

From lab to state-of-the-art technology, the role of RIs in innovation

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What is ALBA?

Public
Research
Center



A complex of electron accelerators: 3 GeV

Accelerator of
270 m

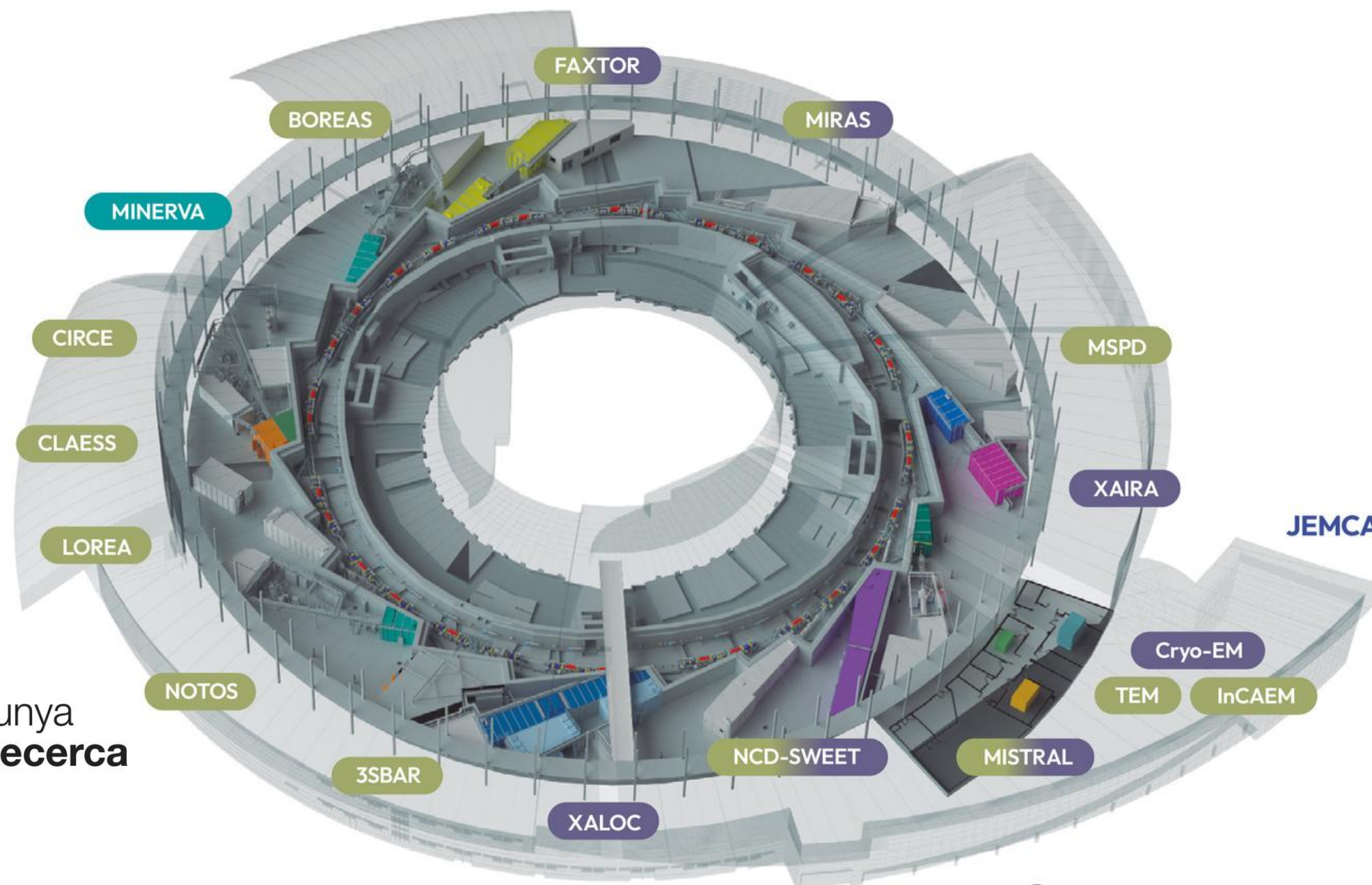
14 beamlines

+1 microscopy
platform



Generalitat de Catalunya
**Departament de Recerca
i Universitats**

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+3.800
users/year

+600
experiments
/year

