



INL Annual Report 2025

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Foreword

Over the past year, INL has continued to move forward with a strong sense of shared ambition. We know that we face a rapidly evolving global landscape and we have not only strengthened our scientific output but also reinforced what defines us most: a vibrant community of people working together to generate knowledge, innovation and impact.

It is with great pride that we state that 2025 has been a year of consolidation and growth. Our scientific achievements reflect both excellence and relevance, demonstrating our ability to translate fundamental research into innovation. Across our Grand Thematic Areas - Information and Communication Technologies, Energy and Environment and Life Sciences - we continue to address some of the most pressing challenges of our time, while pursuing research to answer cutting-edge scientific questions.

At the heart of these achievements is our people. Today, INL brings together researchers, students and professionals from diverse backgrounds, united in their commitment to pursue excellence. We have strengthened our leadership, while continuing to nurture the next generation of scientists supporting initiatives such as the Early Stage Researchers Association (ESRA) Symposium, the Postgraduate School and new educational pathways. We know that this investment in talent ensures that INL remains a dynamic and forward-looking institution. We have also reinforced our position within the European and global research ecosystem.

In 2025, INL secured €23.46 million in funding, reflecting our competitiveness and alignment with strategic priorities at both the Iberian and European levels. These encompass major initiatives, such as the participation in the Chips EU pilot line on Heterogeneous Integration (APECS), the launch and coordination of the Portuguese Competence Centre for in Semiconductors (POEMS), our role as key partners of the European Chips Design Platform (EuroCDP), and contributions to the European Advanced Materials Initiative, which highlight our growing role in shaping the future of key technologies. Innovation continues to be a cornerstone of our mission, bringing to INL over €3 million in industrial contracts, thus we are strengthening the bridge between science, the economy and society.

The work of the Innovation Board and the Technology Transfer Office has further enhanced our ability to transform research into tangible solutions, while ensuring that innovation at INL generates both societal and economic value. INL has developed a forward-looking IP policy to foster its start-ups.

This year also marked important progress in strengthening our institutional framework. The Research Board, Innovation Board, Administration Board and Steering Committee of Research Core Facilities have all played key roles in enhancing governance, improving coordination and supporting strategic decision-making. These structures constituted an essential step in INL's transformative process in which participation in addressing our challenges and dreams becomes a collective endeavour. They were a step in our learning process as a young institution with global ambitions.

Equally important is our commitment to people, ethics and organisational culture. The establishment of the Ombudsperson and the implementation of ethics training programmes for research and engineering group leaders in the first instance reflect our dedication to fostering an inclusive and responsible environment.

In 2025, our Micro and Nano Fabrication Facility acquired a new Head, Dr Ivan Prieto, whose transformative vision is driving the advancement of cutting-edge research requiring micro- and nanoscale structures, while also strengthening INL's engagement with industrial partners. We also welcome Dr Selim Hanay as research group leader to head the former Integrated Micro and Nano Technologies (iMiNa) group, who will strengthen INL research in MEMS and NOEMS. Finally, our impact is further reflected in the recognition received by our researchers, including international awards, competitive grants and the presence of INL scientists among the top 2% worldwide. These achievements reinforce our position as a leading institution in nanoscience and nanotechnology.

Now, as we look ahead, our ambition is clear: we will continue to advance in key areas such as micro- and nanoelectronics, artificial intelligence, quantum technologies, advanced materials and sustainability. From clean energy and water solutions to nanosafety, from sensors in the life sciences and integrated systems in industrial applications, INL is committed to contributing to a more sustainable and inclusive future. At the same time, we will further strengthen our innovation ecosystem, expand partnerships, and enhance our global reach.

None of this progress would be possible without the dedication, creativity and collaboration of our people. Therefore, we extend our sincere gratitude to every member of our community, partners and stakeholders who contribute every day to making INL an intergovernmental institution of excellence.

Together, we keep shaping the future.

Prof. Dr. Clivia Sotomayor Torres

Director-General

Prof. Dr. Ado Jório de Vasconcelos

Deputy Director-General

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International Iberian Nanotechnology Laboratory



Delivering our mission in 2025

In 2025, INL maintained a strong focus on people, excellence and impact. With a diverse and talented team of 576 members, spanning 37 nationalities and organised into 20 Research and Engineering Groups and 10 support units, INL continued to attract and develop world-class talent. INL invests in people through continuous training, with the majority of knowledge transfer driven internally. This year, 116 internal training courses were delivered, with 64% of the total training hours provided by

INL staff, highlighting both internal expertise and a strong culture of knowledge sharing. Research and innovation performance remained highly competitive, with 249 peer-reviewed publications, 17 filed patents, 1 licensed technology, and 8 honours and awards recognising excellence. INL was involved in 187 funded projects, supported by competitive programmes including ERC, MSCA and EIC Pathfinder grants, reflecting both scientific excellence and alignment with European and international research priorities.

INL numbers for 2025



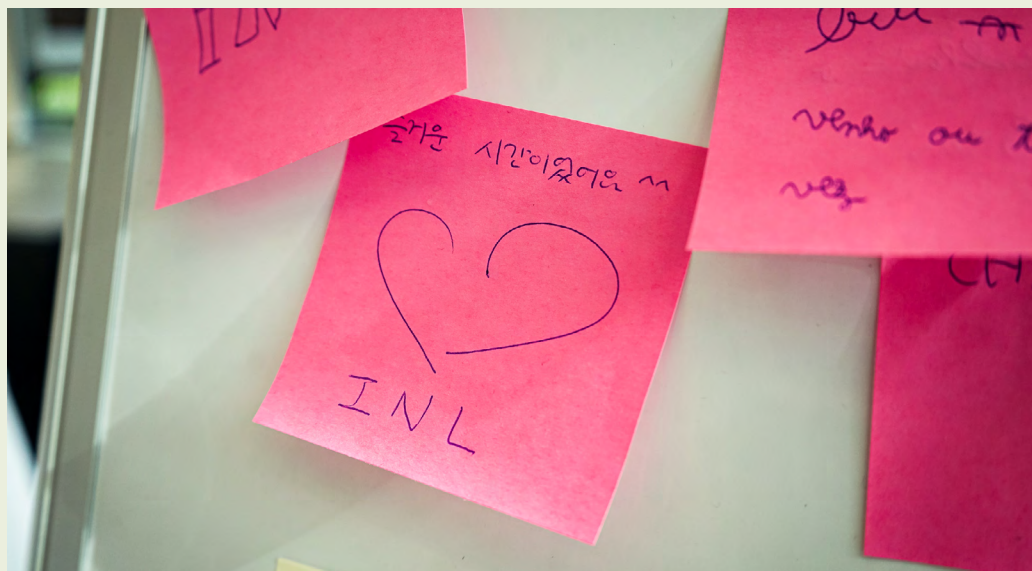
Advancing Scientific Excellence

In 2025, INL advanced its mission *to excel in nanoscale research for the benefit of society* and its vision *to lead in nanotechnology by fostering excellence and global recognition, making meaningful contributions to shape the future*. Through strategic research, innovation, and international collaboration, the Laboratory continued to translate fundamental discoveries into societal impact, addressing global challenges aligned with the United Nations' Sustainable Development Goals, from clean energy and sustainable cities to health and wellbeing. A major milestone was INL's participation as a partner in

APECS (Advanced Packaging and Heterogeneous Integration of Electronic Components and Systems), one of the EU Chips Act Pilot Lines. Launched in 2025, INL also coordinates POEMS — the Portuguese Competence Centre for Semiconductors, with support from national and European funding. Building on this momentum, 2026 will focus on consolidating capabilities and preparing the ground for new pilot lines. These preparatory efforts position INL to play a more active role in future large-scale European initiatives, reinforcing its contribution to the semiconductor ecosystem at national and European levels.



Secretary of State for Science and Innovation in Portugal, Helena Canhão, POEMS event



Visitors feedback collected during INL Open Day.

Ensuring Operation Excellence

In 2025, INL further strengthened its commitment to [Responsible Research and Innovation \(RRI\)](#), advancing a culture of ethical conduct, transparency, and societal responsibility across the organisation. As part of this effort, [INL introduced the Ombudsperson role](#) and [implemented a comprehensive Whistleblower Policy](#), reinforcing robust governance mechanisms that support integrity and accountability.

The Laboratory also continued to enhance operational excellence and quality assurance, progressing towards a continuous improvement with the ISO 9001:2015 INL User Facilities certification and maintaining compliance with ISO 13485:2016 for Medical Devices and GLP certification. INL sustained its dedication to a positive and supportive research environment through the HR for Excellence Award, complemented by ongoing wellness campaigns that promote staff wellbeing and engagement.



Diwali celebration at INL

Strategic Initiatives and Global Engagement

This year, INL strengthened both its global presence and regional influence through initiatives that connect people, ideas, and technologies. The first edition of the Steppingstone Series invited alumni to share how their experiences at INL shaped their professional journeys,

highlighting the Laboratory's role in fostering talent and career development. Community engagement flourished with the [Diwali celebration](#), bringing together staff, students, and partners in a vibrant expression of inclusion.



Diwali celebration at INL

Showcasing Innovation on the World Stage

INL showcased its cutting-edge nanotechnology at the [World Expo Osaka 2025](#), engaging a global audience. The Expo underscored INL's leadership in translating research into tangible societal impact and reinforced its role as a bridge between Europe and Asia in science and innovation.

Strategic research collaborations deepened through the launch of a [joint programme with](#)

[the Budapest University of Technology and Economics \(BME\)](#) and a delegation visit to [Oswaldo Cruz Foundation \(Fiocruz\)](#), reinforcing INL's position as a hub for cross-border scientific cooperation. Locally, the [Braga25 partnership](#) marked another milestone in regional engagement, supporting innovation ecosystems that connect science, society, and industry.



INL at World Expo Osaka



INL at World Expo Osaka



Artist Miguel Teodoro during a Braga25 residency at INL

Leadership and Legacy

INL welcomed key leaders who will shape its scientific and innovation trajectory, including Olivier Messenger as Head of Technology Transfer, Ivan Prieto as Head of the Micro and Nanofabrication Facility, and new Research Group Leaders Selim Hanay and Rui Domingues, strengthening the Laboratory's

expertise and capacity to drive high-impact research. The year was further enriched by the [20th anniversary](#) of the binational decision that gave rise to its creation, a heartfelt tribute to a legacy of scientific excellence and the enduring Iberian collaboration that underpins INL's mission.



Guests attending the 20 Years of INL event





Invisible Piano, at the INL Open Day

Engaging Society and Inspiring the Future

Knowledge dissemination and societal engagement remained central to INL's mission in 2025. Initiatives such as the [INL Open Day](#) welcomed hundreds of visitors, sharing the Laboratory's research with the broader community while ongoing collaborations with

universities and secondary schools continued to inspire the next generation of scientists. INL research and initiatives were featured across [88 media clippings](#), highlighting the Laboratory's impact nationally and internationally.

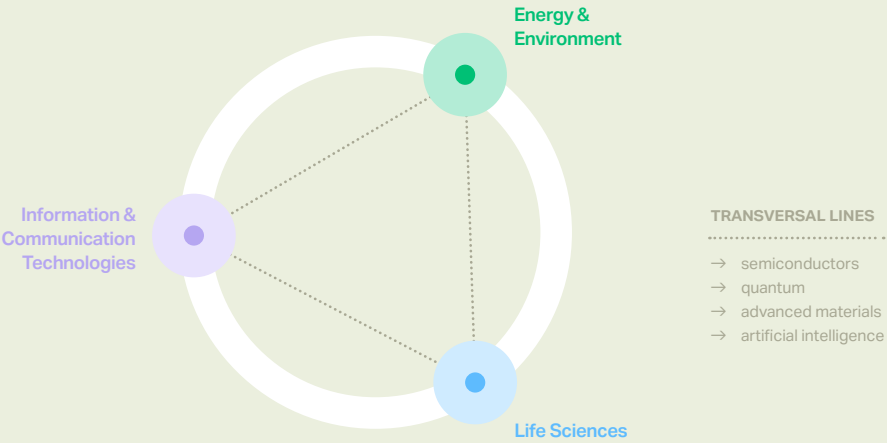
Looking Ahead

The accomplishments of 2025 demonstrate INL's success in advancing research, fostering innovation, and creating societal impact. By integrating discovery, collaboration, and knowledge transfer,

INL has strengthened its position as a global leader in nanoscience, laying the groundwork for continued breakthroughs, partnerships, and contributions to society in 2026 and beyond.

Research Excellence

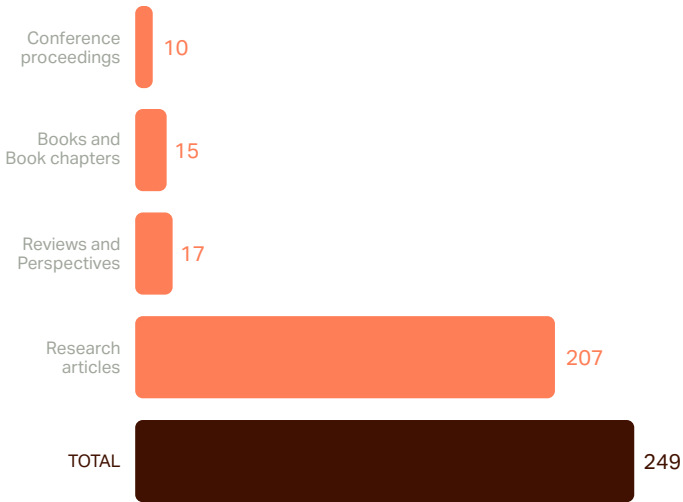
Research excellence at INL is reinforced by collaboration. Our interdisciplinary Research and Engineering Groups work closely across scientific boundaries, bringing together complementary expertise around three grand thematic areas that address key societal and technological challenges.



INL’s research is structured across three Grand Thematic Areas. In Information & Communication Technologies (ICT), it advances neuromorphic systems, flexible electronics, nanolasers, and nanoscale fabrication, shaping next-generation computing and communication. In Life Sciences, INL applies nanotechnology to healthcare and nutrition through biosensing, nanomedicine, biomedical devices, tissue engineering, food technologies, and molecular imaging,

supporting solutions with strong translational potential. In Energy & Environment, it develops approaches for clean energy, climate action, and sustainability, with a focus on energy storage and conversion, water and air quality, sustainable materials, and advanced sensing. Across all areas, semiconductors, advanced materials, artificial intelligence, and machine learning act as key transversal enablers.

In 2025, INL’s publication output reflected both excellence in fundamental research and strong translational impact. Many publications resulted from collaborative efforts across multiple groups, reinforcing the Laboratory’s interdisciplinary approach. A total of 249 publications were produced, including 207 research articles, 15 books and book chapters, 17 reviews and perspectives, and 10 conference proceedings. The complete list of publications is provided in the chapter ‘Scientific Output’.



Alpuim

The group focuses on two main research areas: graphene-based biosensing, with particular emphasis on CMOS hybrid and heterogeneous integration, and transition metal dichalcogenide (TMDC)-based memristors. Additional activities include super-resolution imaging using hybrid graphene–DNA origami platforms and liquid-phase exfoliation of MXenes and nanocarbons for flexible and wearable electronic applications.

19

Publications

3

IP activity

5

Projects

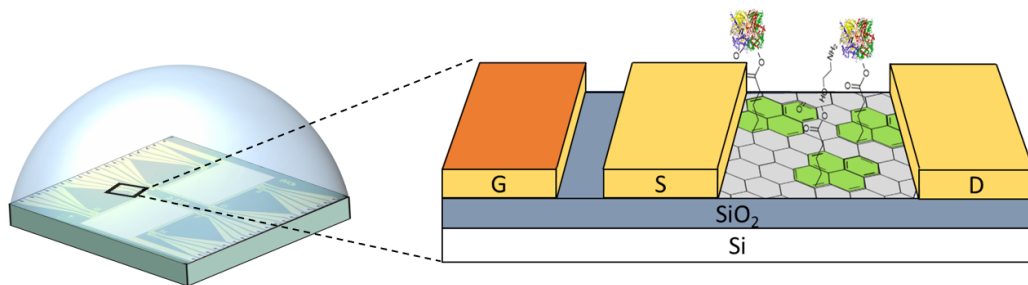
Group Leader	Pedro Alpuim
Research Scientists PI	Andrea Capasso Jérôme Borme
Postdoctoral Researchers	João Mouro
Application & Systems Integration Engineers	Mohammadmahdi Faraji Rodrigo Wrege Siva Sankar Sushmitha Veeralingam Tiago Pereira
PhD Students	Mafalda Abrantes Maria João Costa Telma Domingues Vicente Lopes
Advanced Students	Adriana Oliveira Ana Rita Lopes Beatriz A. Silva Beatriz G. Silva Beatriz Oliveira Beatriz Ferreira Gabriel Barbosa Iago Nogueira Júlia Schultz Mariana Fernandes Pedro Silva Sérgio Carvalho Tiago Abreu Tiago Dias

Associates	Manuel Vázquez Fátima Cerqueira Mirkos Martins Solange Fagan
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Research lines

- Graphene biosensing chips
- Advanced processing of 2D materials
- Cost-effective radio-frequency devices based on graphene
- Single-photon emitters for quantum optical technologies

The group's first technology transfer to a spin-off company aimed to commercialise a graphene biosensing platform based on graphene electrolyte-gated field-effect transistor (EG-FET) chips. In 2025, the technology demonstrated exceptional performance as a glucose sensor in human tears, achieving attomolar sensitivity — orders of magnitude lower than previously reported.



Hanay

The Hanay group conducts applied research in silicon-based micro- and nano-electromechanical systems (MEMS/NEMS), flexible and printed sensors, micro-opto-electromechanical systems (MOEMS), diffractive optics, and microlenses. Research activities also include advanced integration technologies and microfluidics-integrated sensors. The group maintains a large, funded project portfolio built on strong collaboration with industrial partners, enabling the development of microtechnologies at high technology readiness levels (TRLs) and supporting substantial industry-commissioned research, particularly in the MEMS domain. Since late 2025, part of the research portfolio has been aligned towards emerging fields such as neuromorphic computation and quantum sensing.

17

Publications

6

IP activity

15

Projects

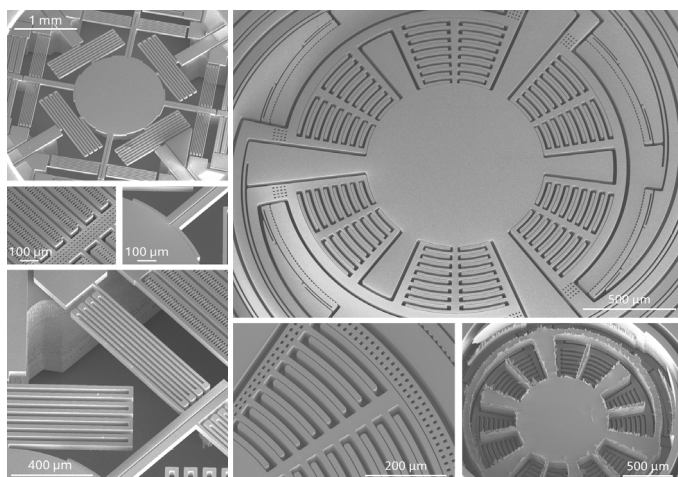
Group Leader	Selim Hanay
Research Scientists PI	Diogo Aguiam Filipe Alves Rosana Dias
Research Engineers	Ana Inês Dias Nélson Castro
Postdoctoral Researchers	Aamod Shanker Humayun Ahmed Manuel Rodrigues Temple Douglas
Research Assistants	Filipa Mota Gabriel Moreira Patrícia Silva
Application & Systems Integration Engineers	Aritz Retolaza Edoardo Sotgiu Filipe Camarneiro Inês Garcia João Cunha Joel Antunes Patrícia Sousa Pedro Matos Rui Pinto Uzay Tefek

PhD Students	Débora Amorim Inês Afonso João Borlido
Advanced Students	Beatriz Martinez Mariana Teixeira
Associate	Gabriel Ferreira

Research lines

- MEMS/NEMS and flexible devices
- Micro optical elements
- Advanced integration technologies
- Neuromorphic computation
- Microwave sensors

The group demonstrated a novel near-zero-power, omnidirectional in-plane MEMS inertial switch designed for wake-up and event-driven sensing in energy-efficient edge computing and IoT applications. The device operates without continuous power consumption and is based on a nonlinear electrostatic pull-in effect, enabling highly tuneable low-g acceleration threshold detection. The switch combines a suspended proof mass supported by Archimedean spiral springs with radially distributed parallel-plate actuators, ensuring uniform in-plane sensitivity. Programmable acceleration thresholds were experimentally validated using shaker-based testing. Fabricated using an in-house silicon-on-insulator (SOI) multi-level micromachining process, the device exhibited predictable mechanical and electrostatic behaviour, confirming its suitability for ultra-low-power sensing applications.



Scanning electron microscopy images of an ultra-low-power MEMS inertial switch.

This research highlight is described in detail in the proceedings of the [23rd International Conference on Solid-State Sensors, Actuators and Microsystems \(TRANSDUCERS\)](#).

M. Martins

The group is a cohesive, multidisciplinary engineering team dedicated to advancing INL’s research, development, and innovation activities, with a strong focus on systems engineering. Its mission is to strengthen institutional capabilities for interdisciplinary work by translating ideas into high-quality nanotechnology-based products and services. The team brings together expertise in mechanical, electronic, and computer engineering, complemented by physics-based knowledge, and works closely with researchers to enable faster and more robust prototyping, system integration, and validation. This approach supports an efficient transfer of knowledge into impactful and deployable solutions.

