

Leading research in microtechnologies



CIC microGUNE is a Cooperative Research Centre created with the aim of becoming a new model of scientific/technological alliance for carrying out excellent research

Integrating the capacities of different agents in the Basque Science, Technology and Innovation Network in the strategic field of microtechnologies, to contribute to raising the competitiveness level of the Basque Country's business sector.

This is the result of the strategic alliance of the CEIT, IKERLAN and TEKNIKER research centres, the MONDRAGON UNIBERTSITATEA and TECNUN universities, with the support of the MONDRAGON group, and the collaboration of IMEC (Microelectronic Interuniversity Centre (Belgium)), for technological research and development of micro-nanotechnology.

COOPERATION PLATFORM

CIC microGUNE is a high performance cooperation platform that brings together the capacities of different, geographically separate research groups, in a single market/technology project. The activity is carried out through three research units specialising in: Microsensors, Microfluidics and Micro/Nanoengineering.

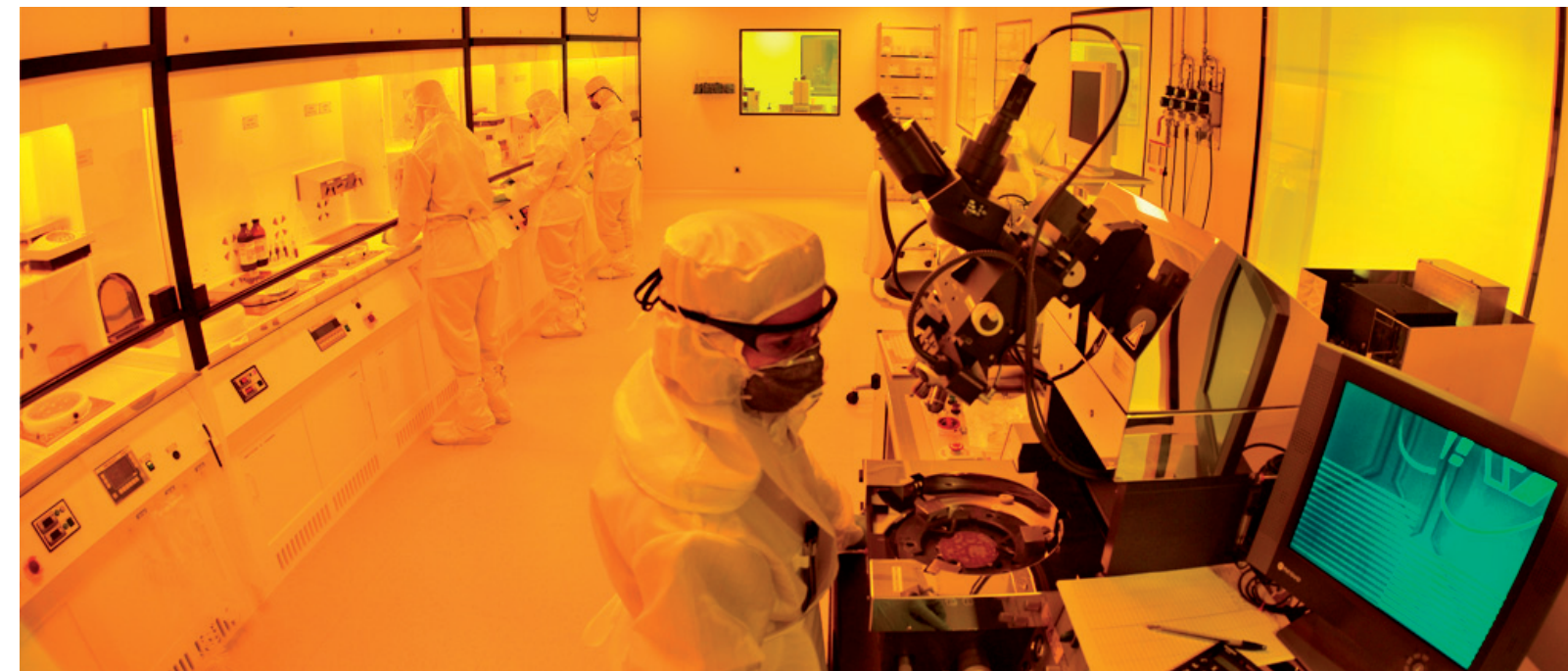
RESEARCH AREAS

The Microtechnology activities include the design, manufacturing and packaging of micro-nanodevices and components that can be used in a wide spectrum of applications, including the car industry, biomedicine, energy saving and ICT.

THREE LINES OF SPECIALISATION

Microsensors

The research in this field is focused on the development of microsensors that enables the measurement of physical, chemical or biological magnitudes or to monitor and control industrial processes. This activity combines both surface/bulk nanostructuring and rapid processing of thin film for modifying local material properties and for developing new sensor techniques based on innovative detection principles. Techniques such as CVD (Chemical Vapor Deposition) or PVD (Physical Vapor Deposition) are used to deposit oxides, metals, nitrides, etc.



Thanks to microtechnology, very precise micro-sensors can be created, very small in size and taking advantage of the laws of scale (lower inertias, energy consumption, etc.), at a low cost as they are batch-manufactured. Its state-of-the-art research is geared towards electrochemical and immunomagnetic detection for health applications (detection of antibody/antigen hybridization): DNA, protein, virus..., and measurement of gas properties such as concentration, viscosity, thermal conductivity of gases, methane number, etc.

Microfluidics and organic electronics

Research in microfluidics specialises in micro-components and packaging for fluidic micro-devices. Its strategic research centres conduct research into technologies for lab-on-a-chip development for health and organic electronic applications, molecular photovoltaic applications and the development of light emission structures. With special emphasis on polymeric materials and flexible structures:

- Microvalves and micropumps
- Fluidic chips (electrophoresis, PCR, ...)
- Packaging end external interfaces
- Sample handling in LOC (Lab on a chip)
- Microdispensing components
- Multilayer structures for photovoltaic and light emitting devices

Micro-nanoengineering

The speciality of this line is the development of devices based in micromachining techniques (dry and wet etching, PVD, electrodeposition, replication, bonding, hot embossing) and ultra-precision techniques (micro-milling, microelectroerosion, laser micromachining and microinjection). Some examples of products already developed are: drug delivery systems, microheat spreaders, heat exchangers, orthodontic components and micromoulds and stamps.

Its strategic research is geared towards knowledge of laser interference lithography (LIL) for generating layers with nanometric resolution and nanoimprint lithography (NIL) for nanostructuring of different materials. This last process is mainly centred on health applications such as tissue engineering, DNA stretching and protein chips.

STRATEGIC INNOVATION

Our capabilities allow us to develop:

- Microsensors for detecting and metering gases
- Biosensors for health and food safety
- In vitro diagnosis applications
- Flexible microprobes
- Customized packaging
- Fluidic microactuators (valves, pumps,...)
- Fluidic devices (electrophoresis chips, microdispensers,...)
- Micromoulds
- Microreactors
- Customized microparts
- Organic micro devices (OLED, OPV)

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