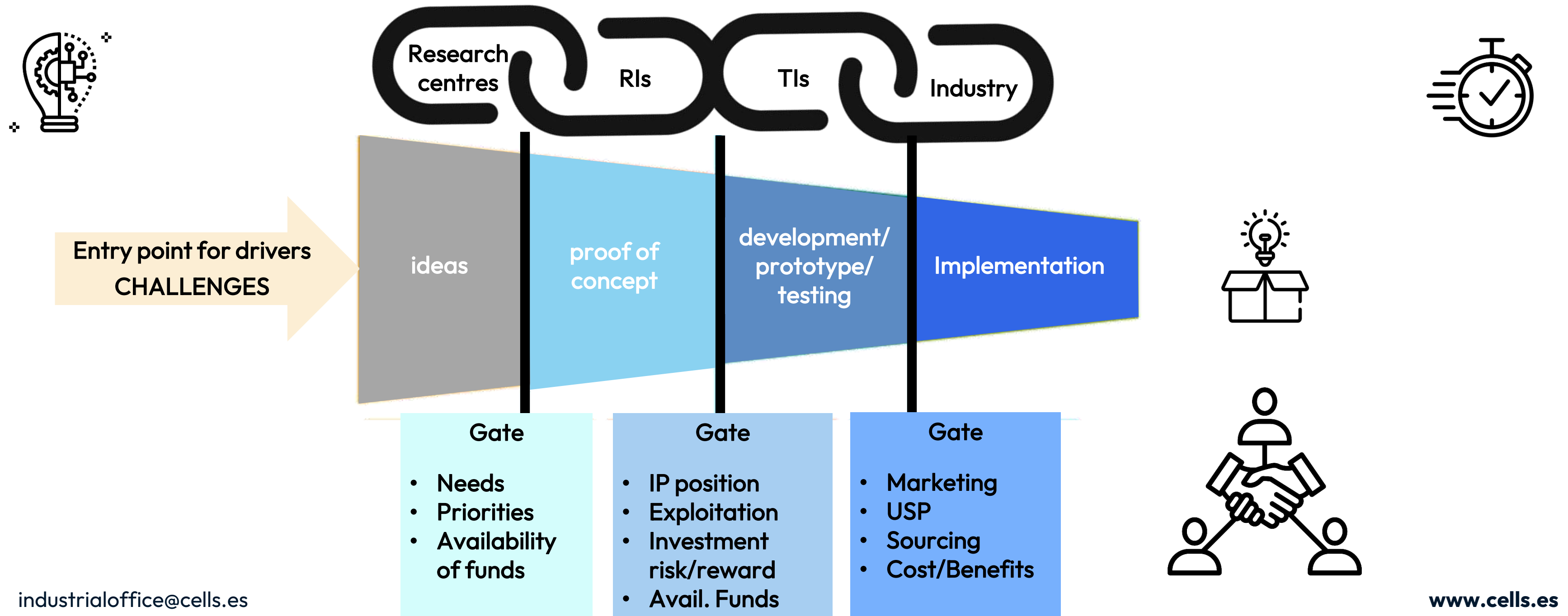
- Instruments for Life Sciences
- Instruments for Materials Science
- Metrology



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ALBA and the INNOVATION ecosystem

From knowledge to market



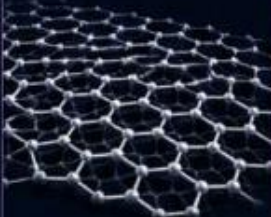
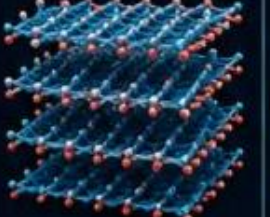
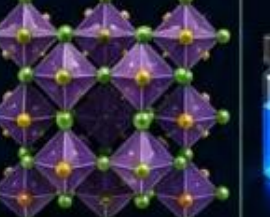
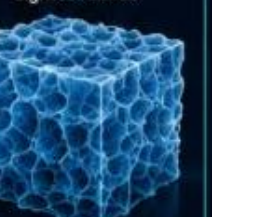
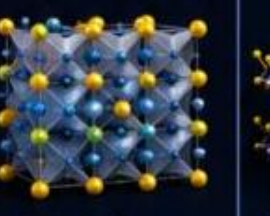
ALBA for the MATERIALS challenge