2

Publications

1

IP activity

13

Projects

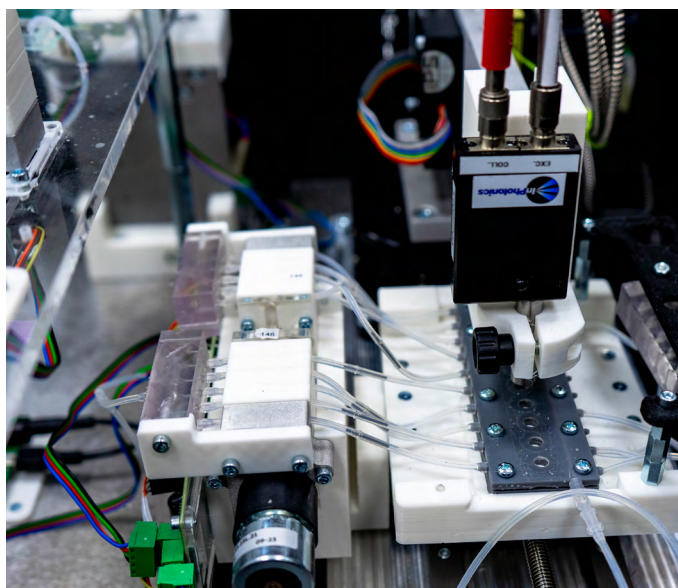
Group Leader	Marco Martins
Engineering Leads	Adriano Pedro Duarte Mota João Moura Luis Paula
Software Engineers	Jaymin Patel Daniel Rocha Henrique Costa João Manuel Rodrigues Muhammad Raza Pedro Carrinho
Application & Systems Integration Engineers	Fábio Martins François Burdin Guilherme Martins Tiago Cabrita Victor Joco Vinícius Silva
Manufacturing Technician	Nelson Silva

Research lines

- Mechanical engineering
- Artificial intelligence and computer vision
- Computer science
- Electronic engineering

The group has developed advanced prototypes and integrated systems reaching high technology readiness levels (TRLs). These solutions have been rigorously tested and validated in relevant environments, demonstrating readiness for deployment and broader adoption.

The group has successfully integrated complex artificial intelligence algorithms into both edge-computing devices — enhancing sensor data acquisition and enabling fast, efficient local processing — and cloud-based platforms that support scalable analytics, model updates, and decision-support services across multiple sites. In addition, highly efficient electronic systems have been developed in compact form factors, specifically designed in accordance with Design for Manufacturability principles. This ensures that the resulting products are not only innovative, but also suitable for large-scale production and industrial uptake.



High-TRL marine monitoring system combining advanced sensing and edge AI to detect harmful algal blooms.

Novo

The Novo group investigates the aspects of quantum theory that provide advantages for quantum information processing tasks, with a particular focus on photonic implementations of quantum computers. Given the diversity of quantum effects, there is no single approach to harnessing them; instead, the group explores multiple models of quantum computation to identify distinct strategies for leveraging the unique properties of quantum systems. Through their work, the group contributes to the development of quantum information science, which holds the potential to transform information processing by enabling faster quantum algorithms and innovative protocols for cryptography, metrology, and sensing.

17

Publications

2

IP activity

7

Projects

Group Leader	Ernesto Galvão
Research Scientists	Leonardo Novo* Rui Soares Barbosa
Postdoctoral Researchers	Benoît Seron Lorenzo Catani Som Kanjilal
Research Assistants	Diogo Gomes Eduardo Araújo Sara Franco
PhD Students	Alexandra Ramôa Ana Neri André Sequeira Angelos Bampounis Anita Camillini Antonio Ruiz Jaime Santos Laurens Wallegghem Mafalda Ramôa Manisha Jain Marco Robbio Michael de Oliveira Nico Wittrock Rafael Wagner Raman Choudhary Zeinab Rahmani

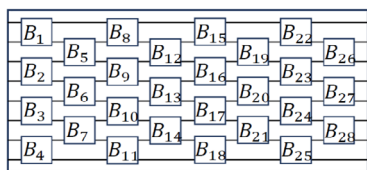
Advanced Students	Ana Barros Carolina Sobral Mafalda Couto Pedro Ferreira Ricardo Silva
Associates	José Nuno Oliveira Luís Soares Barbosa Luís Paulo Santos

* Leonardo Novo appointed Interim Research Group Leader since September 2025

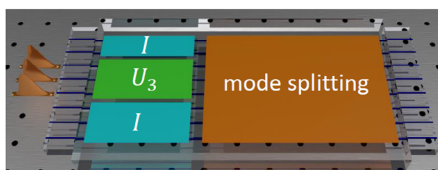
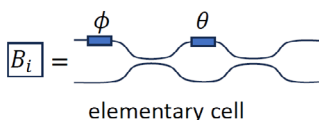
Research lines

- Foundations of quantum computation
- Photonic quantum computation
- Quantum software engineering

The Novo group, in collaboration with Sapienza University of Rome and the Polytechnic of Milan, developed methods to analyse data from multiphoton interference experiments, providing reliable guarantees on the indistinguishability of photons. These methods are applicable even when linear interferometers are imperfect, overcoming a major limitation of previous protocols that assumed ideal device operation. Ensuring photon indistinguishability is crucial for achieving quantum computational advantages in photonic systems, where sources must produce highly similar single photons in all internal degrees of freedom, such as spectral shape and polarization. This work provides a new toolset for validating photonic quantum computation platforms in realistic experimental conditions.



integrated photonic processor layout



processor programming

$U_3 \rightarrow 3 \times 3$ transformation
 $I \rightarrow$ identity over the modes
 mode splitting $\rightarrow$ portion of the device
 used for detection

P. Ferreira

The group focuses on the investigation of the atomic structure, composition, and defect behaviour of nanomaterials using aberration-corrected TEM/STEM and *in situ* TEM/STEM, combined with EELS/EDS and differential phase contrast. Research activities aim to elucidate the relationships between atomic structure, composition, and material properties, as well as the fundamental mechanisms governing material behaviour at the nanoscale. Material systems of interest include battery materials, catalyst nanoparticles for proton exchange membrane fuel cells and water electrolysis, as well as two-dimensional materials.

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Publications

1

IP activity

17

Projects

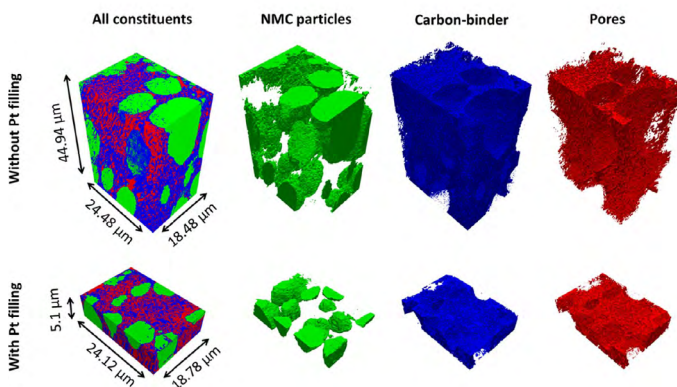
Group Leader	Paulo Ferreira
Research Scientists	Pedro Costa Puspendu Guha Timothy Gutu
Research Scientists PI	Leonard Francis
Postdoctoral Researchers	Aqrab Ahmad Avnish Pal Dnyaneshwar Gavhane Hong Yin Ihsan Çaha Ioannis Siachos Meera Mohan Rajashree Konar Rui Maia Sandeep Maurya Samishta Choudhary Shunrui Luo Tahir Muhmood William Morais
Research Assistants	Fatemeh Latifi Tauqeer Ahmad
Application & Systems Integration Engineer	João Cunha

PhD Students	Carlos Garcia Daniela Santos Dhanusha Rajanna James Peters Luis Piedra Mariana Gomes Maryam Karimi
Advanced Students	Adriana Maceiras Carolina Durães Coralie Sourd João Tavares Laura Formoso Tânia Bastos Yildiz Emir
Associates	Niloofar Khodamoradi Carlos Rodríguez Zihan Yin Manuel González

Research lines

- Atomic structure, composition and charge distribution of materials in Li-ion and Na-ion batteries
- Degradation of nanocatalysts and supports for PEM-FC and water electrolysis
- Atomic defects in 2D nanomaterials

A contrast-enhanced three-dimensional characterisation approach was developed to improve the analysis of porous lithium-ion battery electrodes. Using focused ion beam-scanning electron microscope (FIB-SEM) tomography combined with in situ pore filling by platinum via gas-injection-system (GIS) electron-induced deposition, the method enables reliable reconstruction of electrode microstructures with a spatial resolution of approximately 10 nm. Electrode morphology plays a critical role in determining electron and ion transport, as well as the electrochemical processes that ultimately govern battery performance. However, conventional FIB-SEM tomography is limited by low contrast between electrode constituents, particularly between carbon-binder domains and pores, which hampers accurate 3D reconstruction. The introduced contrast-enhancement strategy significantly improves pore identification and the determination of volume fractions, enabling more precise 3D characterisation of electrode architectures. This development opens new opportunities for the detailed analysis and optimisation of battery electrodes, supporting the design of improved lithium-ion energy storage systems.



3D reconstructions of electrode blocks, with and without platinum filling. NMC: Nickel-Manganese-Cobalt. This research highlight is described in detail in the journal [Energy Storage Materials](#).

Piteira

9

Publications

1

IP activity

20

Projects

The Piteira group translates nanotechnology developed at INL into form factors suitable for applications across ICT, health, agri-food, and environmental sectors, delivering advanced cyber-physical systems that are power-, size-, and cost-efficient. The group focuses on CMOS-integrated circuit technologies, microelectronics, and biosensors to create compact, highly integrated analytical devices. These applications require a high level of miniaturisation and integration of sensors, microfluidics, and readout electronics, achieved through custom-designed microelectronics solutions, seamless integration of microfluidic systems and sensing technologies, and smart system integration strategies that enable automation and portability to perform the complete analytical cycle from sample preparation to analyte detection.

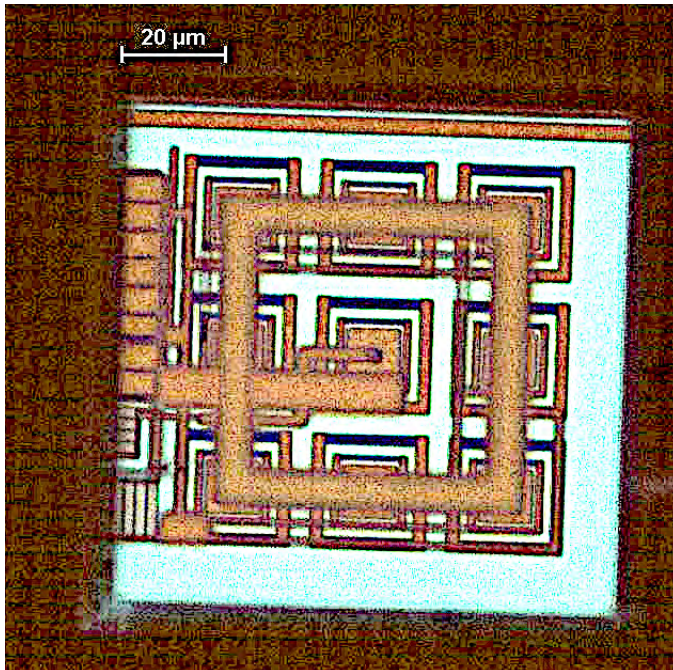
Group Leader	João Piteira
Research Scientists	Andrea Cruz Carla Carvalho Elisabete Fernandes Hugo Oliveira
Research Engineer	José Loché
Postdoctoral Researchers	Accel Abarca Adrián Visedo Carole Sousa Catarina Nogueira Nancy Anasthasiya Prabir Kulabhusan Kishore Kampara
Research Assistants	Ana Ribeiro Francisco Barreira Jéssica Sousa Sofia Pereira
Process Engineer	Denis Santos
Application & Systems Integration Engineers	Álvaro Geraledes Ana Frangolho Bruno H Freitas Carlos Marques David Araújo

	Hazal Gergeroglu Helder Avelar Mohammadmahdi Faraji Ricardo Silva Roberto Laranjeira Tiago Darós
PhD Students	Catarina Lopes Margarida Gonçalves
Advanced Students	Adaeze Phoebe Njoku Bruno Martins Deimante Stankunaite Francisca Oliveira Inês Vilhena Luís Gonçalves Manuel Pereira Margarida Cunha Maria Pereira Renato Ribeiro Sara Fernandes Vasco Martins Vítor Costa
Associates	Damian Neubauer Diana Pinho Marta Aramburu Tomasz Wasilewski
Trainee	Muhammad Yousaf

Research lines

- Advanced CMOS hybrid services
- Smart system integration
- Ultra-low power and autonomous wireless sensor networks

Within the framework of the EIC-Pathfinder project CrossBrain, the group developed a compact, low-noise bandgap voltage reference for stable operation under process, voltage, and temperature variations. The design uses a single-resistor noise-tuning mechanism to suppress low-frequency flicker noise without increasing area or power consumption. Fabricated in standard CMOS technology, the circuit demonstrated low noise, low power, thermal stability, and a very small footprint, making it ideal for space- and power-constrained applications such as implantable biomedical devices and precision sensing systems.



Microphotograph of the bandgap reference (BGR) prototype; the transistor core occupies most of the chip area. This highlight is described in detail in the journal [IEEE Transactions on Circuits and Systems I](#).

R. Ferreira

The group conducts research in spintronics, focusing on two main areas that rely on devices based on magnetic tunnel junctions. The first involves ultrasensitive magnetoresistive sensors, with an emphasis on practical applications and collaboration with industry partners. The second, pursued through several competitive European projects, investigates spin dynamics and spin-transfer torque nano-oscillators for emerging technologies.

6

Publications

0

IP activity

8

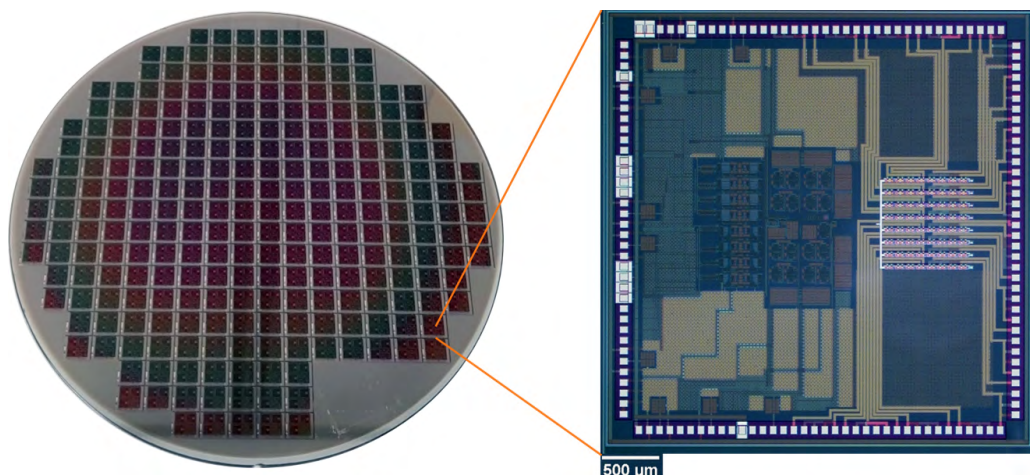
Projects

Group Leader	Ricardo Ferreira
Research Scientist PI	Alex Jenkins
Research Scientists	Ensieh Iranmehr Tim Böhnert
Postdoctoral Researchers	Abdulsalam Muhrat Artem Talantsev Maksim Steblii Subhajit Roy
Application & Systems Integration Engineers	André Araújo Luana Benetti
PhD Students	Erlaitz Gómez Henrique Teixeira Zixi Wang
Advanced Students	André Martins Catarina Pereira Xabier Castro

Research lines

- Magnetoresistive sensors
- Spin dynamics and spintronic nano-oscillators

Within the framework of the Horizon Europe FET Proactive project RADIOSPIN, the group successfully integrated artificial radio-frequency synapses based on spin-transfer-torque nano-oscillators (STT-NOs) with CMOS technology. The integration of functional circuits was achieved homogeneously with a backend process on a 200 mm wafer, with 180-nm CMOS technology. To the best of our knowledge, this represents the first integration of STT-NOs with CMOS, marking a significant milestone for the scale-up and adoption of neuromorphic hardware based on spintronic devices. Electrical characterisation confirms the success of the integration. The resulting neuromorphic computation chiplets are undergoing further testing, including training to perform native RF-domain classification of data acquired from a mammography system based on microwave tomography. The project also involves Institut Polytechnique de Bordeaux (France), CNRS (France), Thales (France), and Umbria Bioengineering Technologies Limited (Italy).



200 mm CMOS wafer with homogeneous integration of artificial synapses, with a zoom-in of a neuromorphic processing chiplet.

Rossier

The Rossier group investigates non-trivial quantum collective phenomena arising from entanglement and coherence, with applications in ICT, including quantum sensing and quantum computing. Research focuses on the magnetic, optical, magneto-optical, orbitronic, and transport properties of nanoscale systems, including two-dimensional materials, cavity electrodynamics in molecular crystals, and individual atoms and molecules on surfaces studied using scanning probe techniques.

27

Publications

0

IP activity

5

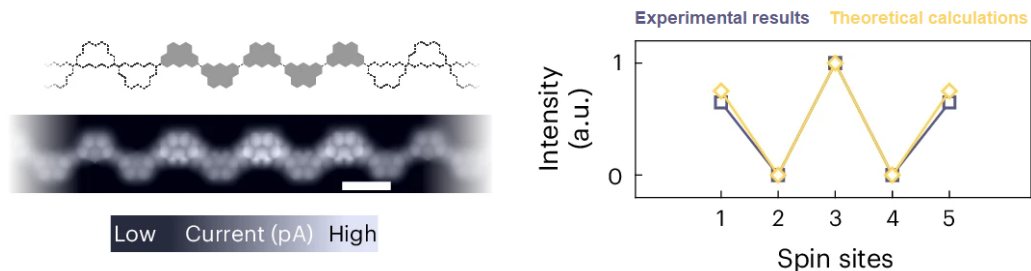
Projects

Group Leader	Joaquín Fernández Rossier
Postdoctoral Researchers	Álvaro Buendía Jan Staller Kevin Vidarte
Research Assistants	João Henriques Luísa Madail Marcelo Barreiro
PhD Students	Diogo Cunha Macario Rodrigues Mar Ferri Victor Duarte Yelko del Castillo
Associates	António Junior Tatiana Rappoport Mikhail Vasilevskiy Nuno Peres

Research lines

- Modelling emergent electronic and optical properties in Van der Waals heterostructures
- Atom-by-atom design of quantum states
- Quantum algorithms for quantum simulation and machine learning methods
- Orbitronics
- Quantum sensing

The Rossier group, in collaboration with international partners, created linear chains of carbon-based olympicene molecules, forming atomic-scale spin-1/2 Heisenberg chains. Using inelastic electron tunnelling spectroscopy, the team directly measured spin excitations and confirmed the predicted gapless behaviour as chain length increases. In chains with an odd number of spins, individual spinons were directly visualised, providing a rare atomic-scale observation of this elementary quantum excitation. The results validate long-standing theoretical predictions in quantum magnetism and establish a platform for designing and probing tailored quantum spin systems.



Theoretical calculations and current imaging of olympicene spin chains, revealing the ground-state electronic structure. Detailed results are reported in the journal [Nature Materials](#).

Sotomayor

The Sotomayor group investigates the physics and applications of phonon confinement and propagation in materials and devices and is a world reference as demonstrated by recent international recognitions, namely, the Bloch medal and the Klemens award to the group leader. The group deploys contactless methods including Brillouin and Raman light scattering spectroscopy, ultrafast pump-probe spectroscopy, laser Doppler vibrometry and optomechanical techniques. They explore and innovate concepts in phonon dynamics, phonon scattering, interactions, topological phenomena and neuromorphic computation, with a focus on scalable technologies, based on silicon and 2D quantum materials.

2

Publications

0

IP activity

7

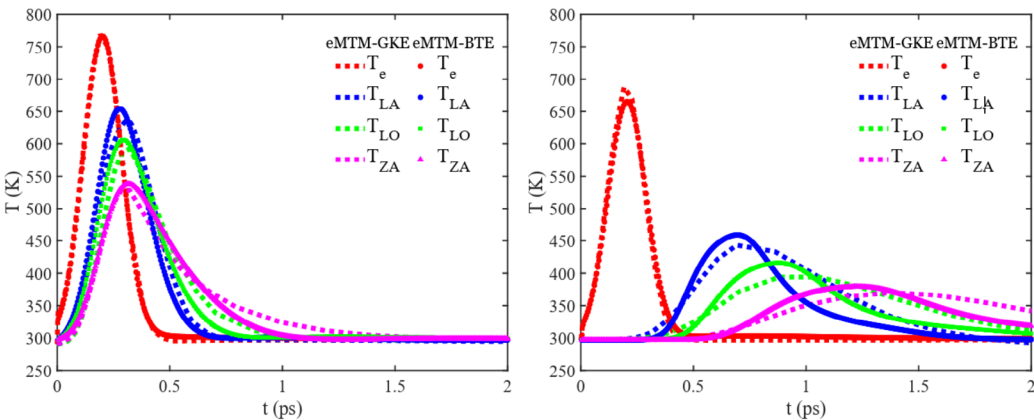
Projects

Group Leader	Clivia Sotomayor Torres
Project Management Officer	Iliona Wolfowicz
Postdoctoral Researchers	Daniel Tchuimeni Gloria Conte Houssem Rezgui Manjunath Balagopalan Omid Ranjbar Samaneh Moeini Tânia Ribeiro Thomas Yager Tiago Magalhães Yani Chen

Research lines

- Topological matter
- Optomechanics
- Nanoscale heat transport

Ultrafast thermal transport in low-dimensional materials challenges traditional diffusive models due to reduced scattering, strong electron-phonon coupling, and pronounced non-equilibrium effects. To address these complexities, the macroscopic multi-temperature model was extended to incorporate non-diffusive and non-local phenomena, treating electrons, optical phonons, and acoustic phonons as coupled but thermally distinct subsystems. Frequency fluctuations can become the main performance limiter in opto-electro-mechanical resonators (MOEMS/NEMS) operating at room temperature, particularly when the device functions as a frequency-based oscillator. In principle, the thermal bath sets a fundamental noise and decoherence floor through thermomechanical motion. The fluctuation-dissipation framework is useful here, as it links loss and noise. In optomechanical nanobeams, thermal noise channels, such as thermorefractive and thermoelastic noise, are influenced by heat flow. Consequently, variations in thermal conductivity, device geometry, or thermal boundary resistance can modify the resulting noise spectrum. By analysing these parameters, together with deterministic variability introduced during fabrication, the dominant dissipation channels can be identified, providing insight into the room-temperature performance and frequency stability limits of photonic and phononic crystal N(O)EMS optomechanical devices.



