOV)
- Industrial Pollutants Biodegradation and Waste Valorization Group
- Composting Research Group (GICOM)
- Sustainability and Environmental Prevention (SOSTENIPRA)
- Water, Territory and Sustainability Research Group (GRATS)
- Study Group on Energy, Territory and Society (GURB) Study Group on Mobility, Transport and Territory (GEMOTT)

UAB Research Groups

- Inclusive governance and territorial and coastal-marine sustainability (INTERFASE)
- Laboratory of Palynological Analysis
- Urbanization Observatory
- Applied Geography Research Group
- Applied Economics Research Group
- Geography and Gender Research Group
- Economic Geography Group
- Tourism Research Group (TUDISTAR)
- Research Group Methods and Applications in Remote Sensing and Geographical Information Systems (GRUMETS)
- Institute of Law and Technology (IDT)
- TransMedia Catalonia
- Barcelona Science and Technology Studies Group (STS_b)
- Center for studies and research in entrepreneurship and social innovation (CREIS)

R&D&I capabilities

Technologies

Energy and Environment

Governance

Living and inclusion

Infrastructures Security

Economy



Tecnologies

Security

- Development of digital certificate provisioning mechanism for mobile environments
- Secure e-voting system for environments without reliable telecommunications infrastructure
- Encryption of information for distributed storage and authentication in social networks
- Data protection and European legislation

Computer vision


- 3D kinematics for remote patient monitoring
- Automatic waste recycling using hyperspectral cameras
- Open source simulator for autonomous driving
- Machine learning and sensor-based solutions for cognitive monitoring of aviation and pilot
- Hate speech on social media
- Multispectral imaging for agriculture
- Smart agriculture

Artificial intelligence

- Artificial Intelligence and Law
- Structured representation of legal concepts and their interconnections
- Case-based and rule-based reasoning

Metamaterials

- Filters, assemblers, power dividers, and other RF/microwave components
- Miniaturised and multi-band antennas for RFID applications
- CHIPLESS RFID: Chipless identification systems
- Position, rotation and velocity sensors



Energy and Environment

Water control and treatment

- Microelectronic devices (microchips) for measuring water toxicity and for the detection and quantification of microorganisms in water samples
- Sensors for quality control in drinking water distribution networks
- Biological processes for cleaning waste water
- Biodegradation of emerging pollutants in WWTP waters and sludge
- Systems based on membrane technology, applied to the separation, purification and recovery of pollutants
- Systems based on biomass, applied to the separation, purification and recovery of pollutants
- Development of oxidative technologies for water treatment
- Technologies for the neutralization of waste water, as well as for the treatment of water used in the leisure industry
- Sensors for the management of water treatment plants
- Sensors for spill analysis (for water reuse)
- Sociological analysis of needs, uses and utilization of water
- Studies on the use of water
- Models of urban development and consumption of environmental resources

Climate change

- Microsystems and sensors for environmental monitoring
- Valorization of microalgae biomass
- Valorization of agri-food waste for the production of new functional ingredients

Clean energy

- Reduction of net CO₂ emissions
- Manufacture of power devices
- Systems to improve efficiency and reduce energy consumption, with special emphasis on applications, transport, the aerospace industry, automotive renewable energy and energy distribution
- Materials to generate photovoltaic energy
- Materials to store and convert energy
- Materials for the generation, storage and use of energy
- Materials for flexible photovoltaic panels based on plastic materials
- New methods to obtain and store energy in a sustainable way
- Transformation of natural biological products into energy products
- Microelectronic systems for remote water/gas/ electricity metering
- Algorithms for the optimal management of electric vehicle charging
- Environment and people control systems



Mobility

Electric vehicle

- Open source simulator for autonomous driving
- Advanced driving assistance systems

Logistics

- Advanced information services for the transport of goods
- Identity management systems and mechanisms for identifying people and resources

Infrastructures

- Development of networks called DTN (Delay and Disruption Tolerant Networks) that make connectivity possible even in situations where the current ones do not reach

Public transport

- Studies on mobility and transport
- Mobile application to improve mobility in the city
- Application to facilitate the notification and visualization of incidents related to rail transport in the metropolitan area of Barcelona



Governance

Participation

- Stimulation of participatory processes for municipal innovation.
- Community governance of natural resources and urban commons
- Technosocial platform for the development of sustainable models and value production for the Internet of the future based on collaborative production among peers
- Social Augmented Reality for engaged communities
- New citizen practices and new public policies
- Innovation in local government
- Analysis of the impacts of the current economic and financial crisis on the socio-spatial configuration of Catalan municipalities
- Collaborative production
- Database of elected officials: women and men protagonists in democratic institutions
- Polls on the political culture of Catalans
- Studies on electoral and political participation
- Advice on the management of migratory flows
- Advice, design, implementation and/or evaluation of social intervention programs
- Advice, design and/or evaluation of public policies
- Advice and reports on citizens' attitudes and values

Regulation

- Elaboration of social reintegration plans
Advice on security and digital privacy issues
- Modeling the rights of internet users
- Analysis of the informational transparency of the institutions' websites
- Design of local development models
- Advice on international and intercultural policies



Economy

Education and work

- Psycho-social impact studies of technical innovations
- Advice on occupational risk prevention
- Advice on learning methods
- Elaboration of educational protocols and plans
- Advice and / or design of social intervention programs with children and adolescents
- Advice on the integration of ICT in the educational system
- Advice on the effective use of the language
- Advice on educational policies
- Training of trainers
- Psychopedagogical advice
- Design, development or editing of didactic and educational materials
- Advice and evaluation of socio-educational inclusion processes

Entrepreneurship

- Promotion of the entrepreneurial spirit
- Training in entrepreneurship

Regional, urban and rural economy

- Evaluation of public projects
- Location of economic activity and growth
- Transport economy / Tourism
- Demand and efficiency
- Local policies / Land market
- Analysis and evaluation of agricultural and rural development policies and programs

Circular economy

- Ecological Economy
- Environmental and climate economics
- Social and solidarity economy
- Urban agriculture / Ecodesign / Research in decline



Living & inclusion

Management of public spaces

- Geographic information systems in institutions or companies.
- Digital cartographic bases.
- Analysis and planning of the territory.
- Analysis and processing of satellite images (remote sensing).
- Design and programming of tailored applications for geographic information systems.
- Monitoring, control and surveillance, and management of accesses and emergencies
- Management of the public enllumenat

Cities,health and environmental justice

- Elaboration of indicators on the standard of living of the population
- Environmental and economic impact studies and evaluation
- Design of development and sustainability projects

Gendre

- Social studies of health from a gender perspective
- Preparation of equality plans
- Geographies of childhood, youth and families
- Gender and rurality
- Qualified migrations

Social and urban cohesion

- Design of local development models

UAB Universitat Autònoma
de Barcelona

CSIC
IRTA
UAB



Parc de Recerca
UAB



CORE
SMART
CITIES

CORE Smart Cities

+34 93 586 82 45

www.uab.cat/core-ciutats