From knowledge to market – the barriers in between



ALBA for the MATERIALS challenge

From knowledge to market – materials that will shape the future

1 GRAPHENE The 2D Wonder  - Exceptional strength - High electrical & thermal conductivity - Ultra-thin, flexible & transparent Applications Flexible Electronics, Composite Materials, Energy Storage	2 MXENES The 2D Powerhouse  - High conductivity - Hydrophilic surface - Excellent mechanical properties - Easy to functionalize Applications Supercapacitors, EMI Shielding, Sensors	3 PEROVSKITES The Energy Game Changer  - High light absorption - Tunable bandgap - Low-cost & lightweight - High efficiency potential Applications Solar Cells, LEDs, Photodetectors	4 QUANTUM DOTS Tiny Particles, Big Impact  - Size-tunable optical properties - High color purity & brightness - Excellent stability Applications Displays, Bioimaging, QLEDs	5 AEROGELS The World's Lightest Solids  - Ultralight with high porosity - Excellent thermal insulation - Highly customizable Applications Thermal Insulation, Oil/Water Separation, Aerospace
6 HIGH-ENTROPY ALLOYS Strength in Diversity  - Multi-element composition - High strength & hardness - Excellent corrosion & wear resistance - Thermally stable Applications Aerospace, Structural Components, Extreme Environments	7 METAL-ORGANIC FRAMEWORKS (MOFs) The Molecular Sponges  - Extremely high surface area - Tunable pore size & chemistry - Selective adsorption - Lightweight & porous Applications Gas Storage (H ₂ , CH ₄), Carbon Capture, Catalysis	8 SOLID-STATE ELECTROLYTES Powering the Next Generation Batteries  - Non-flammable - High ionic conductivity - Enables high-energy density batteries Applications Solid-State Batteries, EVs, Portable Electronics	9 2D TRANSITION METAL DICHALCOGENIDES (MoS₂, WS₂, etc.) The Nanoelectronics Enablers  - Semiconducting behavior - Atomically thin - High carrier mobility - Excellent flexibility Applications Transistors, Photodetectors, Flexible Devices	10 BIOMATERIALS & BIOINSPIRED MATERIALS Healing Through Innovation  - Biocompatible - Promote cell growth & regeneration - Sustainable & adaptive Applications Tissue Engineering, Drug Delivery, Implant Coatings

“ The future is built at the atomic scale.
The right materials will build a better world. ”

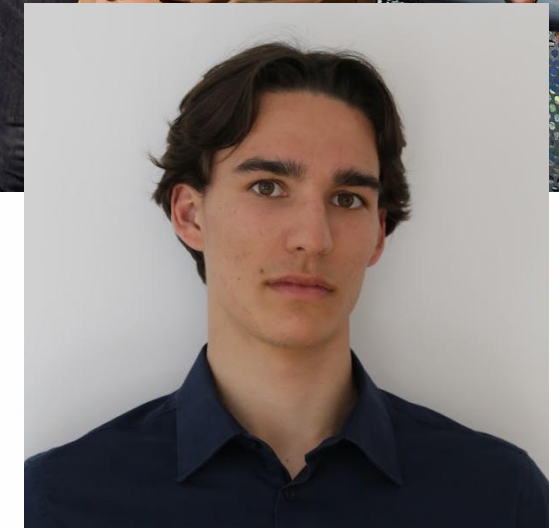


<https://nanohelp.eu/>

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Industrial Liaison Office

- ▶ One-stop shop service.
- ▶ Comprehensive and personalised service
- ▶ Multidisciplinary team with a high specialisation level (PhD)
- ▶ + 20 years of experience working with SMEs and large corporations
- ▶ Support before, during, and after the experiment or project