Temporal evolution of temperatures at spatial positions 1 nm (left) and 5 nm (right) from the centre of the ultrafast laser excitation, comparing different transport models. Detailed results are reported in the journal [Transport in Graphene](#).

Alfaro-Moreno

The Alfaro-Moreno group focuses on advancing nanosafety through innovative experimental, computational, and high-throughput approaches. Supported by several European projects, including LEARN, iCare, UPRISE, and NEEP, the group develops advanced *in vitro* models, organ-on-a-chip systems, epigenetic and bridging models, and immunotoxicology assays to assess the effects of nanomaterials on human health and the environment. The group integrates *in vitro*, *in vivo*, and *in silico* approaches, including QSAR, QSPR, and machine-learning methods, to strengthen risk assessment and support the development of safer-by-design nanotechnologies.

11
Publications

0
IP activity

3
Projects

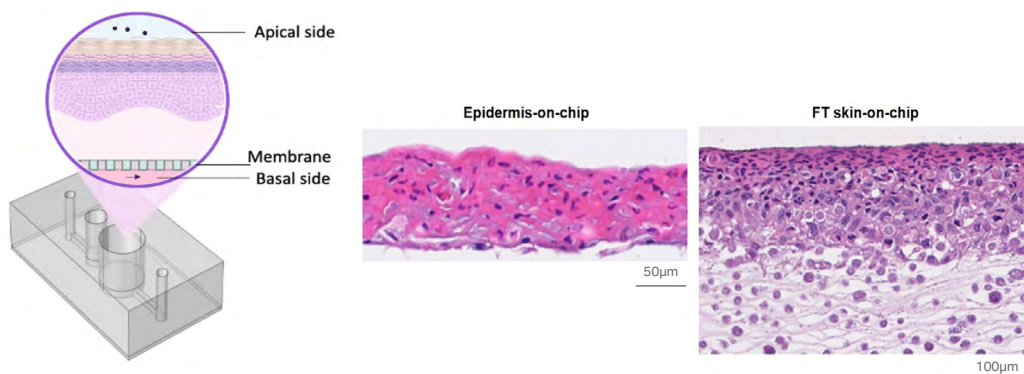
Group Leader	Ernesto Alfaro-Moreno
Research Scientists	Ana Ribeiro Nivedita Chatterjee Vânia Vilas Boas
Research Laboratory Assistant	Sadaf Almas
Postdoctoral Researchers	Kabiruddin Khan Maria Enea
Research Assistants	Ana Fernandes Lia Santos
Application & Systems Integration Engineer	Filipa Lebre
PhD Students	Marceli Silva Raquel Abad Samantha Costa Tuyla Fontana

Advanced Students	Anica Hügli Bárbara Coelho Jessica Alves Lía Rivas Margarida Cunha Marta Mariz Nuno Braz Rodrigo Cândido Sofia Pereira
Associate	Ana Nogueira
Trainees	Dayana Santos Diana Azevedo Jose Freixo Lucía Medín

Research lines

- *In vitro* systems using organ-on-a-chip technologies
- Evaluation of epigenetic patterns
- Evaluation of the toxic potential of nanoparticles and nanomaterials

The group achieved a significant milestone with the development of an advanced microfluidic platform capable of generating both three-dimensional epidermis and full-thickness human skin models. This innovative system recreates physiologically relevant skin architecture, enabling more accurate assessment of nanomaterial interactions with human tissue. By integrating controlled microenvironments, dynamic culture conditions, and precise nutrient flow, the platform supports robust tissue maturation and barrier formation, addressing key limitations of conventional static cultures. The model enables evaluation of nanoparticle penetration, accumulation, and potential toxicological effects with improved fidelity, thereby enhancing the predictive value of *in vitro* safety testing. This achievement advances the development of safer-by-design nanotechnologies and provides an ethical, human-relevant alternative to animal testing, reinforcing INL's position in nanosafety research and organ-on-a-chip innovation.



Schematics of the microfluidic platform for generating 3D epidermis and full-thickness human skin models, and morphology of epidermis-on-chip and FT skin-on-chip after TiO₂ nanoparticle exposure. Full results published in the journal [Advanced Healthcare Materials](#).

Bañobre

Bañobre’s group focuses on the development of diagnostic and therapeutic strategies for disease, with particular emphasis on cancer, inflammatory conditions, and infectious diseases. By harnessing the unique properties of nanomaterials, the group explores innovative medical approaches to address unmet clinical needs and emerging health challenges. Research activities include the development of theranostic nanomedicines that integrate diagnosis and therapy for real-time treatment monitoring, animal-free platforms for safety and efficacy assessment, and bacteriophage-based strategies to combat antibiotic-resistant infections.

18

Publications

1

IP activity

2

Projects

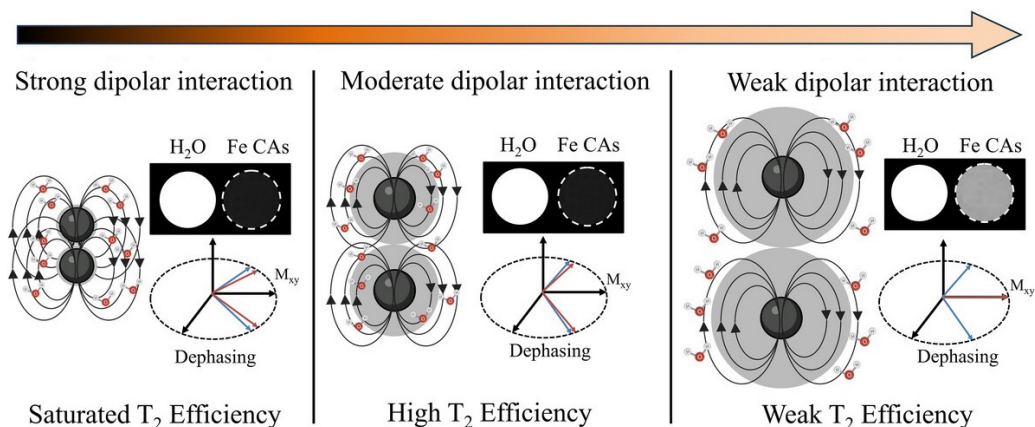
Group Leader	Manuel Bañobre
Research Scientists PI	Juan Gallo Sanna Sillankorva
Research Laboratory Assistant	Ana Ribeiro
Postdoctoral Researchers	Ana Hortelão Ana Barbosa Andreia Magalhães Lara Diego Prajakta Tambe
Research Assistant	Raquel Pereira
Laboratory Technicians	Nuria Genicio Victor Gonçalves
PhD Students	André Carvalho Cátia Rocha Cátia Martins Raquel Gonçalves Raquel Pereira Sofia Pereira

Advanced Students	Ana Peixoto Ana Peredo Ângela Lopes Anne Barros Brenda Velasco Carolina Poeta Clara Gonçalves Fernanda Coelho Josephine Guntermann Maria Bistaffa Sabela Fernández Zita Tamasi
Associates	Andreia Magalhães Pelayo Garcia Violeta Carvalho Rosana Monteiro

Research lines

- Theranostic probes
- Animal-free validation platforms
- Viral strategies against antibiotic resistance

In 2025, the group advanced the fundamental understanding of how magnetic interactions at the nanoscale can be harnessed to improve next-generation MRI contrast agents. It was demonstrated that controlling dipolar interactions between superparamagnetic iron oxide nanoprobcs is a key factor in enhancing T_2 MRI contrast, particularly under ultra-high magnetic field conditions. By engineering a model system in which iron oxide nanoparticles were coated with silica shells of precisely tuned thickness, nanoscale magnetic field inhomogeneities were systematically modulated. This approach revealed an exponential relationship between dipolar interaction strength and transverse relaxivity, achieving up to a sevenfold contrast enhancement compared to non-interacting systems. Relaxivity was also shown to exhibit non-linear behaviour across clinically relevant and ultra-high magnetic fields, highlighting important design rules for future MRI probes. These findings establish control of dipolar interactions as a powerful and previously underexplored design parameter, paving the way for more sensitive, efficient, and field-optimised nanomaterials for diagnostic imaging and precision medicine.



Diéguez

The group operates at the interface of biomedical research, nanotechnology development, and clinical practice, with the overarching goal of translating scientific advances into improved human health. The group capitalises on the precise control of fluid dynamics, high throughput, and reproducibility offered by microfluidics, as well as the high sensitivity and specificity of nanobiosensors and the biomimetic capabilities of organ-on-a-chip systems. Together, these approaches are used to develop innovative solutions that advance understanding of human disease and enable earlier and more precise diagnostics.

15

Publications

1

IP activity

16

Projects

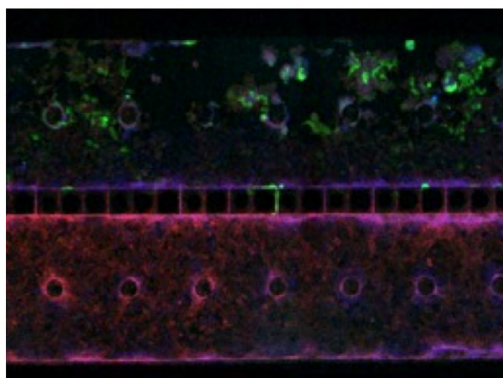
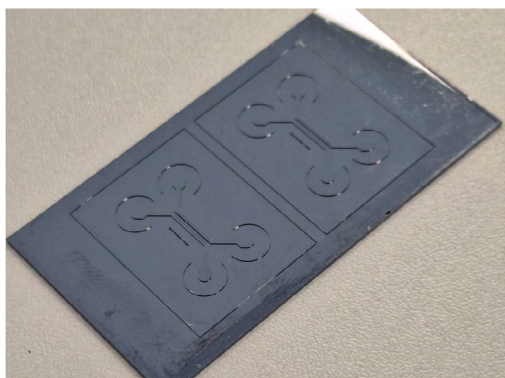
Group Leader	Lorena Diéguez
Research Scientist PI	Alar Ainla Sara Abalde-Cela
Research Scientists	Carlos Honrado Miguel Xavier Pieter De Beule
Postdoctoral Researchers	Adrián Visedo Alejandro Rodríguez Alexandra Teixeira Juan Merino Sergio Quintero
Research Assistants	Adriana Vilaça Margarida Esteves Carolina Rodrigues Daniela Macedo Diogo Moreira Diogo Poeta Francisca Oliveira Hugo Silva José Fernandes Lara Pierantoni Manisha Chatterjee Mohammadjavad Kiani Rafael Vilarinho Teresa Lage

Application & Systems Integration Engineers	Adelaide Miranda Hedieh Mahmoodnia Leila Matavele Paulina Plairo Rui Campos Susana Costa
PhD Students	Adriana Carneiro Ana S Martins Francisca Guedes José Tamagno Maria Relvas Pedro Fernandes
Advanced Students	Alice Calado Ana Rodrigues Delsy A Salinas Francisca Oliveira José Silva José Gama Leonor Sousa Mariana Costa Mariana Ribeiro Rita Matos

Research lines

- Biomarker enrichment and isolation from liquid biopsies
- Ultrasensitive biomarker detection using nanobiosensors
- Advanced 3D models based on multicellular spheroids, organoids, and organ-on-chip
- Optical technologies for advanced medical instrumentation

Within the framework of the BIOCELLPHE project, the group developed a novel plasmonic substrate that significantly improved the stability and reproducibility of surface-enhanced Raman spectroscopy (SERS)-based sensing. This work introduced a new fabrication approach combining precision nanopatterning with controlled chemical growth to produce a precise and scalable array of nanostars with ultrasensitive performance. In parallel, within the METASTARG project, the group developed an organ-on-a-chip system that mimics lung micrometastasis. The dynamic platform features a vascularised three-dimensional lung cancer model and was used by collaborators from IDIS to optimise the formulation of targeted nanoemulsions and to ensure their transport from circulation into the tumour.



Lung micrometastasis-on-chip platform for testing nanotherapeutics: microfluidic 3D tumour model, and confocal microscopy images of lung cells in the platform. Full results published in the [Journal of Controlled Release](#).

Domingues

The Domingues research group advances nanobiomaterials, biofabrication, and regenerative medicine by developing smart materials and engineered platforms that interface with living systems. By integrating biomaterials design, tissue engineering, and nanoscale biointerfaces, the group creates next-generation nanotherapies, microphysiological systems, and bioengineered grafts, with an emphasis on musculoskeletal and soft-tissue disorders. The group focuses on coupling synthetic molecular recognition with bioengineering tools to precisely control cell mechanotransduction, translating mechanobiology into innovative, precision therapies for inflammation, fibrosis, and tissue degeneration.

3

Publications

0

IP activity

2

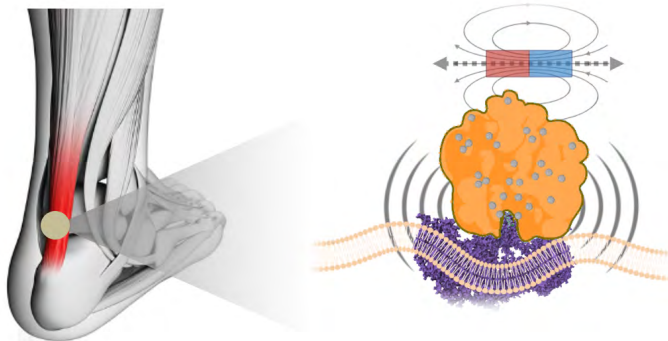
Projects

Group Leader	Rui Domingues
Postdoctoral Researchers	Brent Bijonowski Daniel García Simão Teixeira
Research Assistant	Riccardo Piantoni
PhD Student	Rosa Monteiro
Advanced Student	Francisco Marques

Research lines

- Smart nanobiomaterials for tissue engineering and regeneration
- Biofabrication and 3d bioprinting of functional tissues
- Advanced nanotechnologies for remote and precision
- Mechanobiology of sensorimotor interfaces, inflammation, healing, and fibrosis

In 2025, the group successfully established an independent research programme at INL, enabled by the ERC Consolidator Grant FORTIFY. Officially launched in April 2025, the group laid the scientific and operational foundations for a long-term effort in nanobiomaterials, biofabrication, and regenerative medicine, with a distinctive focus on exploiting cell and tissue mechanobiology to activate regenerative responses. Within its first months, the group expanded from a single-PI setup to a multidisciplinary team, including postdoctoral researchers, research assistants, and doctoral and master's students, integrating expertise in nanotechnology, biomaterials, bioengineering, and mechanobiology. Simultaneously, the team initiated the Biofabrication and Molecular Recognition Laboratory, establishing the experimental infrastructure necessary to implement the FORTIFY vision. Early scientific outputs included the start of ERC-funded research activities and the group's first INL-affiliated publications. Collectively, these achievements mark a critical milestone: the transformation of ERC funding into a fully operational, collaborative research environment poised to deliver fundamental insights and translational advances in tissue regeneration and precision medicine.



Schematics illustrating the use of mechanobiology for tendon regeneration: an oscillating magnetic field enables selective magnetomechanical actuation of mechanosensitive PIEZO channels via nanoswitches.

Pastrana

Pastrana’s research group develops nanotechnology-based solutions to support a healthier, more sustainable, and digital food system, operating across technology readiness levels (TRL) 2 to 7. Research activities focus on smart, active, and edible food packaging based on biomaterials and advanced coatings; food personalisation through micro- and nanoencapsulation and cellular agriculture; and miniaturised, sensorised *in vitro* digestion models to assess the bioactivity of food nanomaterials. The group combines scientific excellence with a strong market orientation, targeting future-proof food products and processes.

18

Publications

1

IP activity

14

Projects

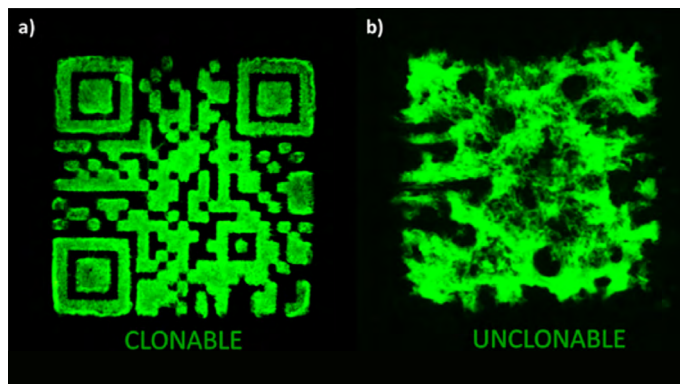
Group Leader	Lorenzo Pastrana
Research Scientists PI	Miguel Cerqueira Pablo Fuciños
Research Scientists	Isabel Bourbon Catarina Gonçalves Isabel Rodríguez Sara Oliveira
Postdoctoral Researchers	Hafsae Lamsaf Helena Calejo Maria Felgueiras Pedro Silva
Research Assistants	Carla Teixeira Enrico Brigada Maria Costa Marisol Dias Nélson Martins Raquel Vaz Sofia Sousa Zoha Ali
Application & Systems Integration Engineers	Andrey Ipatov Artur Martins
Laboratory Technician	Gabriela Azevedo

PhD Students	Buse Gürbüz Cátia Sampaio Carla Teixeira David Segura Danielle Rodrigues Diva Melo Eliana Santos Ércles Machado Francisca Marques Larissa Fonseca Mafalda Neto Maria Nascimento Mariana Alves Marta Lima Marisol Dias Muyideen Bamidele Leire Yeregui Teresa Campos Túlio Silva
Advanced Students	Daniela Peixoto Gabriela Monteiro Henrique Nóbrega Joana Lopes Mariana Fernandes Nina Collienre Patricia Silva
Associates	Aina García Andrea Rodríguez MarLucí Padilha Noádia Barroso Pedro Santos

Research lines

- Food packaging research
- Food structure and functionality research

The group has developed a highly promising strategy for secure, traceable, and sustainable anti-counterfeiting solutions based on bioplastics, significantly advancing intelligent food-grade materials. The resulting fluorescent patterns can be designed to be deterministic (reproducible) or stochastic (unique to each instance). The stochastic tags act as physical unclonable functions: even under identical imaging and processing conditions, each tag exhibits distinct emission characteristics, making replication virtually impossible. This work results from a strategic collaboration with IBM within the EU project TrustEat, which aims to build trustworthy, transparent, and digitally verifiable food systems. It aligns with the group's research agenda on developing advanced smart biomaterials with quantum-enabled optical properties for next-generation food packaging, designed to protect food while providing consumers with verifiable authenticity. By embedding unclonable, digitally linkable identifiers directly into sustainable packaging substrates, the research contributes significantly to the digitalisation of the food value chain, supporting secure traceability, fraud prevention, and the transition toward intelligent packaging in a circular bioeconomy.



Deterministic and stochastic fluorescence patterns for secure labelling: a) QR-like pattern, and b) random fluorescent pixels. This research highlight is described in detail in the Journal [Materials Today Nano](#).

Nieder

The group investigates light-matter interactions across three key areas. In advanced bioimaging and sensing, nanofunctionalised surfaces and particles combined with ultrafast laser technology enable high-resolution, multi-parameter imaging and sensing, supporting novel diagnostic and therapeutic applications. In quantum photonics, the focus is on controlling the emission of single quantum emitters in 2D materials and 3D crystals, which can be integrated into controllable photonic platforms. Finally, in photonic integrated devices, the group develops photonic chips and advanced characterisation tools to advance neuromorphic and quantum computation, while also enabling biosensing and quantum information technologies.

7

Publications

4

IP activity

10

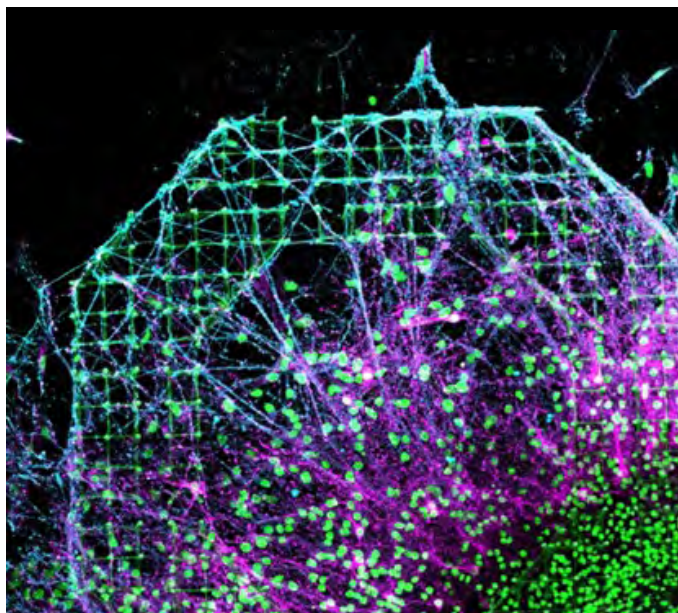
Projects

Group Leader	Jana Nieder
Research Scientist PI	Bruno Romeira
Research Scientist	Christian Maibohm
Postdoctoral Researchers	Temple Douglas Tiago Magalhães
Research Assistants	Artur Andrishak João Azevedo Juan Silva Nuaman Kutty
PhD Students	Bejoys Jaco João Silva Leonor Ribeiro
Advanced Students	Beatriz Costa Inês Gonçalves João Leote Lia Santos Maria Martins Mária Losa Orlando Cunha Pedro Silva Rui Coito

Research lines

- Advanced bioimaging and sensing
- Photonic integrated devices
- Quantum photonics-enhanced technologies

The Nieder group has developed a novel 3D neuronal model by combining 3D polymeric scaffolds with 3D neuronal spheroids. The platform integrates smart polymeric scaffolds embedded with fluorescent nanodiamonds, providing quantum sensing capabilities for real-time monitoring of magnetic signals and nanoscale temperature variations. The scaffolds, fabricated using laser-based 3D microprinting, are low in autofluorescence, biocompatible, and capable of supporting the growth and directional alignment of 3D neuronal spheroids, including dopaminergic neurons relevant to Parkinson's disease research. This system enables precise investigation of cellular signalling, disease mechanisms, and drug responses, offering new opportunities for the study of neurodegenerative diseases.