Impact on INNOVATION



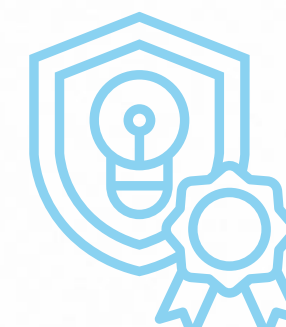
+125

Industrial users



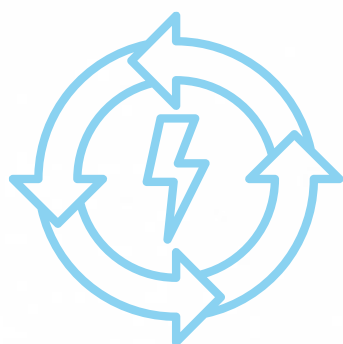
+70

Industrial experiments
per year



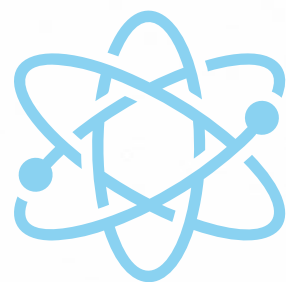
+4.500

connected patents



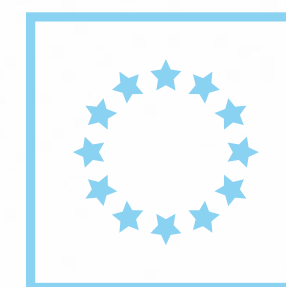
4.800

beamtime hours per
year available to
industry



+3.800

users per year
(academia and
industry)