Multicolour confocal image of a 3D neuronal spheroid growing in a polymer scaffold fabricated by femtosecond laser writing. Full results published in the journal [Advanced Healthcare Materials](#).

Espiña

Founded in 2016, the group's mission has been to address some of the most challenging issues in the water environment through the responsible use of original applied research in environmental nanotechnologies. The Espiña research group develops and applies nanotechnology-based solutions to support the safe and sustainable use of water resources. The group currently comprises more than 20 researchers from five nationalities and a range of disciplines, including biology, chemistry, chemical engineering, electronics, and computational chemistry.

14

Publications

3

IP activity

12

Projects

Group Leader	Begoña Espiña
Research Scientists PI	Laura Rodríguez-Lorenzo Raquel Queirós
Postdoctoral Researchers	Aitor Álvarez Carlos Gonçalves Bernardo Nogueira Najib Messaoud Olesia Dudik Prabir Kulabhusan Renato Gil
Research Assistants	Bruna Alves Miguel Chaves Nuno Costa Vera Cardoso
Application & Systems Integration Engineers	Ana Vieira Ivone Pinheiro Marília Santos Monica Quarato Paula Campos Samuel Silva

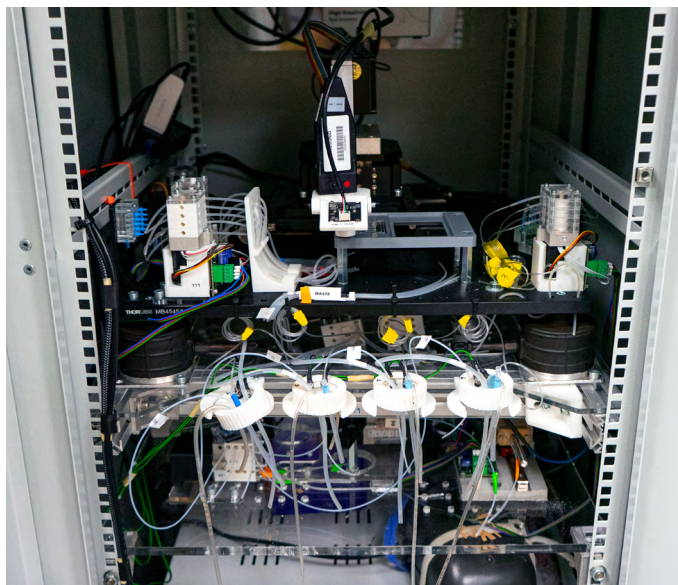
PhD Students	Diogo Cachetas Elizandra Oliveira João Barbosa Lurdes Gonçalves Tiago Moura Vera Cardoso
Advanced Students	Beatriz Fontes Diana Sousa Inês Azevedo Iván González Lucas Cornado
Associates	Ana Barros Caroline Montes Iván Lozano Nini Liang

Research lines

→ Water monitoring

→ Econanosafety

In collaboration with the M. Martins' group at INL, the team has developed an automated monitoring device for contaminants in run-off waters under the Horizon Europe project D4RUNOFF. The prototype integrates Raman-based sensors for microplastics, electrochemical sensors for metals (zinc and nickel), and inline miniaturised solid-phase extraction devices based on covalent organic frameworks to extract and pre-concentrate emerging contaminants, including triazine pesticides and the tyre-wear toxic compound 6-PPD-quinone. The system enables trace-level detection during rain events and is fully automated, with analytical software incorporating machine-learning algorithms and wireless data transmission for decision support. In 2025, the prototype was validated in three case studies in Santander (Spain), Odense (Denmark), and Pontedera (Italy). This development provides a means to monitor diffuse urban pollution from extreme rainfall events, an increasing concern in the context of climate change.



Prototype of the automated run-off water monitoring system integrating Raman, electrochemical, and solid-phase extraction sensors. One [patent filed and approved](#) for one of the modules.

Kolen'ko

The group focuses on unconventional nanomaterials that are free from critical raw materials and toxic compounds. Novel chemical strategies are employed to synthesise materials with unconventional size, shape, structure, and composition. Nanostructuring approaches – such as core–shell architectures, porous supports, functionalisation, and self-assembly – are emphasised to enhance material performance. Sustainability and scalability of chemical syntheses are prioritised to ensure alignment with industrial requirements.

25

Publications

2

IP activity

17

Projects

Group Leader	Yury Kolen'ko
Research Scientist PI	Juliana Sousa
Research Scientist	Mouli Thalluri
Postdoctoral Researchers	Cátia Freitas Diana Alves Gaje Singh Isabel Oliveira Isilda Amorim João Restivo María Poupard Ramsundar Mohan Sandra Amaral Soraia Fernandes Srinivas Katam Tânia Grainha Waqas Zaman Yashwant Kharwar Zhipeng Yu
Research Assistants	Ângela Lima Manuel Pereira
Application & Systems Integration Engineers	Catarina Gomes João Braga João Rodrigues Natalia Spera Siva Sankar Siavash Farsangi

Laboratory Technician	Sónia Ferreira
PhD Students	Clara Ponte Denis Nascimento Elizabeth Cepero Mafalda Pina Tania Prieto Valerie Theuns
Advanced Students	Ângela Ronda Bernardo Guerrero Catarina Gomes Francisco Silva Stefan Ferreira Tatiana Cardoso
Associates	Anton Konopatsky Joana Araújo Laura Salonen

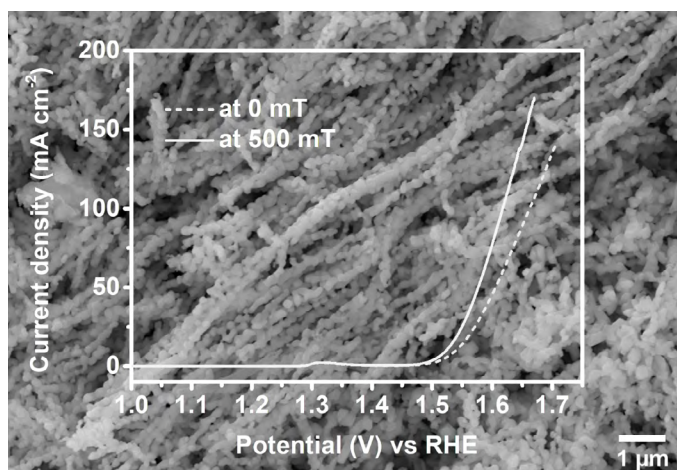
Research lines

→ Heterogeneous catalysis

→ Electrolysis

→ Coatings

In support of the emerging green hydrogen economy, the development of efficient, platinum-group-metal (PGM) free catalysts for the oxygen evolution reaction (OER) remains a priority. The Kolen'ko group is exploring magnetic enhancement as a strategy to improve catalyst performance by promoting the formation of triplet oxygen through spin polarisation. In 2025, CoFe_2O_4 nanowires were synthesised using an electrospinning template approach followed by calcination. Optimisation of the calcination temperature produced a nanowire-like structure with strong magnetic properties. This material exhibited excellent OER activity in alkaline conditions, and application of an external magnetic field further enhanced performance by around 100%, with the effect persisting for over 10 hours after the field was removed. These findings demonstrate the potential of PGM-free catalysts for magnetoelectrochemistry, highlighting how both intrinsic magnetic properties and external fields can be leveraged to boost catalytic activity, representing a step forward for sustainable hydrogen technologies.



Electron microscopy image of PGM-free CoFe_2O_4 nanowire catalysts for OER, and performance graph showing how intrinsic magnetism and external magnetic fields enhance catalytic activity.

Muñoz

The Muñoz research group focuses on the development of advanced materials for energy storage and conversion, targeting applications such as the integration of renewable energy sources, transport, operation under harsh conditions, and efficient energy distribution. The group has extensive expertise in the synthesis of novel materials and in their structural, morphological, physicochemical, and electrochemical characterisation, employing a wide range of experimental techniques. These experimental studies are complemented by theoretical simulations to establish clear correlations between material structure and properties.

13

Publications

0

IP activity

4

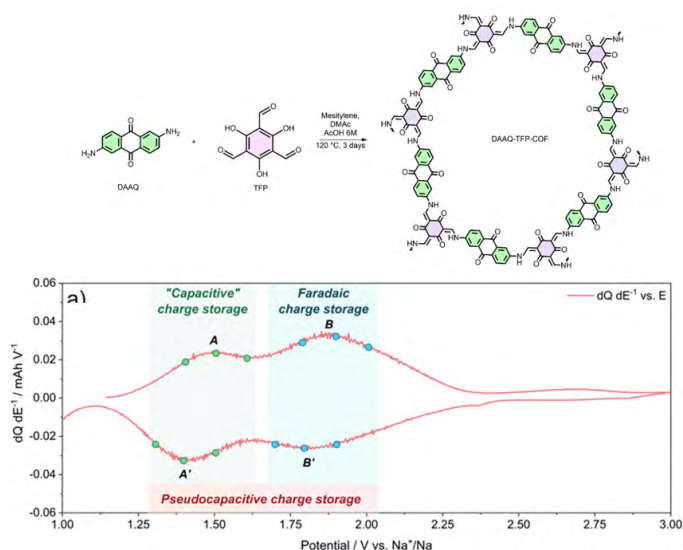
Projects

Group Leader	Miguel Muñoz
Research Scientist	Sandipan Maiti
Postdoctoral Researchers	Anchali Jain Leonardo Sbrascini Najeeb Lashari Navya Valiyaveetil Rita Policia Yogita Yurong Zhou
Staff Researcher	Manab Kundu
Research Assistant	Nilloofar Khodamoradi
PhD Student	Asia Patriarchi

Research lines

- Advanced materials for batteries and supercapacitors
- Electrochemical performance of energy storage devices
- Hydrogen photocatalysis

Sodium-metal batteries are emerging as a sustainable alternative to lithium-ion technology due to sodium's abundance and lower environmental impact. In 2025, the Muñoz group advanced understanding of the sodium storage mechanism in a β -ketoenamine-linked anthraquinone-based covalent organic framework, representing a significant step towards next-generation organic electrodes. Electrochemical techniques, namely X-ray diffraction, X-ray photoelectron spectroscopy, and molecular simulations, revealed that sodium ions interact with carbonyl groups within the COF channels rather than intercalating between layers, while the TFP units remain inactive. This architecture supports a mixed pseudocapacitive mechanism, combining surface-controlled and faradaic processes to enable efficient charge storage. This achievement results from a collaborative effort between INL, the University of Santiago de Compostela, the University of the Basque Country, CIC energiGUNE (Spain), and the University of Camerino (Italy), and lays the foundation for the design of COF-based materials as promising candidates for sustainable, high-performance sodium batteries.



Redox-active covalent organic framework with pseudocapacitive and faradaic Na storage; cycle plot highlights capacitive (green) and faradaic (blue) contributions.

Sadewasser

The group conducts research and development activities in the field of materials for sustainable energy, with a strong emphasis on advanced thin-film solar cells. Research primarily focuses on chalcogenide materials, such as Cu(In,Ga)Se₂ and Sb₂Se₃, including their micro- and nanostructuring and characterisation at the nanometre scale. In parallel, the group develops and applies nanoscale scanning probe microscopy techniques for the characterisation of energy materials, including solar cells, batteries, and catalysts. Additional activities include the development of thin-film solid-state batteries, as well as the growth and integration of chalcogenide two-dimensional materials and devices.

9

Publications

4

IP activity

15

Projects

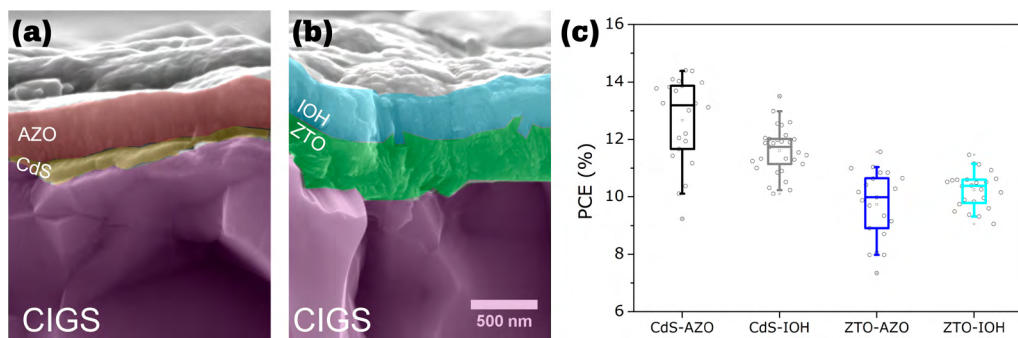
Group Leader	Sascha Sadewasser
Research Scientist PI	Nicoleta Nicoara
Research Scientist	Pedro Anacleto
Postdoctoral Researchers	Angélica Thomere Carlos Rosário Chadrasekhar Loka Cláudia Coelho Devaraj Ramasamy Jitendra Kumar Neha Kumari Neslihan Akçay Parveen Dagar Sivajee Kapu Vikash Kumar
Research Assistants	Ana Moura André Silva Diana Oliveira Hitesh Pedaprolu José Fonseca Nuno Rodrigues Pedro Sousa

Application & Systems Integration Engineers	Diogo Costa Joana Ribeiro Marina Alves Pablo Valentim
PhD Students	Diego Garzón Elmahdi Amar Marina Alves Rachid Oubaki

Research lines

- Development of advanced thin-film solar cells
- Development and application of scanning probe microscopy techniques
- Development of 2D materials for optoelectronics and other applications
- Materials development for energy devices

Cu(In,Ga)Se₂ (CIGS) thin-film solar cells represent a promising solution to current energy challenges. Conventional devices typically employ a toxic CdS buffer layer at the charge-separating interface with the CIGS absorber. To address this limitation, a chemical bath deposition process was developed for a non-toxic Zn_{1-x}Sn_xO_y (ZTO) buffer layer with a wider bandgap. In addition, the standard ZnO:Al (AZO) window layer was replaced by the more conductive hydrogen-doped indium oxide (In₂O₃:H, IOH). Solar cells incorporating IOH exhibited higher fill factors and open-circuit voltages, albeit with slightly reduced short-circuit current compared to AZO-based devices. Devices combining ZTO and IOH front contact layers achieved a maximum power conversion efficiency of 11.5%, only marginally lower than that of reference cells using the conventional, toxic CdS buffer layer. These results demonstrate the potential of non-toxic buffer and window layer combinations for more sustainable CIGS solar cell technologies.



Coloured cross-section SEM images of solar cells with CdS/i-ZnO/ZnO:Al and Zn_{1-x}Sn_xO_y/i-ZnO/In₂O₃:H front contacts, alongside CdS- and ZTO-based device parameters showing power conversion efficiency (PCE). Results published in the [Journal of Physics: Energy](#).

Salomé

The Salomé research group develops advanced materials, devices, and processes to support the energy transition. Research activities span novel energy materials, optoelectronic devices, and energy applications, including thin-film solar cells and batteries. The group combines cleanroom micro- and nanofabrication with state-of-the-art characterisation techniques to deliver innovative solutions for sustainable energy and next-generation technologies, in collaboration with industrial and academic partners across Europe.

11

Publications

2

IP activity

14

Projects

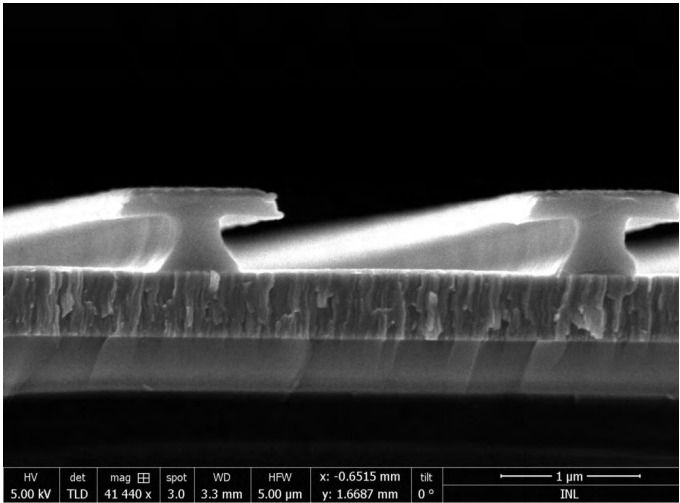
Group Leader	Pedro Salomé
Research Scientists	Jennifer Teixeira José Fernandes
Postdoctoral Researchers	Alexander Simon António Oliveira Carleane Reis Gaganjot Singh Joel Cardoso Ricardo Silva Vítor Lopes
Research Assistants	Ana Silva Ana Pires Carolina Fernandes Deepto Roy Guilherme Araújo Hurraira Hashim João Marques Manuell Macedo Muhammad Khan Pablo Montesino Rui Loureiro
Software Engineer	João Alves

Application & Systems Integration Engineers	Andrés Pardo André Violas Kevin Oliveira
PhD Students	António Oliveira Diogo Carvalho Enzo Ribeiro Guilherme Ribeiro Maria Oliveira Mariana Santos Bárbara Sieira Xavier Pinheiro
Advanced Students	Clara Pinto David Carvalho Gonçalo Lopes Isabel Silva
Project Assistant	Sofia Oliveira
Associate	Paulo Fernandes

Research lines

- New materials for energy applications
- Optoelectronic devices
- Smart architectures and energy systems

In 2025, the group reached a major milestone with the successful fabrication of flexible sub-micrometre CIGS thin-film solar cells achieving a light-to-power conversion efficiency of 12.5%. This accomplishment positions INL among the few European laboratories capable of producing high-performance flexible photovoltaic devices entirely in-house. The breakthrough was enabled by the establishment of a complete CIGS processing chain, integrating precision sputtering, advanced nanofabrication, screen printing, and state-of-the-art characterisation techniques. This development demonstrates the group's capability to engineer high-quality absorber layers on lightweight substrates while optimising interfaces, passivation strategies, and device layouts to ensure mechanical robustness and long-term stability. The new capability supports European efforts towards ultra-light, portable, and building-integrated photovoltaics and opens new opportunities for collaboration with industrial and academic partners. It also strengthens INL's role in next-generation photovoltaic research, enabling rapid prototyping of novel device structures, tandem architectures, and application-driven photovoltaic solutions for energy communities, wearables, aerospace, and off-grid environments.



Scanning electron microscopy cross section image of T-shaped nanostructures, created with nanoimprint lithography, a next-generation sustainable technique that will help boost the performance of ultrathin solar cells. Full results published in the journal [RRL Solar](#).

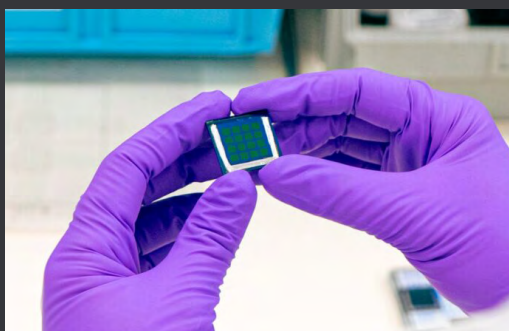
Spotlights



Optical microscope image of non-uniform silicon dioxide deposition caused by a sample defect, by Pedro Anacleto, INL.



INL researchers publish in *Nature Materials* on building atomic-scale 'spin chains' to study quantum excitations



INL researchers boost efficiency of ultrathin solar cells



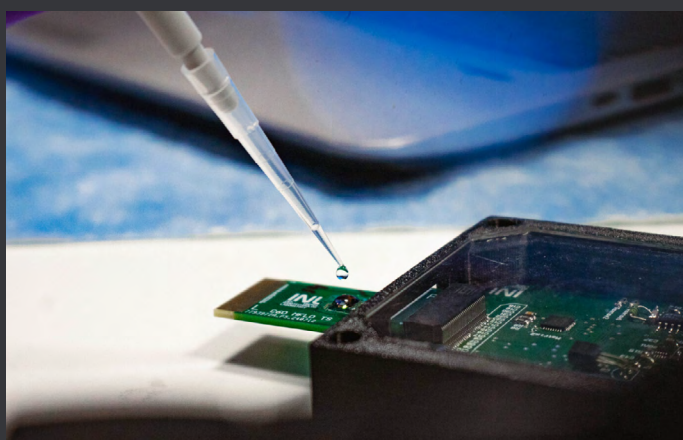
Can Earth's gravitational field monitor climate change?



Graphene enhances lithium detection in new INL research



INL advances skin engineering with the European network NETSKINMODELS



Graphene-based biosensor breaks detection records for non-invasive monitoring of diabetes



Magnetic nanowires take hydrogen production to the next level



Could this next-generation battery technology power the future?



Advancing neuronal research using 3D polymeric micro-scaffolds integrated with quantum sensors



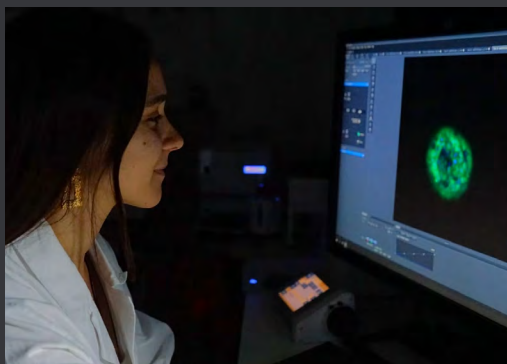
Nanostars push SERS sensing to new performance levels



How microalgae could transform the way we produce photonics



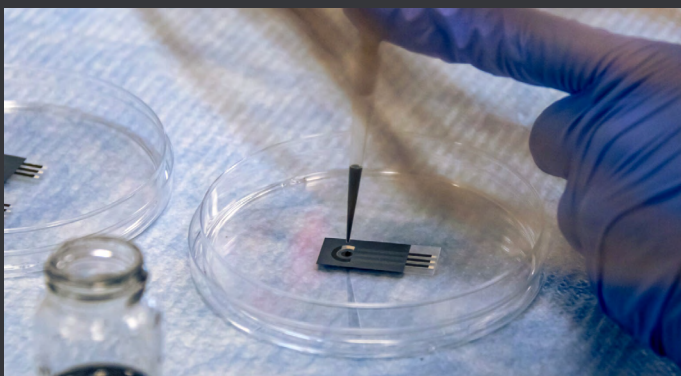
A new tool being developed at INL can explore electrical effects on cells



INL researchers are exploring new ways to predict breast cancer metastasis



Magnetic 1D van der Waals heterostructure



Eco-friendly sensor developed at INL enables rapid detection of pharmaceutical contaminants in water



Taking inspiration from the human brain to create a new class of intelligent, light-powered devices



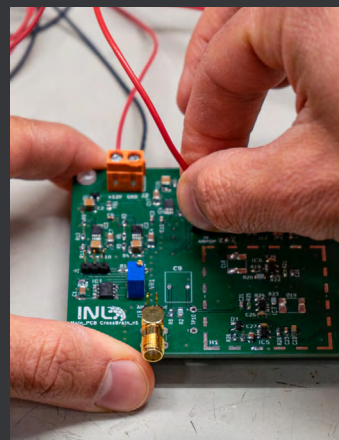
Shedding light on ultrafast heat transport in graphene



No assumptions — just quantum advantage



Intelligent biosensor developed at INL combines NMR and AI to improve infectious disease diagnostics



When less is more- a minimal approach to low-noise circuits

Honours and Awards

Every day, our researchers step into the laboratory with unwavering dedication and laser-focused expertise, determined to advance the frontiers of science and, ultimately, improve the future of society.

In 2025, their efforts earned widespread recognition within both national and international scientific communities. The following overview celebrates the achievements, grants, and awards that marked an exceptional year for INL.



Maria Relvas during the award ceremony of the Portuguese Cancer League

Triumph season began in February when [Maria Relvas](#), a research associate from the [Diéguez group](#), received a Research Initiation Grant by the Portuguese Cancer League to advance cancer diagnosis.

Soon after, [Begoña Espiña](#) was appointed as a [Water Europe expert](#), acknowledging INL group leader's exceptional contributions to water quality research, particularly in developing portable and automated devices for the selective detection and quantification of chemical and biological contaminants in water.



Begoña Espiña was appointed as a Water Europe expert



INL welcomes Rui Domingues, recipient of an ERC Consolidator Grant, as a new group leader

In April, [the Laboratory welcomed an ERC Consolidator Grant recipient](#). Rui Domingues, now group leader at INL, serves as the scientific project manager of the EU-funded FORTIFY project, which aims to develop wireless nanoswitches to control PIEZO channels to restore tendon function. Summer brought further acclaim as [Clivia Sotomayor won the Bloch Prize 2025](#).



Clivia Sotomayor Torres receives the 2025 Bloch Prize.

As a pioneer in the field of phononics, Sotomayor was honoured due to her sustained and outstanding contributions to the science of phononic materials, wave propagation, and related phenomena. Building on this momentum, INL's [Andrea Capasso, from the Alpuim group, was appointed Co-Lead of IAM-I Electronics Working Group 4](#). This appointment stands as a testament of INL's leadership in the European advanced materials ecosystem.

September saw [Vicente Lopes, from Alpuim group, win the SiNANO Institute Best Paper Award](#) with the article: "Graphene-enabled glucose sensing: From field-effect transistors to next-generation wearables". His outstanding work introduced a breakthrough approach to non-invasive glucose monitoring. Simultaneously, [Bruno Romeira joined the Photonics100 2026](#), an elite list celebrating the 100 most innovative minds shaping the global photonics industry. The research scientist at Nieder's group was included thanks to his groundbreaking research at the frontier of neuromorphic nanoscale photonics.



Vicente Lopes wins the SiNANO Institute Best Paper Award

Autumn 2025 brought a cascade of honours. [Clivia Sotomayor was presented with the prestigious "30-year Nanoimprint Pioneer Award"](#). Having the 24th NNT Conference as setting, the award ceremony served to recognise her remarkable work in advancing nanoimprint lithography and its applications across science and industry.



Clivia Sotomayor Torres receives the 30-Year Nanoimprint Pioneer Award

November was quite the eventful month. [Catarina Lopes, member of Piteira's group, won the Maria de Sousa Prize](#) with the project "SNIFF: Volatile organic compounds in saliva for non-invasive detection of gastric cancer". Just two days later, INLer [Leonor Ribeiro competed at the Falling Walls Lab Global Finale](#). As one of the 100 international finalists, the researcher from Nieder's group secured her place on the global stage after winning first place at the inaugural Falling Walls Lab Portugal.



Leonor Ribeiro competes in the Falling Walls Lab Global Finale, in Berlin



Catarina Lopes wins the Maria de Sousa Prize.



Joana Araújo receives the Best Shotgun Poster Award at International Conference on Pollutant Toxic Ions and Molecules.

Back in Portugal, [Joana Araújo, member of the Kolen'ko research group, was honoured with Best Shotgun Poster Award, at the International Caparica Conference PTIM](#). There, Joana presented a poster titled "Covalent Organic Frameworks and Composites for Efficient Adsorption of Pharmaceuticals in Natural Waters".



Sara Abalde-Cela is awarded an ERC Consolidator Grant

Adding to this impressive list, [Sara Abalde-Cela, from the Diéguez Group, won the prestigious ERC Consolidator Grant](#), worth €2 million for her proposal "Deciphering multilevel cell-to-cell communication through microfluidic and plasmonic decoders". The year concluded with Clivia Sotomayor receiving her third accolade of 2025: [the 2025 Klemens Lifetime Achievement Award](#). The prize honoured Clivia's research legacy in phonon scattering in semiconductor nanostructures and her sustained efforts to foster a collaborative phonon community.



Clivia Sotomayor Torres receives the Klemens Lifetime Achievement Award

Filled with pride for the exceptional talent within our walls, INL congratulates all the INLers mentioned above, and those who, even without a prize, continue to push the boundaries of science. In 2026, INL remains committed to cultivating world-class talent and strengthening its position as a leading research centre, held to the highest standards of scientific excellence.

Research Core Facilities

The Research Core Facilities of INL provide a centralised, open-access infrastructure that enables advanced research, technology development and innovation across disciplines. By combining state-of-the-art scientific equipment, specialised techniques and dedicated technical expertise, the facilities support researchers from academia and industry across the full research and innovation value chain – from design and fabrication to characterisation and analysis.

Operating under an open-access model, the facilities offer flexible modes of engagement, ranging from guided self-service to full-service solutions delivered by INL's expert teams. In 2025, activities across the facilities included extensive training programmes for internal and external users, the hosting and co-organisation of international scientific events and courses, and the support of interdisciplinary research and industry-relevant projects through certified, high-quality services.

All facilities operate under a certified quality framework, complying with ISO 9001:2015 2015 (INL User Facilities) and ISO 13485:2016 (Medical Devices) standards, ensuring reliability, traceability and high-quality service delivery.

HIGHLIGHTED INTERNATIONAL EVENTS

Electron Microscopy Course 2025

June 30 – July 4

SPAOM — Spanish and Portuguese Advanced Optical Microscopy

November 5 – 7

INFRACHIP Research Accelerator Programme

November 18 – 20

Electron Microscopy and X-Rays (EMX)

163
INTERNAL AND EXTERNAL USERS

108
TRAINING SESSIONS DELIVERED

Nanophotonics and Bioimaging (NBI)

217
INTERNAL AND EXTERNAL USERS

189
TRAINING SESSIONS DELIVERED

Micro and Nanofabrication (MNF)

105
INTERNAL AND EXTERNAL USERS

386
TRAINING SESSIONS DELIVERED

Empowering Talent at INL



Postgraduate School

The [INL Postgraduate School](#) officially started in 2025, marking a major step in INL’s commitment to developing the next generation of researchers. Designed for PhD candidates at INL, the Postgraduate School equips students with essential skills beyond the lab, combining specialised training, personalised mentoring, and career development support. INL collaborates with higher education academic institutions to jointly co-supervise and mentor PhD candidates. While the research and development work is conducted at INL, the academic institution delivers the technical and degree-related coursework and is responsible for awarding the doctoral degree.

The INL Postgraduate School offers complementary and transversal training designed to enhance specific skills that support researchers in their future careers – whether in academia, industry, or entrepreneurship. These training activities help PhD candidates build a well-rounded professional profile, empowering them with a versatile skill set to succeed across diverse career paths. Throughout their time at INL, PhD candidates receive personalised guidance to support their personal and professional development. This includes a structured series of workshops, masterclasses, and peer discussions tailored to each stage of their PhD journey. In the first year, the focus is on career planning, self-assessment, and navigating the early stages of the PhD. The second year emphasises time management, emotional intelligence, and networking skills. In the final year, candidates are prepared for the job market with targeted training on CV writing, interview techniques, and exploring both academic and non-academic career paths.



PhD students on stage during the Postgraduate School performance 'Human Gaze'

The 2025 programme began with a Communication Course for a cohort of 15 PhD students, offering an immersive 30-hour experience that blended scientific communication with stage presence. The course was delivered in two modules:

"Communicating Science: Techniques for Writing and Speaking" with Professor Andy Ross (Johns Hopkins University), focused on scientific writing and research presentations, and "Stage Presence for Scientists" with Malad'arte Theatre Company, using drama techniques to enhance body language, vocal delivery, and confidence. The programme culminated in "[Epicenter](#)", a live performance that transformed research into theatre, allowing students to share their scientific journey with an audience in a creative and immersive way.

A second course offered four complementary modules dedicated to Data Management, an essential area in the professional and scientific development of PhD candidates and early-stage researchers. This training equipped participants with the core data skills that underpin modern research, enhancing their employability and adaptability across diverse career paths. Covering the full lifecycle of data, from responsible management and FAIR-compliant practices to analysis, visualisation and the emerging use of AI, students learnt to organise, interpret, and communicate their research with greater clarity and rigour. In an increasingly data-driven research environment, the course provided young scientists with essential tools to navigate complexity, make informed decisions, and present their findings with confidence.



Second Symposium of the Early-Stage Researchers Association (ESRA)

Early-Stage Researchers Association

The [Early-Stage Researchers Association \(ESRA\)](#) is run by early-stage researchers for early-stage researchers, providing a platform to give them a voice and support their personal and professional development. Its target group includes MSc and PhD students, Research Assistants, Postdoctoral Fellows, and Engineers with up to four years of research experience following their most recent degree. ESRA's mission is to enable researchers to continually develop their skills and competencies through ongoing initiatives.

In 2025, ESRA consolidated its role as a central driver of career development, training, and community building, engaging 193 early-stage researchers, representing 71% of this community, and strengthening connections across the INL research ecosystem.

The association's flagship initiatives this year included the [first INL Career Fair](#) and the [second ESRA Symposium](#), both showcasing ESRA's strategic focus on professional growth.

The Career Fair, held in June, provided early-stage researchers with opportunities to meet international companies and research institutions, explore career paths, and gain practical insights into industry and entrepreneurship. Preparatory workshops on CV building and professional networking ensured participants were fully equipped to engage with potential employers.

The ESRA Symposium, held in November, offered a vibrant platform for knowledge exchange and networking among MSc students, PhD candidates, and junior researchers.



Early-Stage Researchers Association (ESRA) Career Fair

The two-day programme featured 180 participants, 44 posters, and 13 oral communications, alongside keynote presentations that inspired discussion on research and career development.

The symposium concluded with awards recognising excellence in oral communications and poster presentations across all career stages, celebrating the achievements of early-career researchers and reinforcing INL's commitment to talent development.

Together, these initiatives reflect ESRA's impact on skills development, community cohesion, and professional growth, demonstrating INL's dedication to empowering early-stage researchers and providing them with the tools and opportunities to succeed across academic, industrial, and entrepreneurial careers.



First edition of Falling Walls Lab Portugal, hosted by INL

Falling Walls Portugal

In 2025, INL hosted the [first edition of Falling Walls Lab Portugal](#), integrating Portugal into the international Falling Walls network, a global initiative that promotes breakthrough thinking at the intersection of science, innovation, and society. The event brought together early-career researchers and innovators from outside INL, reinforcing the Laboratory's role as an open, outward-looking platform for talent and ideas with global relevance. The inaugural edition featured five semi-finalists presenting bold, interdisciplinary proposals addressing societal challenges in areas such as healthcare, inclusion, and science–society engagement. The three-minute pitch format challenged participants to communicate complex ideas clearly and convincingly, strengthening skills essential for international scientific and innovation contexts.

An international and multidisciplinary jury, bringing together expertise from academia, European science policy, innovation, science communication, and industry, evaluated the pitches, ensuring a broad and balanced perspective on scientific excellence, societal impact, and innovation potential. The winning proposal earned representation at the Falling Walls Science Summit in Berlin, connecting national talent to a global stage. By hosting Falling Walls Lab Portugal, INL reinforced its commitment to internationalisation, science communication, and societal impact, while positioning itself as a national gateway to globally recognised platforms for emerging scientific talent.



Top 3 presenters of the Three Minute Thesis competition at INL

3-Minute Thesis

In March, INL hosted the [second edition of its Three-Minute Thesis \(3MT\) competition](#), bringing together eight PhD candidates challenged to communicate their research clearly and convincingly to a non-specialist audience in just three minutes.

The competition highlighted participants' ability to translate complex scientific concepts into accessible and engaging narratives, emphasising the importance of clarity, storytelling, and societal relevance in contemporary research careers.

The three finalists were invited to present their work at the INL Annual Research Symposium, INL's flagship internal event dedicated to scientific exchange and collaboration, further increasing the visibility of early-stage researchers within the Laboratory. Following a highly competitive session, one presentation was distinguished as the overall winner.

The 3MT winner was Sofia Araújo Pereira, whose presentation explored the potential of magnetic lipid nanoparticles for the treatment of neuroinflammation, addressing neurological conditions such as Parkinson's and Machado-Joseph disease. Her work stood out for its scientific relevance and compelling communication. Two additional finalists, Leonor Ribeiro and João Borlido, were also recognised for the quality and clarity of their presentations.

Through initiatives such as the Three-Minute Thesis competition, INL supports the development of essential communication skills that enable researchers to maximise the impact of their work across academic, industrial, and societal contexts.



International Workshop of In Situ Electron Microscopy Conference

Training Sessions and Workshops

Training at INL is strategically guided by the Joint Training Board, which advises the Director-General on training matters, defines the institutional training policy, and oversees its implementation. In 2025, this governance role also supported the preparation of future training cycles, including the launch of a staff-wide survey to identify emerging skills needs and priorities.

INL delivered a comprehensive and diversified training portfolio designed to support both scientific excellence and institutional responsibility. Training activities covered scientific and technical competences, digital, data and artificial intelligence skills, safety, health and regulatory compliance, as well as science communication, career development, leadership, and interpersonal

skills. This portfolio is delivered through multiple channels, including the Annual Training Plan, the INL Postgraduate School, Research Core Facilities, project-funded initiatives, ESRA activities, and structured new-hire onboarding.

In total, 115 training sessions and workshops were delivered in 2025, to a total of 631 INLers, reflecting a strong institutional investment in continuous learning. The majority of this training was provided internally by INL staff, demonstrating the depth of in-house expertise and a strong culture of knowledge sharing.

Together, these training activities ensure that INLers are equipped with the skills needed to advance cutting-edge research, engage with industry and society, and contribute responsibly to a rapidly evolving scientific and technological landscape.



Competitive Funding

A dark, high-contrast microscopic image of cells, likely showing a cluster of cells with a prominent, textured, circular structure in the center, possibly a nucleus or a specialized cell type. The background is dark with some lighter, granular textures.

Driving Semiconductor Innovation under the EU Chips Act

Scanning electron microscopy image of 4-leaf clover-shaped semiconductor micropillars, by João Azevedo INL

This year, INL further consolidated its position as a leading European actor in the semiconductor landscape, assuming strategic and technical roles across multiple flagship initiatives under the EU Chips Act.

INL is actively engaged in four pilot lines of the EU Chips Joint Undertaking, addressing next-generation semiconductor and quantum technologies. In APECS, the European Pilot Line for Advanced Packaging and Heterogeneous Integration for Electronic Components and Systems, coordinated by Fraunhofer-Gesellschaft, INL plays the role of a hosting institution, providing access to beyond-CMOS technologies, in particular spintronic devices, GHz and THz technologies, micro and nano-(opto-)electromechanical systems (MEMS/MOEMS/NOEMS) and next-generation device integration.

As semiconductor technologies evolve towards the next industrial revolution, INL is already engaged in three quantum pilot-lines. In CHAMP-ION, the pilot line for Championing a European Advanced Manufacturing of Ion-Traps, coordinated by Silicon Austria Labs (Austria), INL holds a key operational role, leading the Customer Service Desk Operation and Quality Assurance over Pilot Line Services, ensuring that external users and stakeholders can access ion-trap chip fabrication and testing capabilities efficiently and reliably.

In DIREQT, the Diamond Quantum Chip Pilot Line, coordinated by Italy's National Research Council (CNR), INL contributes its microfabrication expertise, performing reactive ion etching (RIE) of diamond substrates and two-photon polymerisation (TPP) for the structuring of diamond quantum chips, particularly in use cases targeting quantum sensing applications. Finally, in SPINS, the Semiconductor Quantum Pilot Line for silicon- and germanium-based quantum-dot technologies, coordinated by imec, INL contributes to cryoelectronics and heterointegration activities, supporting the development of scalable quantum chip fabrication processes.

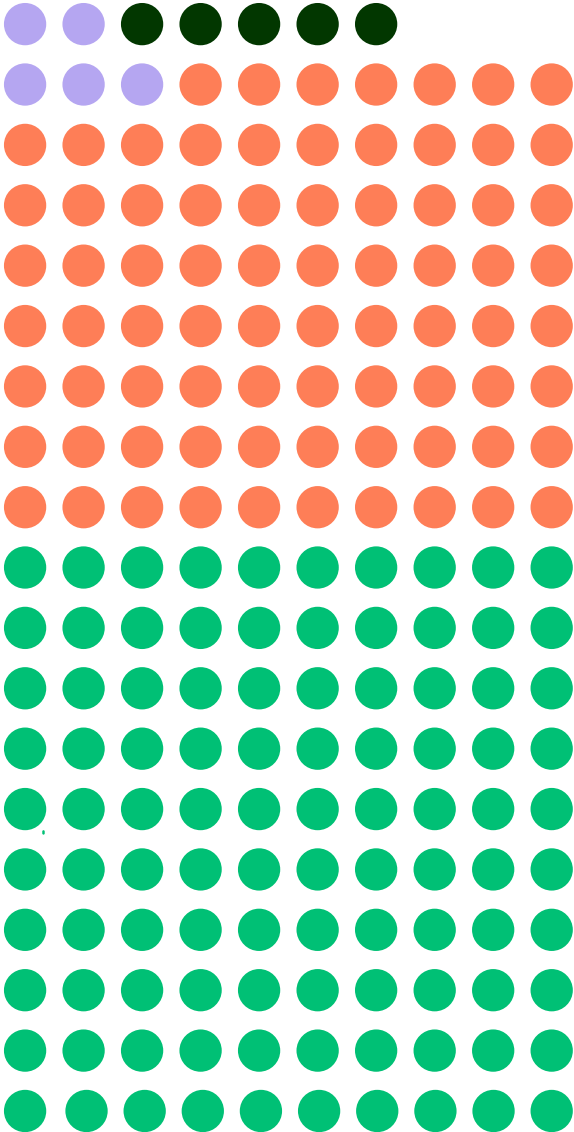
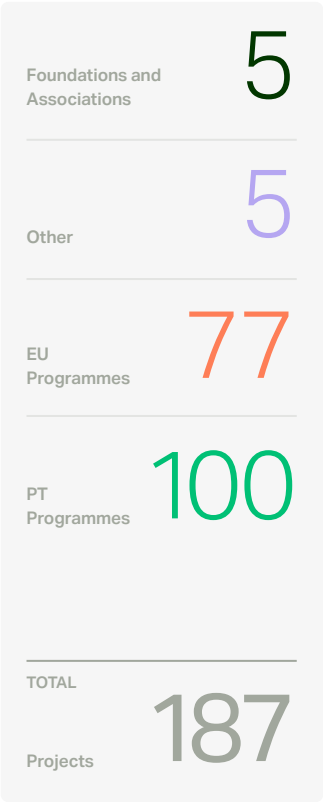
INL is also one of the twelve partners in the EU Chips Design Platform (EuroCDP), coordinated by imec (Belgium) alongside a Platform Coordination Team that includes CEA (France), Fraunhofer and IHP (Germany), Silicon Austria Labs (Austria), and other leading European research and technology organisations. EuroCDP aims to democratise access to advanced semiconductor design infrastructure, EDA tools, IP resources, training, and capital for fabless startups, and SMEs across Europe.

At the national level, INL coordinates POEMS, the Portuguese Chips Competence Centre for Semiconductors, which serves as a central hub with over 16 consortium partners, unifying educational and technical expertise in key areas such as chip design, advanced packaging and emerging fields including photonics, flexible electronics and sensor technologies. It also acts as the bridge between the Portuguese semiconductor ecosystem and the broader European network of competence centres, pilot lines, and the EuroCDP, ensuring that national stakeholders have streamlined access to cutting-edge resources and opportunities. In alignment with the EU Chips strategy and the need to secure the skills essential pipeline for future semiconductor and quantum innovation, POEMS serves to safeguard national expertise while enforcing and continuously upgrading workforce capabilities.