90+

collaborations and EU
projects / institutional-
industrial

Impact on INNOVATION

Origin of the industrial users

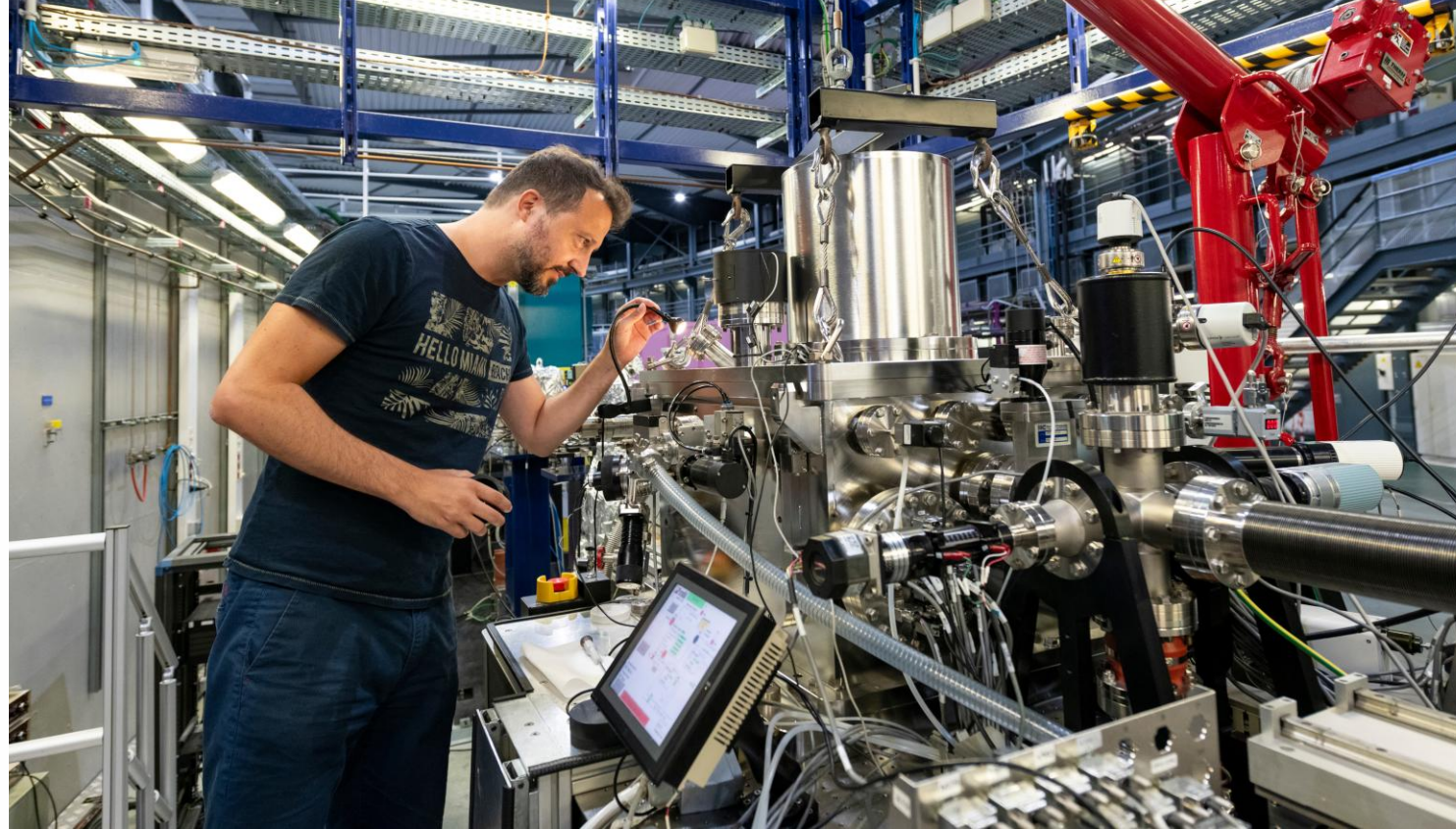


Argentina
Austria
Belgium
France
Germany
Greece
Italy
Japan
Netherlands
Norway
Poland
Portugal
Slovenia
Spain
Sweden
Switzerland
UK
USA

Some of our costumers



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What ALBA brings to the industry



1 **Unique results** that cannot be obtained with other techniques.

2 **Innovation applied** to the improvement of products and processes.

3 **Solutions** that drive the competitiveness and technological development of businesses.



" The high brightness and tunable beam of ALBA's beamlines allow to capture subtle structural changes in soft materials, even in complex, multicomponent systems. This capability is crucial for developing functional adhesives that comply with the principles of the circular economy. "

Kang Wei Chou, senior researcher at Henkel

Applications

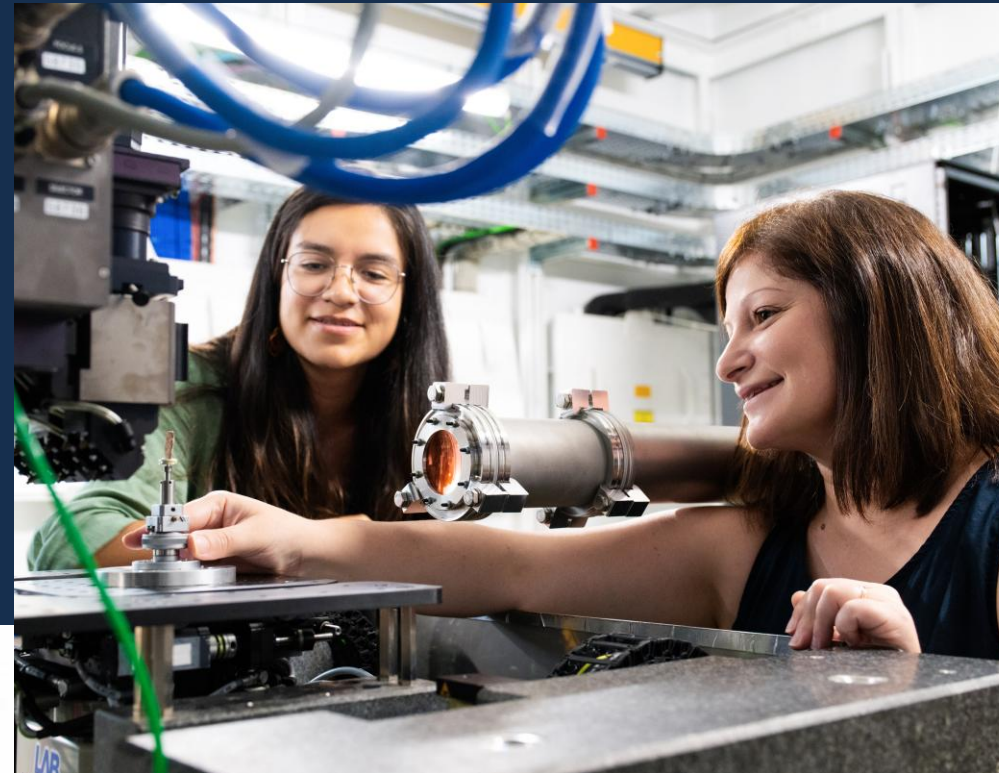
- Health & Life Sciences
- Nanotechnology & Advanced Devices
- Energy
- Environment & Sustainability
- Automotive & Aerospace
- Mining & Metallurgy
- Building Materials
- Chemistry & Plastics
- Food & Packaging Technologies
- Cultural Heritage & Archaeology



Our offer



Advanced characterisation
services of materials and
processes



Fast, accurate and
confidential results



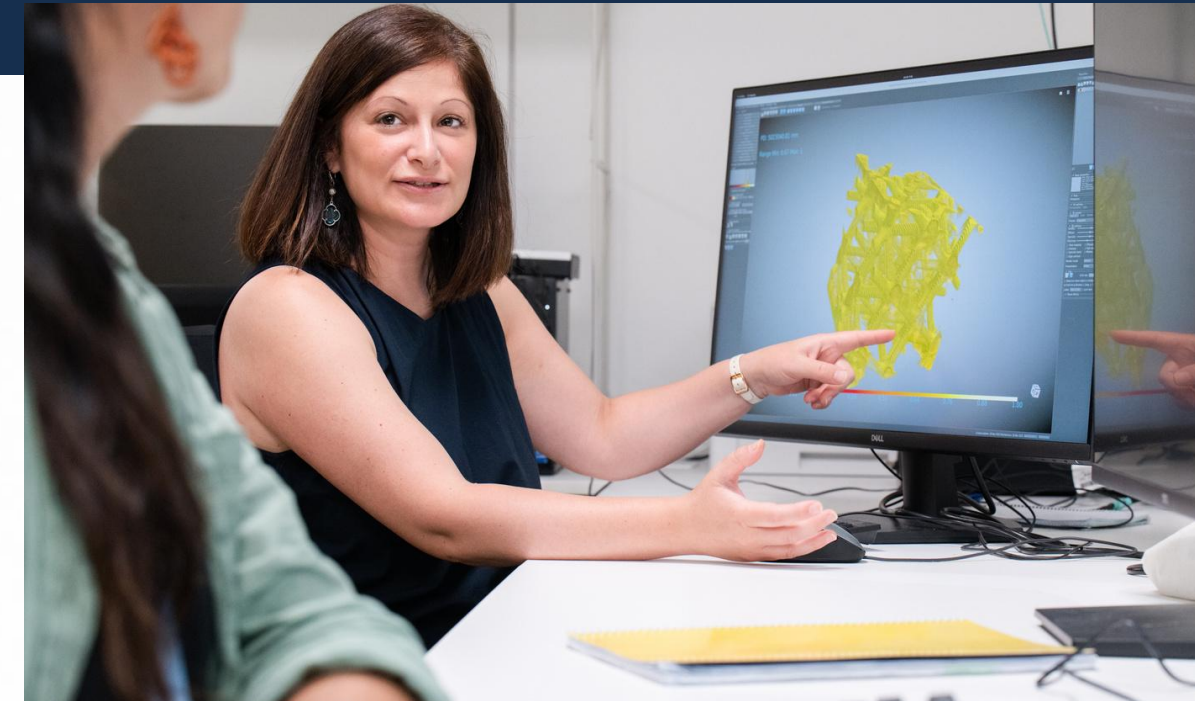
Tailored solutions for
large companies and
SMEs from a wide
variety of sectors

Competitive advantages



Tangibles

- Resolution micro/nano
- Measurements under real conditions
- Fast measurements



Intangibles

- Flexibly (samples, measurements, remote connection)
- Affordable prices and subsidised programmes
- Support on data analysis