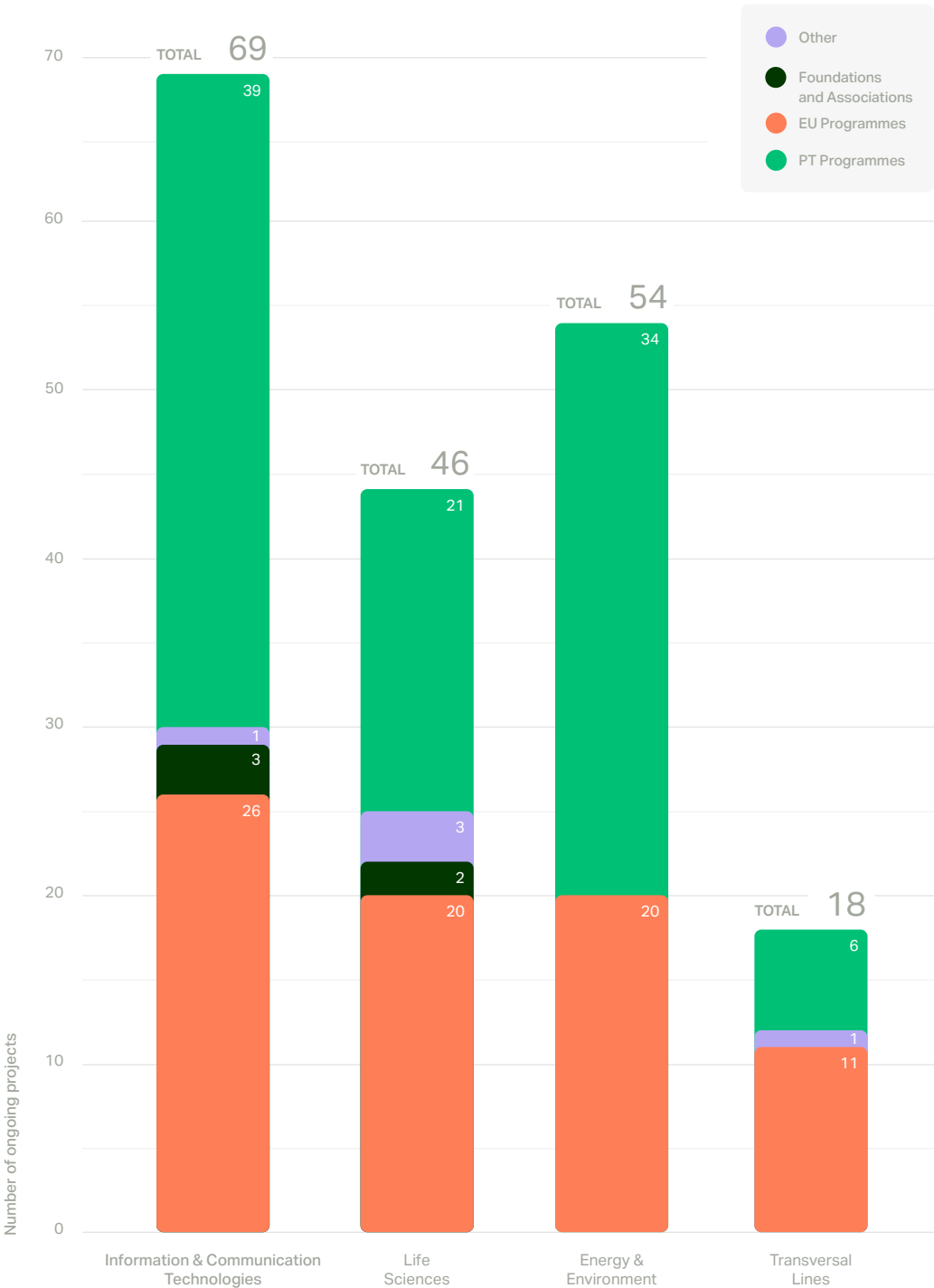
Secretary of State for Science in Portugal, Ana Paiva; Minister of Education, Science, and Innovation in Portugal, Fernando Alexandre; INL Director-General, Clivia Sotomayor-Torres. Semiconductors: Opportunities and Challenges event.

Number of ongoing projects



EU PROGRAMMES CETPartnership, ERA-NET, Digital Europe Programme (DIGITAL), Horizon 2020, Horizon Europe	FOUNDATIONS AND ASSOCIATIONS La Caixa Foundation - Health Research Programme, Swiss National Science Foundation
PT PROGRAMMES FCT, Norte 2030, Portugal 2020, PRR, PT2030	OTHER CHIST-ERA, European Union External Actions, INTERREG POCTEP, RPB International Research Collaborators Award)

Distribution of ongoing projects per research area



Driving Excellence in Competitive Funding: Expanding Frontiers in 2025

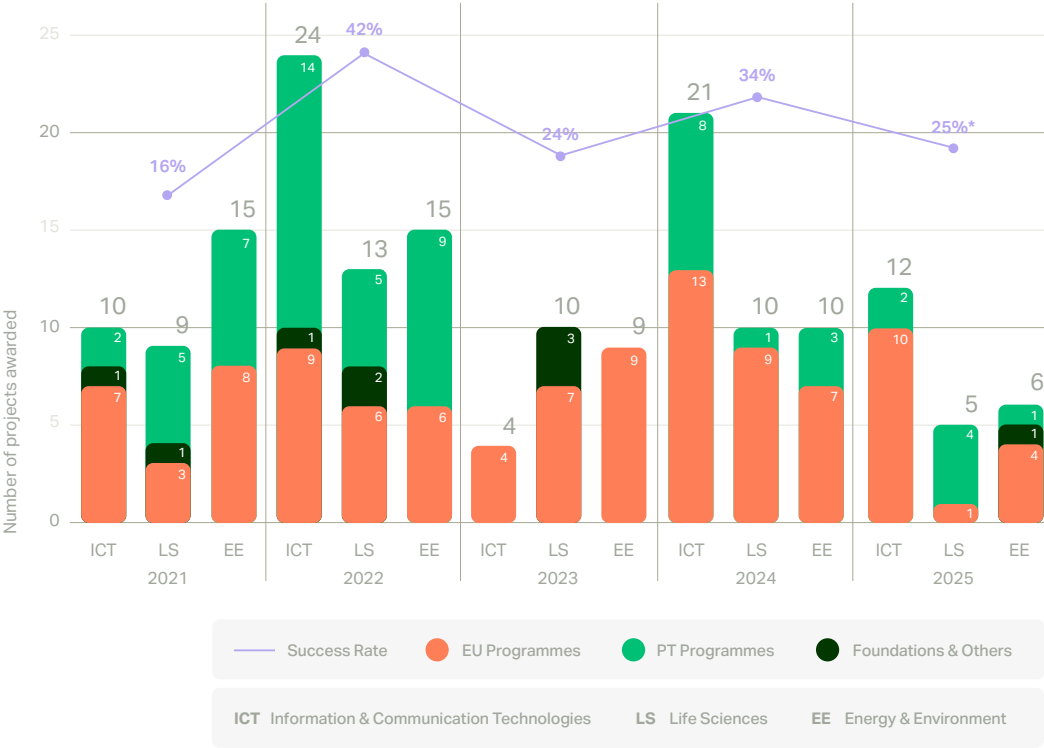
INL continued to strengthen its position as a leading research institution through a robust portfolio of competitively funded projects across strategic domains. The distribution of ongoing projects reflects a balanced and dynamic funding landscape, spanning all Grand Thematic Areas as well as Transversal Lines, including major initiatives under the EU Chips Act and other cross-unit institutional projects. A detailed list of competitively funded projects awarded in 2025, together with externally funded projects active during the year, is provided in the final chapter 'Scientific Output'. A major highlight of 2025 is the arrival of ERC Consolidator Grant holder Rui Domingues, who joined INL with the FORTIFY project. This new ERC award further reinforces INL's scientific excellence which adds to the ongoing ERC project LEIT, led by Clivia Sotomayor Torres. The Laboratory's competitive strength is further demonstrated by the ongoing eight [MSCA Individual Fellowships](#),

reflecting INL's attractiveness to outstanding international talent and its capacity to foster high-impact research careers. In parallel, projects developed under the Mobilising Agendas for Business Innovation of the Portuguese Recovery and Resilience Plan (PRR) continue to represent a significant share of INL's funded activities across all research areas. These large-scale collaborative initiatives aim to foster sustainable economic growth through high-tech R&D, upskilling talent, accelerating the transfer of knowledge to industry and strengthening national innovation ecosystems. These prestigious grants and strategic programmes underscore the merit of INL researchers and the transformative nature of their scientific vision. They reinforce INL's mission to address pressing global societal challenges through cutting-edge nanotechnology, interdisciplinary research, and innovation-driven growth.

In the last years, INL's awarded R&D projects across the three Grand Thematic Areas reflect a dynamic and overall positive trajectory of engagement with competitive funding programmes. The period was marked by a strong peak in 2022, largely explained by the successful acquisition of projects under the PRR framework, which provided a significant boost to INL's project portfolio in that year. This was followed by a natural contraction in 2023 as PRR-driven activity normalised, and a robust recovery in 2024 driven by EU Programmes. EU funding remains the dominant source throughout the period, consistently underpinning the majority of awarded projects, while PT Programmes provide a relevant complementary contribution, particularly in ICT and EE.

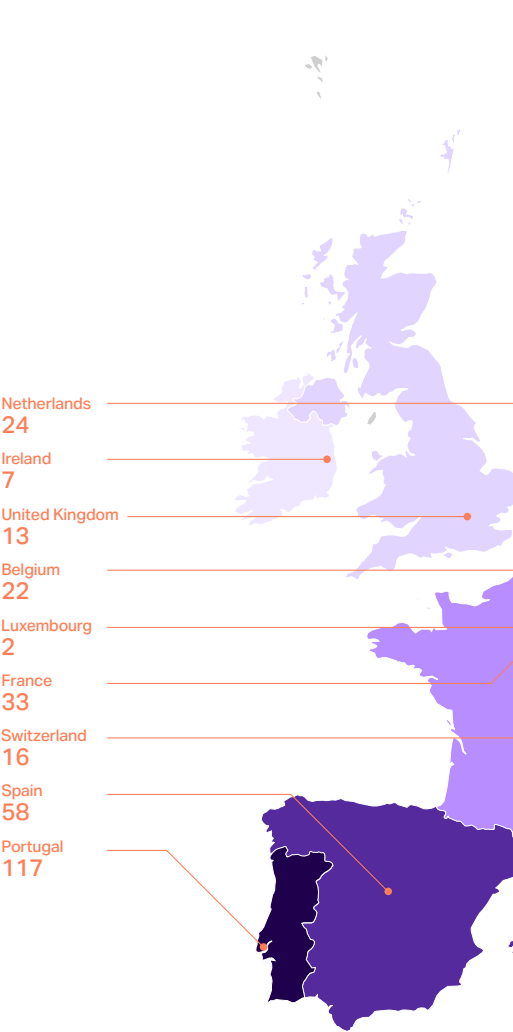
Throughout the years, INL has been increasing the number of proposal submissions, a trend that has been seen all throughout Europe, which has significantly affected the success rates overall. Nonetheless, INL's success rates have remained consistently high compared with European average, driven largely by stronger engagement in European funding opportunities and a growing critical mass within INL teams working towards a shared purpose. With 143 proposals still pending results in 2025, the final awarded project figures are expected the follow this positive trend, reinforcing the importance of cultivating a highly ambitious research community whose drive and commitment continue to elevate INL's capacity to compete and innovate.

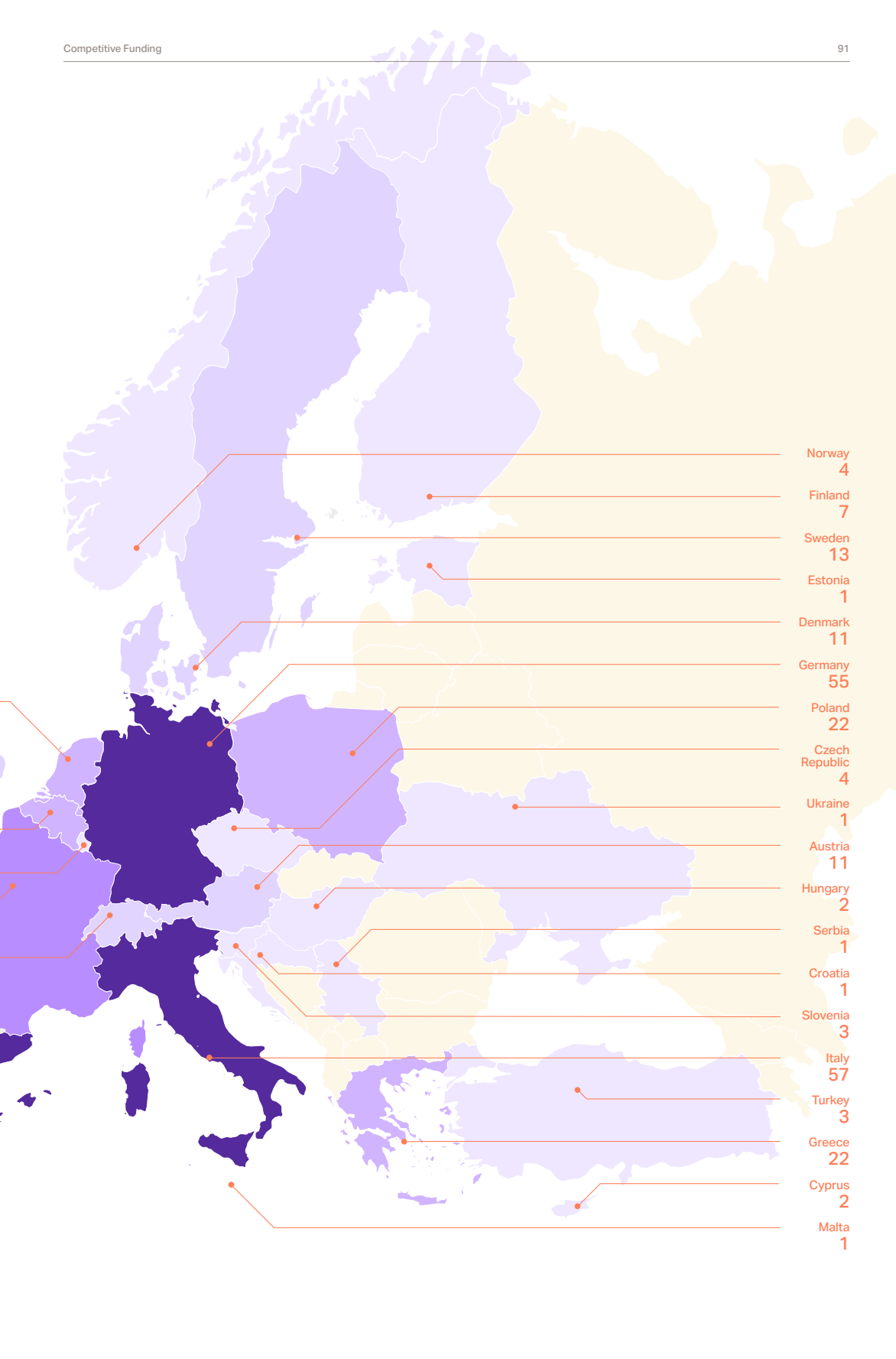
Projects awarded per year and per research area

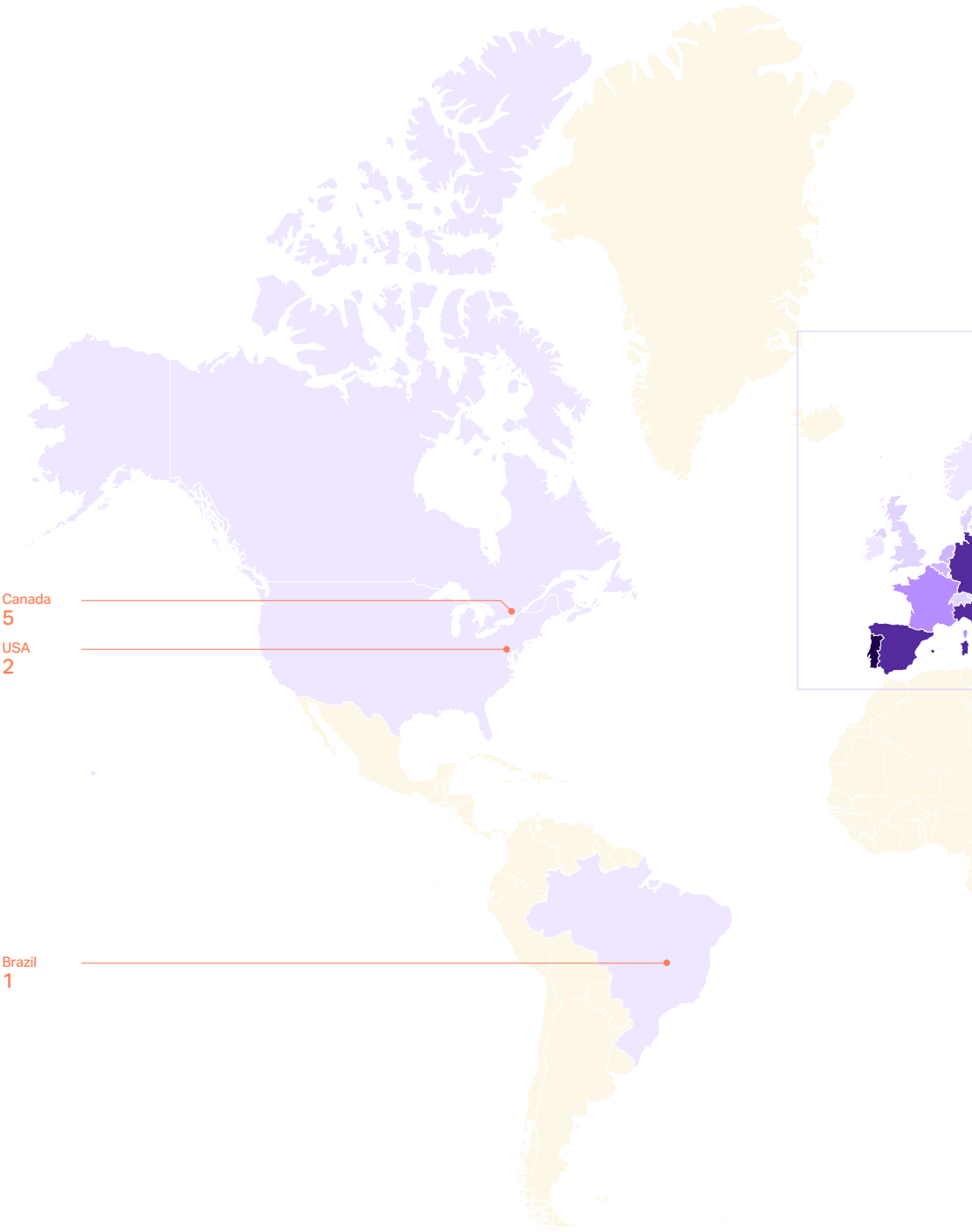


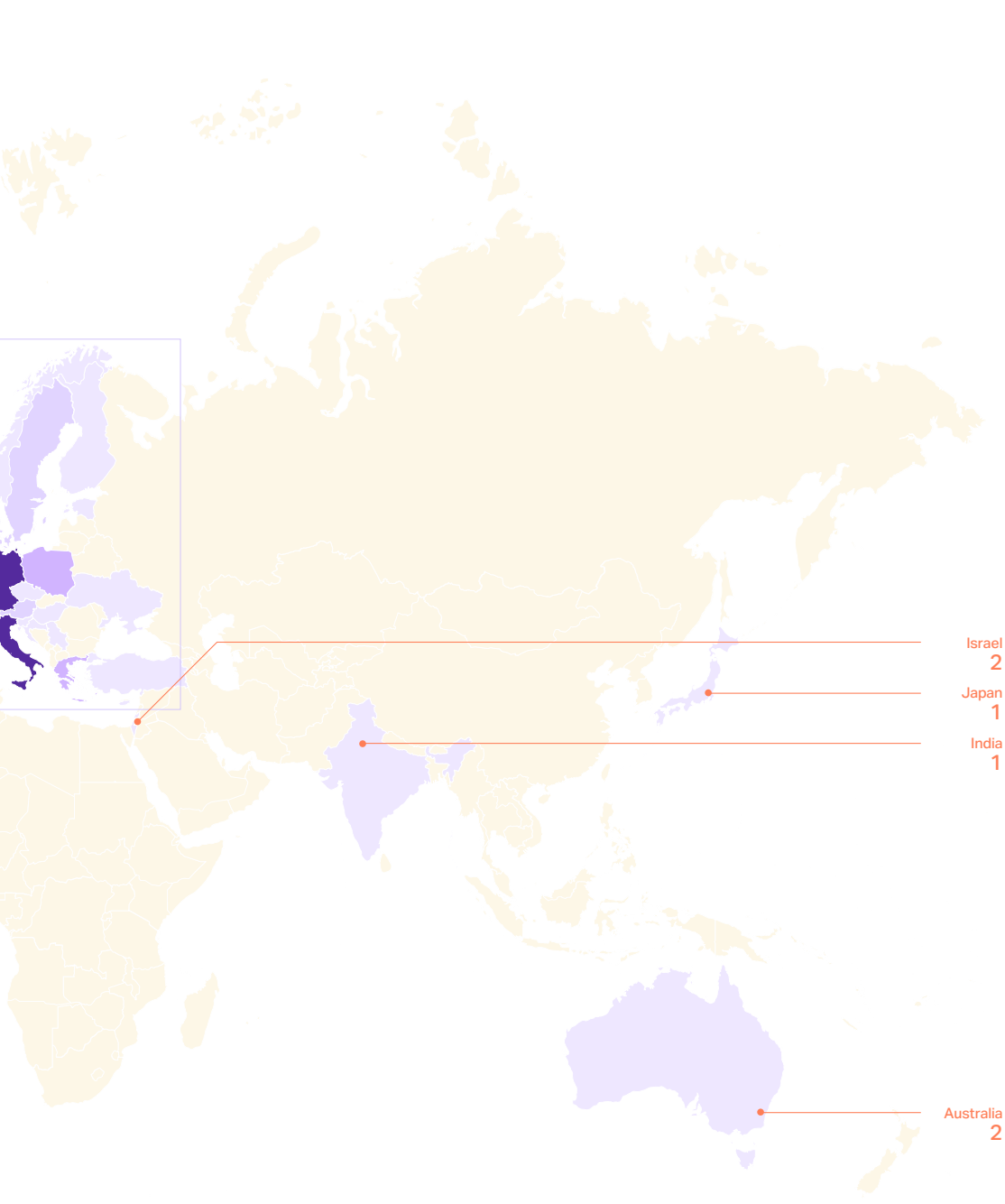
INL's R&D funded projects bring together 527 partner organisations across 35 countries, reflecting a broad and diverse international collaborative network. The partnership base is strongly anchored within the European research arena, with approximately 475 partners located in EU Member States. The Iberian Peninsula stands out as the most represented region, with Portugal and Spain together accounting for 175 partners, followed by Italy (57), Germany (55), and France (33) as other major European contributors. Beyond Europe, funded project collaborations extend to key scientific and industrial hubs including the United Kingdom (13), Switzerland (16), Canada (5), and Norway (4), as well as research institutions in Australia, Israel, India, Japan, Brazil, and the United States, underscoring the global reach of INL's research partnerships.

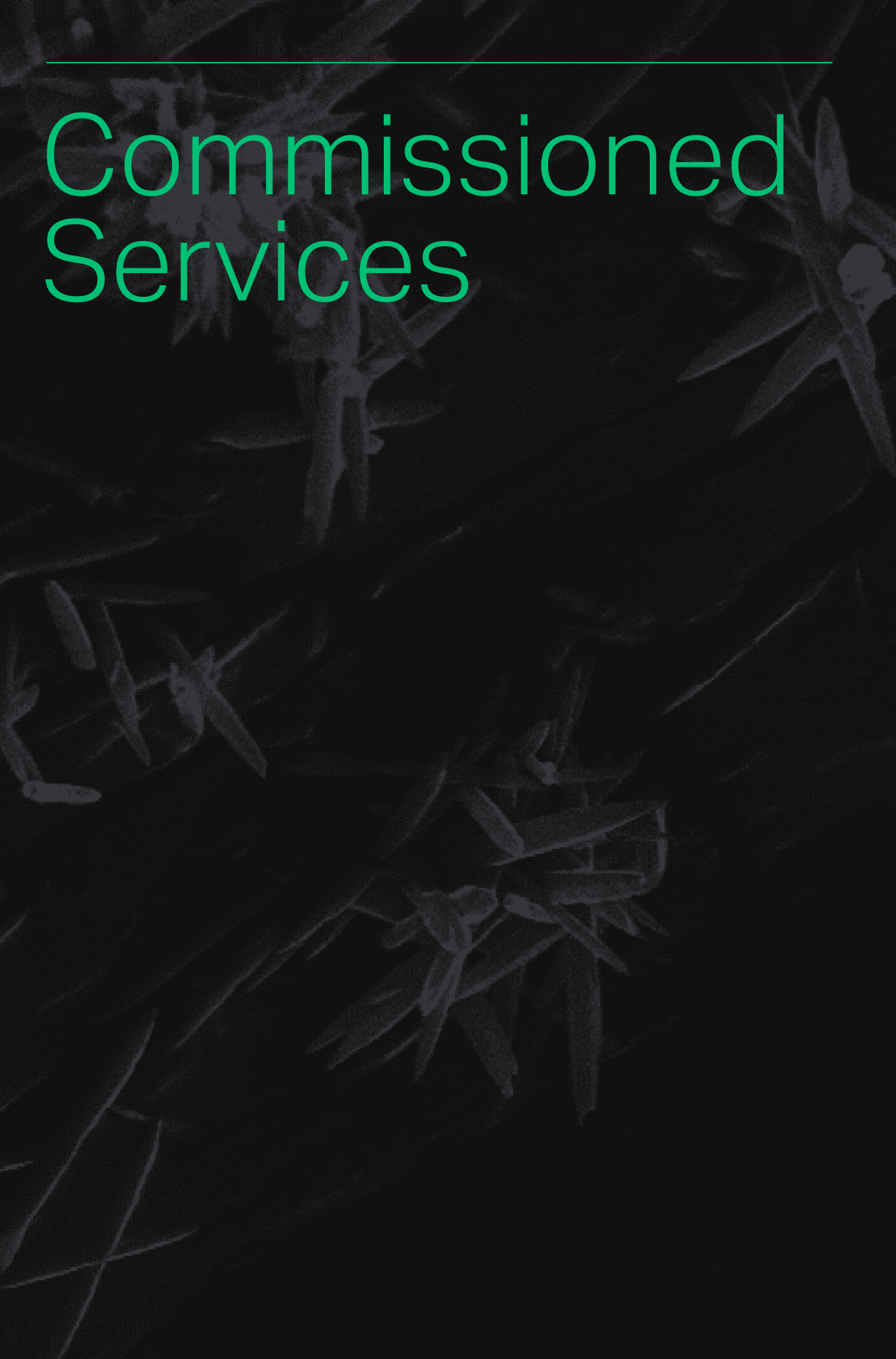
Global distribution of INL partners in funded projects











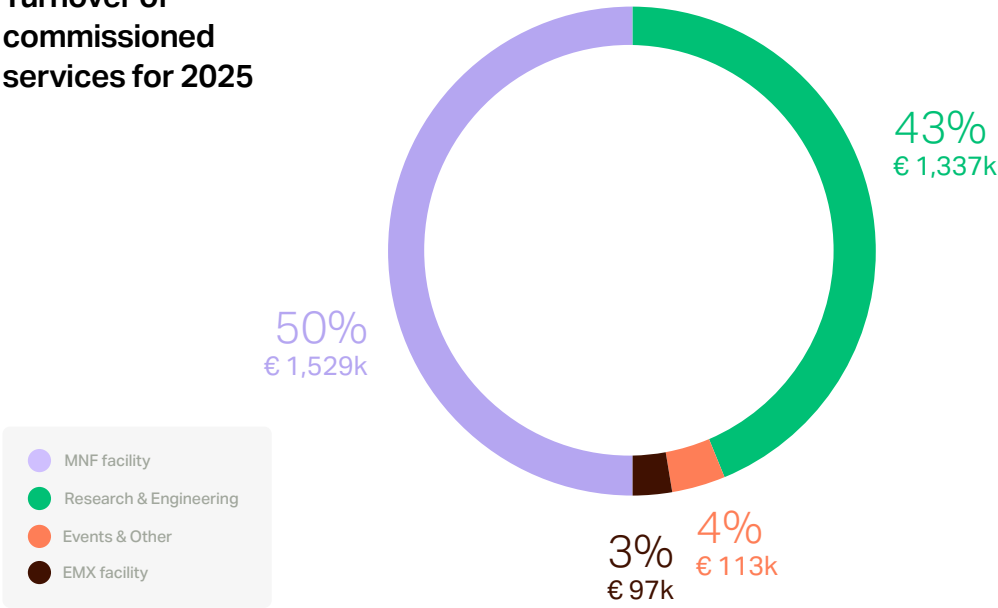
Commissioned Services

INL is committed to translating scientific knowledge into real-world applications by fostering close collaboration between researchers and industry, with the goal of generating societal and economic impact. This is achieved by actively connecting the research community with industrial partners, facilitating knowledge exchange, and supporting the adoption of advanced technologies across multiple sectors.

In 2025, INL strengthened the foundations of its innovation and technology transfer activities. Following the adoption of a new Innovation Policy in 2024, a dedicated Technology Transfer Office (TTO) was formally established in the fourth quarter of 2025 to support its implementation. The office was reinforced through the recruitment of a Head of Technology Transfer and an additional Technology Transfer Officer, effectively, doubling the team's capacity and enabling a more structured and proactive approach to intellectual property management, industry engagement, and technology commercialisation.

During the year, the TTO consolidated its operational model and validated a strategic roadmap aligned with international best practices in technology transfer. These developments supported a clear expansion of INL's industry engagement in 2025. INL hosted four industry partners on site, doubling last year's record, reflecting a growing industrial interest in its capabilities and infrastructure. INL continued to provide industry with access to an integrated innovation ecosystem, spanning innovative device development by research groups in areas such as MEMS, spintronics, solar cells, and battery components; process development and piloting within a 1,200 m² ISO class 100/1000 cleanroom with 200-mm wafer line; testing and qualification of production-relevant materials and equipment; and system-level engineering supported by advanced engineering groups.

Turnover of commissioned services for 2025



Industry contract research and services turnover since 2021



This integrated approach delivered tangible results. In 2025, industry-related turnover increased by 25%, exceeding €3 million for the first time since INL's establishment, supported by more than 60 active industrial customers and partners across three continents. Approximately 20% of these revenues originated from Portugal, with the remaining 80% generated through international collaborations, predominantly within Europe, underscoring INL's growing role as an international innovation partner.

Looking ahead, the TTO plans to launch Techlink, a two-year technology-transfer programme expected to start in the first quarter of 2026. Building on the structures established in 2025, the programme is designed to further support invention maturation and commercialisation, strengthen researchers' understanding of intellectual property and related INL processes, encourage collaboration with industry through challenge-driven initiatives, promote prototype solutions nationally, and enhance INL's visibility and engagement with industry through targeted events, conferences, and trade fairs.



Technology Transfer



Optical microscope image of a sample during electrodeposition of CuInGaSe₂ for solar cell fabrication. Pedro Arechto, INL

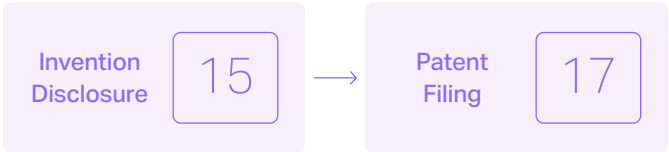
INL continues to consolidate its technology transfer activities through the protection, management, and valorisation of intellectual property arising from its research. In 2025, 17 patent applications were filed across multiple jurisdictions, including Portugal, Spain, the European Patent Office, the United States, Brazil, and through the Patent Cooperation Treaty (PCT).

Intellectual property generated during the year was largely collaborative in nature. Seven patent applications were co-owned with external partners, comprising four private entities and three public research institutions from Portugal, Spain, Italy, Brazil, and Greece. These co-ownership arrangements reflect sustained collaboration with both academic and industrial partners at different stages of technology development.

Patent filings covered INL's three grand thematic areas:

- In Information & Communication Technologies, applications addressed optics, photonics, and quantum technologies, including illumination control systems, diffractive optical components, and quantum photonic circuits. Developments in micro- and nano-systems included MEMS accelerometers, graphene-based quantum sensors, and magnetic field patterning solutions. Data-enabled sensing and classification technologies were also advanced, notably for textile structure and composition analysis.
- In Life Sciences, innovation activities focused on medical devices and health technologies, including a pelvic measurement device integrated into a glove for obstetric applications.
- In Energy & Environment, filings targeted energy storage and advanced materials, such as battery separators, silicon thin-film electrodes, and sodium–manganese solid-state electrolytes. Additional developments addressed environmental monitoring solutions for VOC (volatile organic compounds) and microplastics detection, as well as advances in electrocatalysis and chemistry.

Innovation to Impact

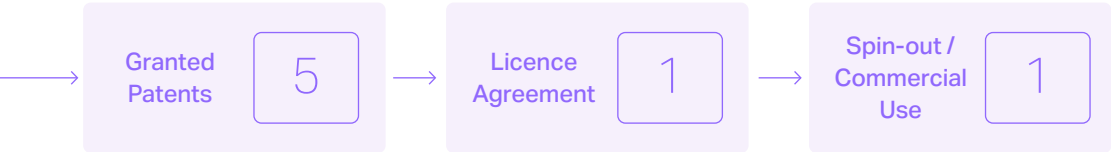




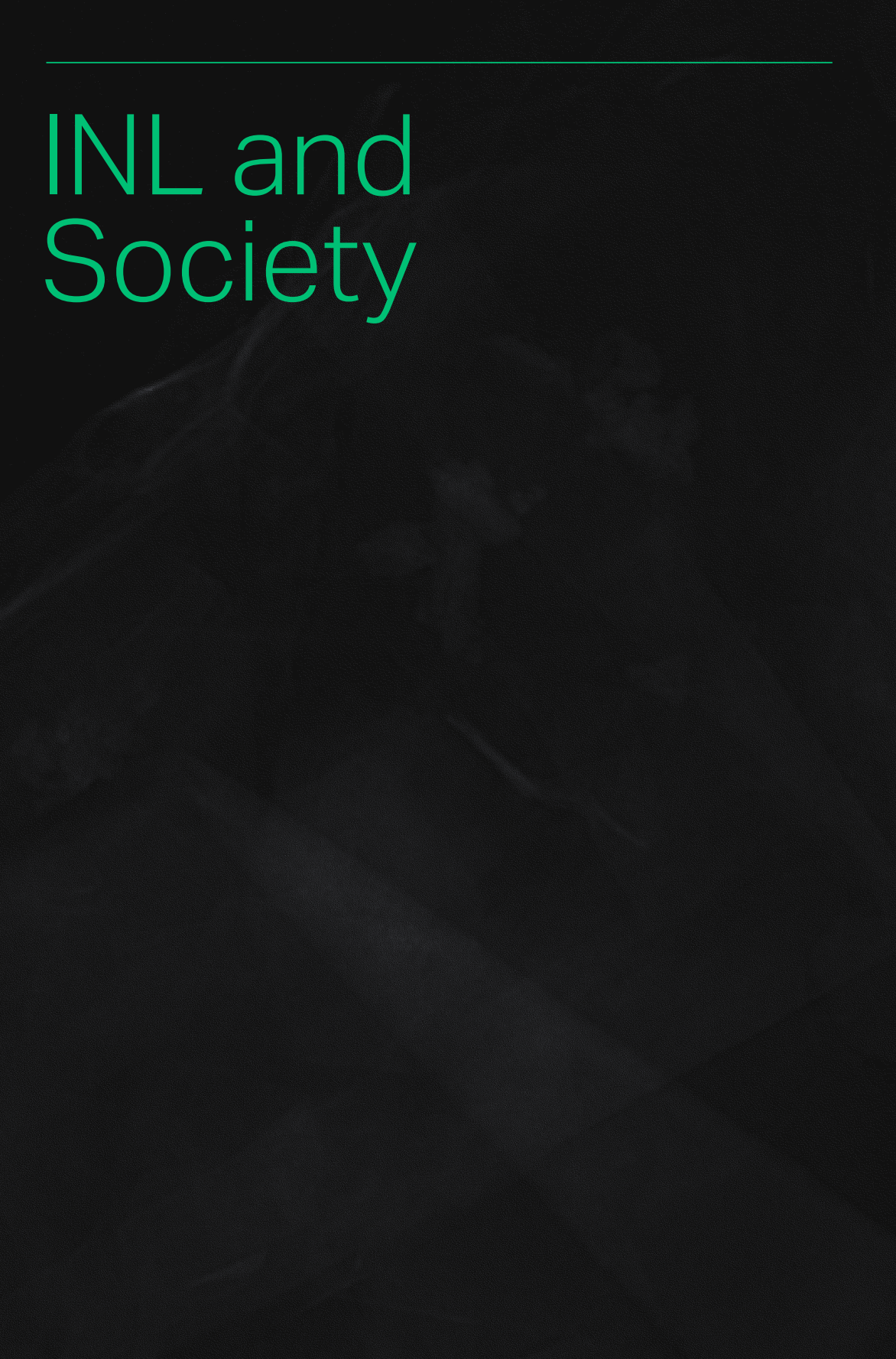
INL and University of Minho sign a technology licensing agreement with IPLEXMED

Progress along the technology transfer pipeline was further demonstrated by the granting of five patent applications during the reporting period. One patent was granted in the United States for a predictive maintenance system and method. Three unitary patents were granted covering neuromorphic devices and neural network systems, a composite material and method for battery anodes, and a multi-organ-on-a-chip platform, the latter already validated in Spain.

In November 2025, INL concluded a [formal licence agreement with IPLEXMED and the University of Minho](#), granting commercialisation rights to a jointly owned patent family relating to a graphene-based sensor for malaria detection. The licensed assets include patent protection in Europe and the United States, together with associated know-how. The technology is based on functionalised monolayer graphene field-effect transistor (FET) sensors designed for non-invasive disease detection. The agreement marks a key step in the transfer of research outcomes towards market deployment through an INL — University of Minho spin-out active in advanced medical diagnostics. Together, these activities illustrate a technology transfer pipeline spanning invention, protection, and early commercial engagement, aligned with INL's broader strategy to translate research outcomes into societal and economic value.



INL and Society





INL Open Day

Open Day

The [INL Open Day](#) welcomed over 800 visitors of diverse nationalities to an inspiring day of discovery and hands-on science. Families, students, researchers, and enthusiasts explored interactive exhibits and live demonstrations across the campus, including fluid dynamics, 3D printing, and quantum technologies. The day also featured art-science performances, the launch of an [activity book](#), and a special appearance by Braga25, creating a lively mix of creativity and learning.

Researchers from different groups showcased cutting-edge projects, from cancer research using microfluidics to clean energy and mobility innovations. Multilingual guided tours and interactive workshops gave visitors a chance to meet the people behind the research. Over 145 INLers contributed to making the day a success, reflecting the Laboratory's collaborative spirit and commitment to connecting science with society.

European Researchers' Night

On 26 September, INL joined thousands of institutions across Europe to celebrate the [European Researchers' Night](#), transforming the Forum Braga into a lively stage where science met the public. INL presented over 25 research projects spanning physics, chemistry, biology, and engineering, showcasing how nanotechnology connects with everyday life – from sustainable solutions to the hidden beauty of the microscopic world.

More than 80 INL researchers engaged visitors through interactive experiments, games, and demonstrations, making complex concepts accessible and inspiring for all ages.

The evening combined science with culture, featuring creative performances, live music, and debates that highlighted research's societal and artistic connections.

The event was honoured by the presence of Portugal's Minister of Education, Science and Innovation, Prof. Fernando Alexandre, who met INL researchers and experienced their work firsthand. By the end of the night, over 2,000 visitors had explored the night's activities, reaffirming the mission of European Researchers' Night to bring citizens closer to science and science closer to citizens.



European Researchers' Night



European Researchers' Night

Ciência Viva in the Lab



Summer internships at INL

For the first time, INL joined the [Ciência Viva no Laboratório](#) programme, hosting five secondary school students for a week of hands-on scientific immersion. Working alongside INL researchers, the students engaged in real projects across nanotechnology, electron microscopy, and optical sensing, gaining practical experience in high-tech labs.

Mentored by INL researchers, they explored diverse experiments, from assessing the health impacts of nanomaterials to studying optical properties with spectral sensors, discovering how curiosity and ideas drive real research. The programme offered a unique opportunity to experience the life of a scientist and inspired the next generation of innovators.



Summer internships at INL

Researchers at Schools & University Visits

INL continued to bring science closer to the community through targeted outreach initiatives. Through Researchers at Schools, 945 students from primary and secondary schools participated in 16 activities, including sessions conducted in collaboration with Native Scientists. Students met INL researchers, learned firsthand about nanotechnology and its applications, and got a glimpse of what it is like to work in a laboratory, inspiring curiosity and engagement with science.

Complementing this, 13 university visits welcomed 314 undergraduate students to INL, offering guided tours, lab demonstrations, and direct interactions with researchers. Visitors gained a first-hand understanding of research in action, had the chance to ask questions, and explored potential career paths in science and engineering.



Researchers at Schools activities

INL at the World Expo Osaka

In October, INL proudly participated in the Portugal Pavilion at [World Expo Osaka](#), contributing to the theme "The Ocean, Blue Dialogue." The Laboratory showcased how nanotechnology, advanced materials, and biotechnology can address global challenges in health, sustainability, energy, and digital transformation. INL's exhibition offered immersive experiences, including a media arts projection exploring micro-to-nano scales, a microscopy exhibition linking science, technology, and art, an interactive virtual lab presenting prototypes focused on the United Nations' Sustainable Development Goals, and ['Activity Books for Nanoexplorers'](#), translated into Japanese.

Overall, the activities engaged an estimated 10,500 visitors. Beyond public engagement, INL co-organised a private networking event with AICEP, connecting leading Japanese companies and universities and presenting innovative solutions, fostering strategic collaborations and reinforcing INL as a bridge between research and industry. INL's participation at World Expo Osaka highlighted its global role in scientific excellence, international collaboration, and public engagement, demonstrating how advanced research can inspire, educate, and contribute to a sustainable and innovative future.



INL at the World Expo Osaka



José Rivas, INL Director-General from 2005 to 2014, at the celebration of INL's anniversary

Celebrating 20 Years of INL: The Beginning of a Vision

INL celebrated 20 years since the bilateral decision that gave rise to its creation, reflecting two decades of [strategic scientific collaboration between Portugal and Spain](#). The anniversary brought together government representatives from both countries, highlighting INL's role as a cross-border hub for research and innovation.