Subsidised access program



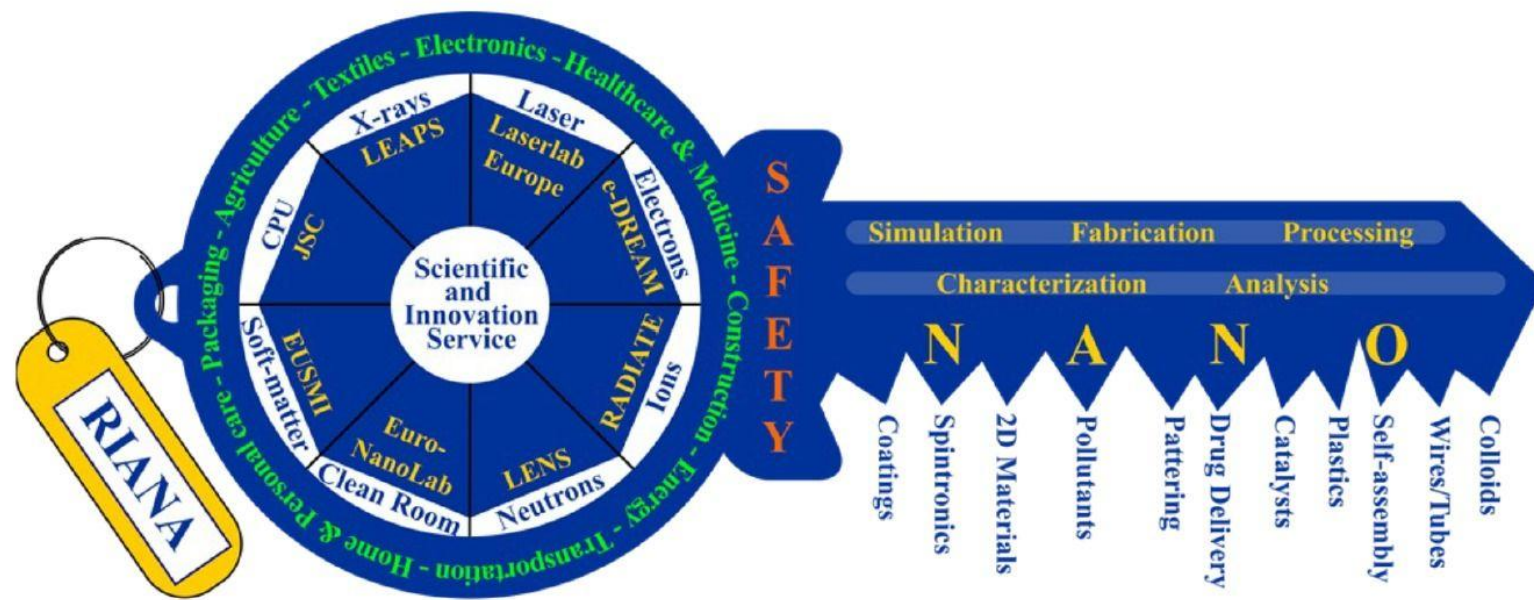
Núria Valls



CALL FOR SMALL AND MEDIUM ENTERPRISES **OPEN**
for nanoscience and nanotechnology projects

<https://riana-project.eu/sme-user-access/>

RIANA : Nanoscience and technology by users is key



- ✓ For Small and Medium Enterprises (SMEs)
- ✓ TNA access to Analytical Research Infrastructures
- ✓ Up to 1.000 Eur if proposal approved
- ✓ Up to 10.000 Eur with service provider-intermediary company
- ✓ Travel support
- ✓ Measurements time partially covered
- ✓ Confidential results



Funded by
the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101130652.

Available analytical tools

- ▶ High-resolution X-ray diffraction and scattering
- ▶ Infrared microspectroscopy
- ▶ X-ray spectroscopy
- ▶ X-ray microscopy/tomography
- ▶ High-resolution electron microscopy



Exhibition: *applications*

Main topics

- ▶ Imaging materials and devices
- ▶ Imaging devices at multi-length scales
- ▶ Band structure and magnetic behavior
- ▶ Quantum materials
- ▶ Thin films and surfaces



Eduardo Solano



Massimo Tallarida



Manuel Valvidares



Núria Bagués



Johannes Ihli



Lucia Aballe
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Exhibition: *ancillary labs and tools*



Josep Nicolas

- Optics & Metrology
- Nanomotion laboratory

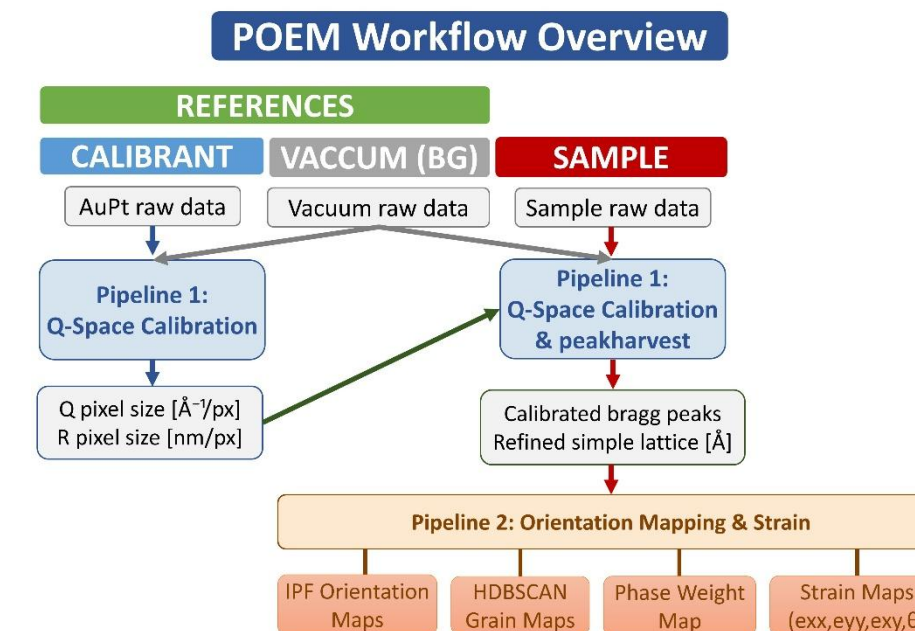


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Joaquín Otón

- Methodology group



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Tools for microelectronics in a nutshell

Fast 3D non-destructive
imaging of large volumes
at low resolution (1mm^3).

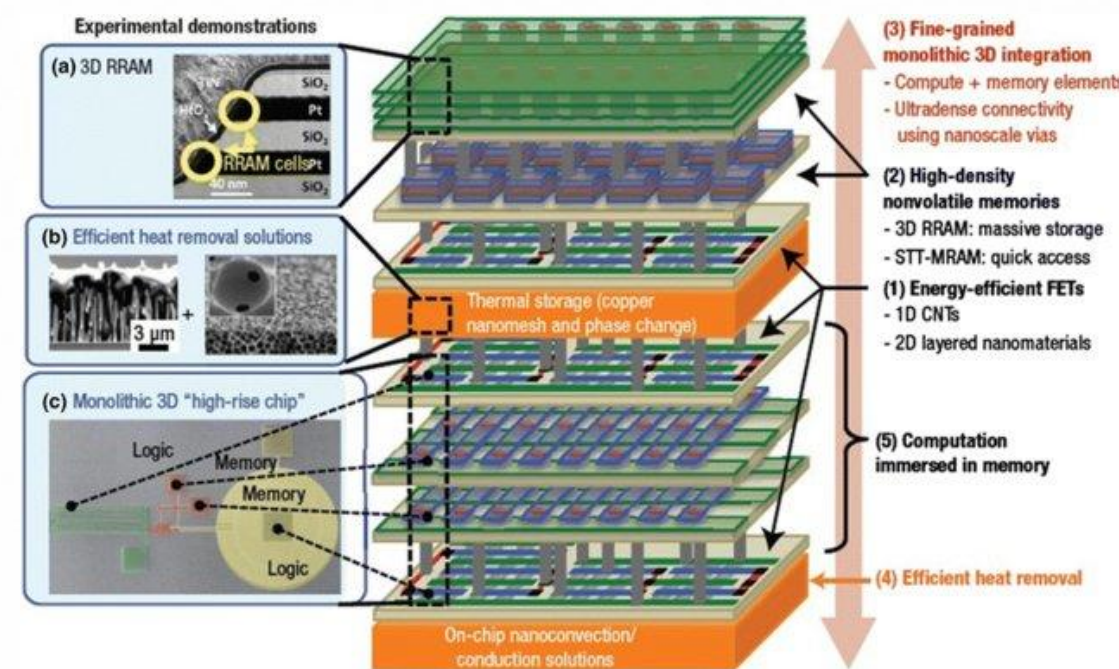
FAXTOR

Phase and chemical information
for combinatorial and in-situ
process development.

CLAESS, MSPD, 3Sbar

2D imaging with sub-atomic resolution
(including chemical analysis and strain).

TEM (with destruction)



Functionality test of Spin and
Charge under device conditions
for new concepts.

BOREAS, LOREA, CIRCE-PEEM

3D imaging with $\sim 10\text{nm}$ resolution
for chemical phase and strain
resolution without destruction
(*nano-probe*).

Imaging of functionality within a
 $40\times 40\text{mm}^2$ area with 5-10nm
resolution (unpackaged device).

CIRCE-PEEM

Imaging of large volumes (10mm^3)
with 30nm^3 resolution without
destruction (full-field hard X-ray
probe).

(soft X-ray full-field probe exists,
MISTRAL).



Let's talk about your challenge?

Services



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<https://www.cells.es/ca/industria>



[albasynchrotron](#)



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