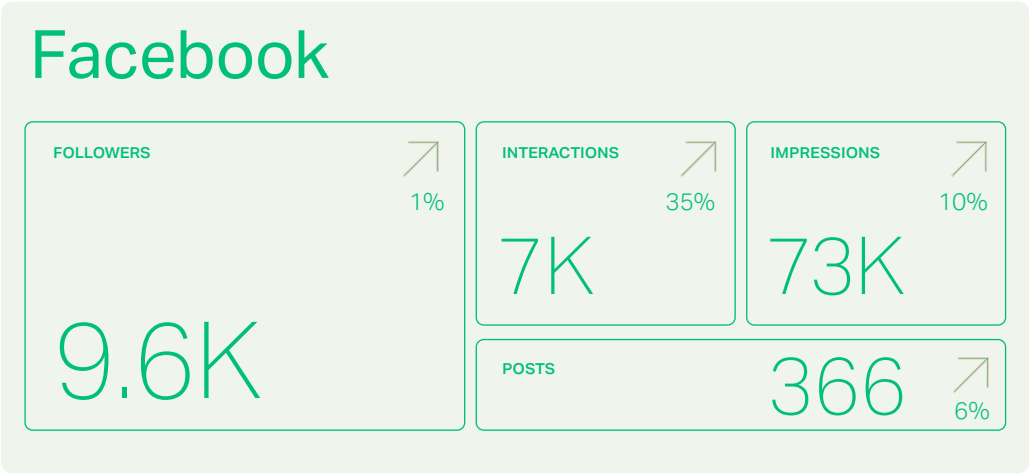
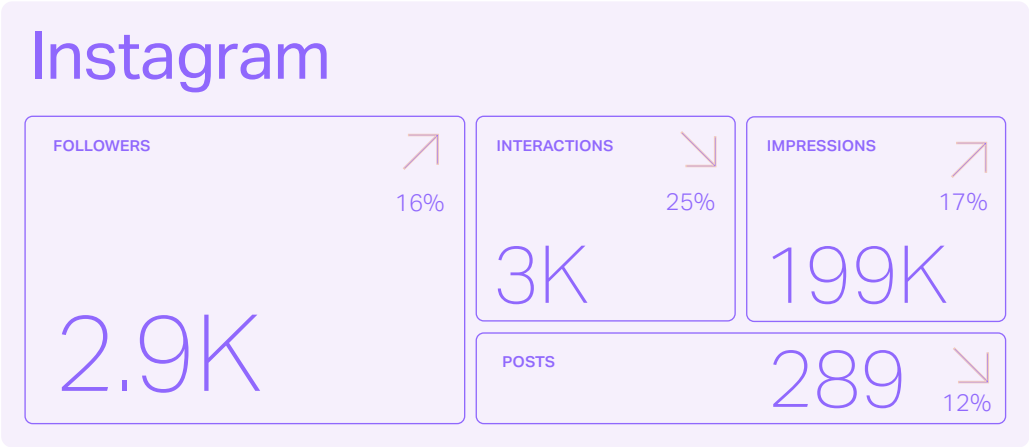
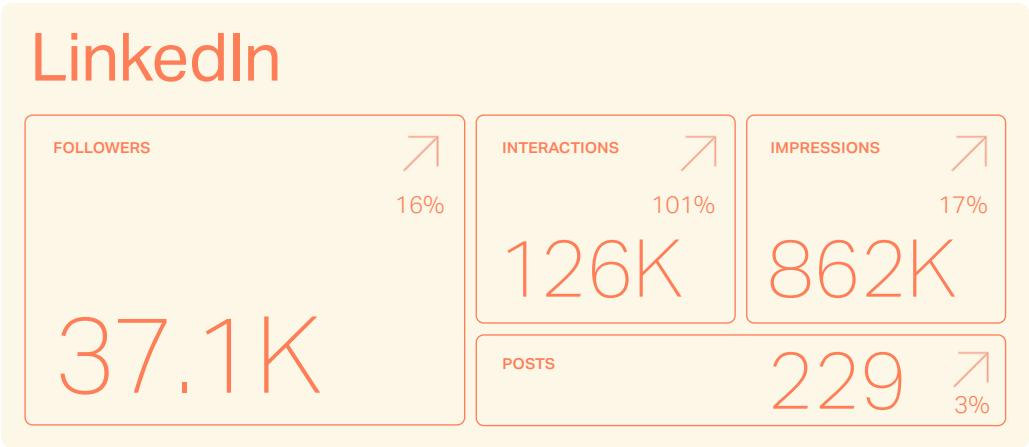
Director-General Clivia Sotomayor opened the ceremony, recalling INL's origins as a shared vision to unite Iberian expertise in science and technology. Presentations from the Postgraduate School, the Early-Stage Researchers Association, and the Research Board showcased INL's impact, innovation, and ongoing commitment to fostering collaboration. The celebration reinforced INL's mission to continue advancing scientific excellence and Iberian cooperation for decades to come.

Sharing our science with the World

INL actively brings science closer to society through a vibrant mix of communication, outreach, and educational activities. In 2025, we shared discoveries, fostered curiosity, and inspired engagement across multiple platforms, reaching students, professionals, and other curious minds.

Across the year, INL produced 884 social media posts, 135 website news articles, 63 events, 33 videos, 25 newsletters, and 9 new brochures and flyers. Social media output was slightly streamlined compared to 898 posts in 2024, reflecting a more focused content strategy. This approach contributed to continued growth in INL's social media presence, with increases in followers and impressions across all platforms, reflecting higher engagement and the reach of content to broader audiences.





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January 2025

Science

Alzheimer's



Stamp-sized microchip that imitates the human brain could speed up treatments for Alzheimer's

● Advanced brain-on-a-chip technology developed by EU-funded researchers helps make potential treatments for neurological diseases more effective

TOM CASSAUWERS

A human brain-on-a-chip sounds like something from a science fiction film, a gadget powering its cyborg villain. But chemical and biological engineer Dr Raquel Rodrigues at the International Iberian Nanotechnology Laboratory (INL) in Braga, Portugal, believes that such a device will be key to developing more effective

treatments for serious neurological disorders, such as Alzheimer's. "The brain is a very complex and puzzling organ," said Rodrigues. "We need electronic monitoring of cells and experimental parts so we can learn how it works." Thanks to research funding from the EU, Rodrigues and fellow researchers at the INL were able to build a unique brain-emulating microchip as part

of a two-year research effort called BrainChip4MED that concluded in February 2024. The research included a 12-month secondment to Brigham and Women's Hospital, part of Harvard Medical School and pioneers in the development of organs-on-a-chip (OoC) and biosensors.

RTPPLAY ▶



Portugal em Direto

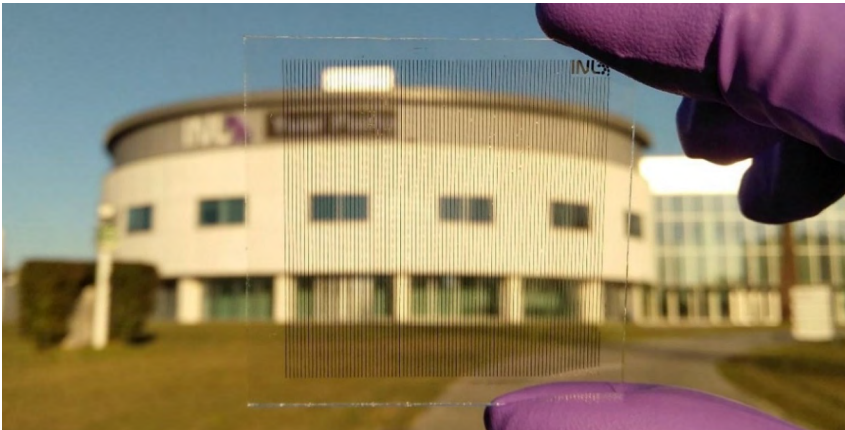
28 jul. 2025

pv magazine

Improving solar windows via microfabrication techniques

Researchers in Europe are investigating semi-transparent solar windows, applying microfabrication techniques to both CIGS and perovskite devices, to overcome the view-impeding properties of earlier solar window concepts.

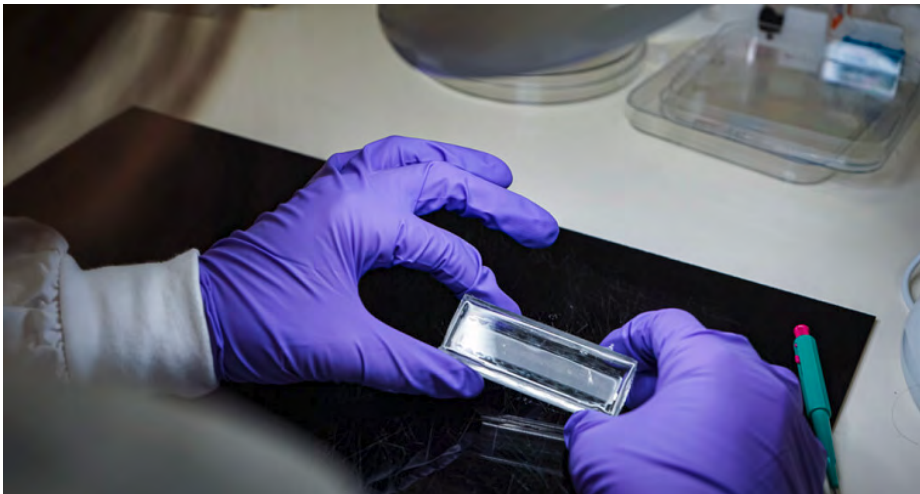
JULY 7, 2025 VALERIE THOMPSON





Em Braga a nanotecnologia do nosso futuro

21 out. 2025



Nanostars Push SERS Sensing to New Performance Levels

30 nov. 2025

SciTechDaily

A Quantum “Goblet” May Hold the Key to the Future of Computing

10 mar. 2025



educacao_pt



O Ministro da Educação, Ciência e Inovação, Fernando Alexandre, esteve ontem na Noite Europeia dos Investigadores, no Forum Braga, organizada pela [@escoladecienciasuminho](#), que celebra este ano o seu 50.o aniversário

Scientific Output



Scientific publications

The following list provides an overview of peer-reviewed scientific publications produced by INL researchers during 2025.

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Competitive Funding

The following appendix details the competitive research funding supporting INL's activities in 2025, covering covering granted and ongoing funded projects.

Individual Fellowships ERC Grants

Marie Skłodowska-Curie Actions (MSCA) TMA Postdoctoral Fellowships

Clivia Sotomayor
LEIT: Lossless information for Emerging Information Technologies
Duration: 01/01/2021 – 31/12/2026

Rui Domingues
FORTIFY: Gating cell force sensors with tailor-made nanoswitches to restore tendon tissue function
Duration: 01/05/2025 – 30/04/2030

Prabir Kulabhusan
Research group: Food Quality and Safety
CHAMPION: Catalytic Hairpin Assembly-based Point of Need Detection Device for Noroviruses
Duration: 01/02/2023 – 31/01/2025

Omid Ranjbar
Research group: Sotomayor
PIONEER: Phononic circuits with nonlinear nanomechanical oscillators
Duration: 15/09/2025 – 14/09/2027

Andreia Magalhães
Research group: Bañobre
MultiTheranostics: Theranostic magnetic nano-based codelivery system for boosting cancer immunotherapy
Duration: 01/01/2025 – 31/12/2026

Prajakta Tambe
Research group: Bañobre
MAGNOSTICS: Development of Magnetic LbL Particles for Diagnostics
Duration: 02/05/2023 – 01/05/2025

Fabio Sciarrino, University of Roma La Sapienza*
QU-BOSS: Quantum advantage via non-linear BOSSon Sampling
Duration: 01/08/2020 – 31/07/2026
** INL is a partner institution*

Hong Yin
Research group: P. Ferreira
HySoBatt: Hybrid solid electrolyte for safer rechargeable sodium batteries with higher energy density
Duration: 01/02/2023 – 31/01/2025

Angelica Thomere
Research group: Sadewasser
MISTiCal: Semi-Transparent Micro-Striped Chalcopyrite Cu(In,Ga)Se2 solar cells for window applications
Duration: 02/10/2023 – 30/03/2026

Carlos Rosário
Research group: Sadewasser
TopRooT: Towards TOPological insulator-based electronic devices for ROOm Temperature operation
Duration: 01/06/2023 – 31/05/2025

Jitendra Kumar
Research group: Sadewasser
HEAT-PV: High Efficiency Antimony Selenide (Sb2Se3) based Photovoltaic Devices
Duration: 01/01/2025 – 31/03/2025

Concurso Estímulo ao Emprego Científico

Sanna Sillankorva Research group: Bañobre Development of a novel biopolymeric antibacterial delivery system for the treatment of chronic wounds using phage therapy coupled with mechanical biofilm destruction and thermal wound healing augmentation Duration: 01/03/2021 – 14/04/2027	Laura Rodríguez-Lorenzo Research group: Espiña Universal Platform for on-field Surface-enhanced Raman Scattering Monitoring of Biotoxins and Emerging Organic Pollutants in Marine Environment (UP4SERSMarine) Duration: 01/04/2021 – 31/03/2027
Ana Isabel Bourbon Research group: Pastrana Healthy-gut: Effect of functional diet on intestinal microbiota health Duration: 03/05/2021 – 02/05/2027	Jennifer Teixeira Research group: Salomé Nanomaterials with tailored properties based on metal oxide nanolaminates for carrier selective contacts in optoelectronic applications Duration: 01/08/2022 – 30/07/2028

Research Projects

EU Programmes

3DSecret: 3D spheroids derived from single cells for discovering stochastic patterns behind metastasis Scientific manager: Sara Abalde Groups/units involved: Diéguez Action type: EIC Grants Duration: 01/01/2023 – 31/12/2026	APECS: Advanced Heterogenous System Integration Pilot Line Scientific manager: Ricardo Ferreira Groups/units involved: Micro and Nanofabrication Facility, R. Ferreira, Alpuim, Hanay, Piteira, Nieder, Sotomayor, Sadewasser Action type: Research and Innovation Action (RIA) Duration: 01/11/2024 – 30/06/2029
ADAPTATION: Adaptable bio-inspired polariton-polariton energy management Scientific manager: Mikhail Vasilevskiy Groups/units involved: Rossier Action type: EIC Grants Duration: 01/04/2024 – 31/03/2028	ASCENTPlus: Access to European Infrastructure for Nanoelectronics Scientific manager: Enrique Carbo Groups/units involved: Micro and Nanofabrication Facility Action type: RIA Research and Innovation action Duration: 01/09/2020 – 28/02/2025
ALADDIN: Accelerated Discovery Nanobody Platform Scientific manager: Alar Ainla Groups/units involved: Diéguez Action type: EIC Grants Duration: 01/01/2024 – 31/12/2027	AttoSwitch: Dirac cold-source transistor technologies towards attojoule switching Scientific manager: Paulo Ferreira Groups/units involved: P. Ferreira Action type: Research and Innovation action (RIA) Duration: 01/01/2024 – 30/06/2027
AlchemisST: Alternative Chemicals and Materials integrating Safety, Sustainability, new Production technologies and Socio-economic aspects Scientific manager: Begoña Espiña Groups/units involved: Espiña Action type: Research and Innovation Action (RIA) Duration: 01/11/2024 – 31/10/2028	ATTRACT: Digital Innovation Hub for Artificial Intelligence and High-Performance Computing Scientific manager: Marco Martins Groups/units involved: M. Martins Action type: Digital Innovation Hubs Duration: 01/06/2023 – 30/09/2025
AMRAMR: Advanced Multidisciplinary Research for Antimicrobial Resistance Scientific manager: Yuri Kolenko Groups/units involved: Kolen'ko Action type: TMA Staff Exchanges Duration: 10/01/2024 – 10/01/2028	BIOCELLPHE: Ultrasensitive BIOSensing platform for multiplex CELLular protein PHENotyping at single-cell level Scientific manager: Sara Abalde Groups/units involved: Diéguez Action type: RIA Research and Innovation action Duration: 01/04/2021 – 30/09/2025

BIOCOCOMER: Biomolecular condensates and coacervates: from medicine to agriculture

Scientific manager: Manuel Bañobre
Groups/units involved: Bañobre
Action type: TMA Staff Exchanges
Duration: 01/01/2025 – 31/12/2028

BlueArray: BlueArray Hop-On: Blue light metasurface correction optics

Scientific manager: Diogo Aguiar
Groups/units involved: Hanay
Action type: EIC Grants
Duration: 01/08/2024 – 31/07/2028

Bugs4UrateOnAChip: Advanced Ex Vivo Platform And Delivery Systems For Assessing And Enhancing Hyperuricemia Treatment

Scientific manager: Catarina Gonçalves
Groups/units involved: Pastrana
Action type: EIC Grants
Duration: 01/04/2025 – 31/08/2027

Convert2Green: Converting Facilities Network for accelerating uptake of climate neutral materials in innovative products

Scientific manager: Pablo Fucinos
Groups/units involved: Business and Strategic Relations, Pastrana
Action type: Innovation action (IA)
Duration: 01/01/2023 – 31/03/2026

CROSSBRAIN: Distributed and federated cross-modality actuation through advanced nanomaterials and neuromorphic learning

Scientific manager: João Piteira
Groups/units involved: Piteira, Nieder
Action type: EIC Grants
Duration: 01/05/2023 – 31/10/2026

D4RUNOFF: Data driven implementation of adaptive hybrid solutions for preventing and managing diffuse pollution from urban water runoff

Scientific manager: Begoña Espiña
Groups/units involved: Espiña
Action type: Research and Innovation action (RIA)
Duration: 01/09/2022 – 28/02/2026

DECIDE / EuroCDP: Democratizing European Chip Innovation and Design Ecosystem / European Chips Design Platform

Scientific manager: João Piteira
Groups/units involved: Business and Strategic Relations Office, Piteira
Action type: Coordination and Support Action (CSA)
Duration: 01/01/2025 – 31/12/2028

DemosAxia: ADVANCED SYNERGIES FOR PILOT DEMONSTRATION TOWARDS INDUSTRIAL INNOVATION IN WIDENING COUNTRIES

Scientific manager: Brigita Jurisic
Groups/units involved: Technology Transfer Office
Action type: Coordination and Support Action (CSA)
Duration: 01/06/2024 – 31/05/2027

E2PACKMAN: European Consortium for Accelerating Innovations in Electronic Packaging Manufacturing

Scientific manager: André Cardoso
Groups/units involved: Micro and Nanofabrication Facility
Action type: Innovation Action (IA)
Duration: 01/07/2025 – 30/06/2028

EPIQUE: European Photonic Quantum Computer

Scientific manager: Leonardo Novo
Groups/units involved: Novo
Action type: Research and Innovation action (RIA)
Duration: 01/01/2024 – 31/12/2026

FEASTS: Fostering European cellular Agriculture for Sustainable Transition Solutions

Scientific manager: Lorenzo Pastrana
Groups/units involved: Pastrana
Action type: Research and Innovation Action (RIA)
Duration: 01/12/2023 – 30/11/2026

FLUFET: Flow detection of virUses by graphene Field Effect Transistor microarrays

Scientific manager: Alar Ainla
Groups/units involved: Diéguez
Action type: EIC Grants
Duration: 01/03/2024 – 31/08/2027

FoQaCIA: Foundations of quantum computational advantage

Scientific manager: Rui Soares Barbosa
Groups/units involved: Novo
Action type: Research and Innovation Action (RIA)
Duration: 01/10/2022 – 31/03/2026

FORGING: Forum for Emerging Enabling Technologies in Support to the Digital and Green Transitions through Value Sensitive Innovations

Scientific manager: Marina Dias
Groups/units involved: Business and Strategic Relations
Action type: Coordination and Support Action (CSA)
Duration: 01/10/2022 – 30/11/2025

FRONTSH1P: A FRONTrunner approacTransition to a circular & resilient future: deployment of systemic solutions with the support of local clusters and the development of regional community-based innovation schemes

Scientific manager: Laura Rodriguez-Lorenzo
Groups/units involved: Business and Strategic Relations, Espiña
Action type: IA
Duration: 01/11/2021 – 31/10/2025

FUNLAYERS: Twinning on Functional Layered Materials for Advanced Applications

Scientific manager: Joaquín Fernández-Rossier
Groups/units involved: Atomic Manipulation for Quantum Nanotechnology, Nanomaterials for Energy Storage and Conversion, Rossier
Action type: Coordination and Support Action (CSA)
Duration: 01/01/2023 – 31/01/2026

HEDAsupercap: High Energy Density Asymmetric hybrid supercapactors for applications in consumer goods and electrification

Scientific manager: Miguel Munoz
Groups/units involved: Nanomaterials for Energy Storage and Conversion
Action type: Research and Innovation action (RIA)
Duration: 01/01/2023 – 31/12/2026

Hi-BITS: High efficiency bifacial thin film chalcogenide solar cells

Scientific manager: Sascha Sadewasser
Groups/units involved: Sadewasser, Salomé
Action type: Research and Innovation action (RIA)
Duration: 01/10/2023 – 30/09/2026

iCare: Integrated assessment and Advanced Characterisation of Neuro-Nanotoxicity

Scientific manager: Ernesto Alfaro-Moreno
Groups/units involved: Alfaro-Moreno
Action type: Research and Innovation action (RIA)
Duration: 01/01/2023 – 31/12/2026

ImAge-D: Imaging Ageing Endothelium at the nanoscale - Doctorates

Scientific manager: Pieter De Beule
Groups/units involved: Diéguez
Action type: TMA Doctoral Networks
Duration: 01/10/2023 – 30/09/2027

INFRACHIP: European Research Infrastructure on Semiconductor Chips

Scientific manager: Enrique Carbo
Groups/units involved: Micro and Nanofabrication Facility
Action type: RIA Research and Innovation action
Duration: 01/01/2024 – 31/12/2027

InsectNeuroNano: Insect-Brain inspired Neuromorphic Nanophotonics

Scientific manager: Bruno Romeira
Groups/units involved: Nieder
Action type: EIC Grants
Duration: 01/04/2022 – 30/09/2026

IRISS: The international ecosystem for accelerating the transition to Safe-and-Sustainable-by-design materials, products and processes

Scientific manager: Dmitri Petrovykh
Groups/units involved: Research, Technology and Innovation Office
Action type: Coordination and Support Action (CSA)
Duration: 29/06/2022 – 29/06/2025

KESPER: Kesterite based Photoelectrodes for Water and Nitrogen Reduction

Scientific manager: Pedro Salomé
Groups/units involved: Salomé
Action type: JTC Joint Transnational Call
Duration: 01/06/2022 – 31/05/2025

KNOWSKITE-X: Knowledge-driven fine-tuning of perovskite-based electrode materials for reversible Chemicals-to-Power devices

Scientific manager: Yury Kolenko
Groups/units involved: Kolen'ko
Action type: Research and Innovation action (RIA)
Duration: 01/01/2023 – 31/12/2026

LABPLAS: Land-Based Solutions for Plastics in the Sea

Scientific manager: Begoña Espiña
Groups/units involved: Espiña
Action type: RIA Research and Innovation action
Duration: 01/06/2021 – 30/05/2025

LEARN: Development of novel assessments for indoor air quality monitoring and impact on children's health

Scientific manager: Ernesto Alfaro-Moreno
Groups/units involved: Diéguez, Alfaro-Moreno, Piteira, Espiña
Action type: Research and Innovation action (RIA)
Duration: 01/05/2022 – 30/04/2026

LIFESAVER: Living Impact on Fetal Evolution: Shelter-Analyze-Validate-Empower Regulations

Scientific manager: Andrea Cruz
Groups/units involved: Piteira
Action type: RIA Research and Innovation action
Duration: 01/11/2021 – 31/10/2025

MAGNIFIC: Materials for a next-generation (nano-) opto-electro-mechanical systems

Scientific manager: Clivia Sotomayor
Groups/units involved: Sotomayor
Action type: Research and Innovation action (RIA)
Duration: 15/09/2023 – 30/11/2026

MemCat: Membrane-assisted Ethylene Synthesis over Nanostructured Tandem Catalysts

Scientific manager: Yury Kolenko
Groups/units involved: Kolen'ko
Action type: EIC Grants
Duration: 01/05/2024 – 30/04/2028

NEP: Nano Foundry and Fine Analysis — Europe | PILOT

Scientific manager: Enrique Carbo
Groups/units involved: Micro and Nanofabrication Facility
Action type: RIA Research and Innovation action
Duration: 01/03/2021 – 28/02/2027

NEUROPIC: Nano electro-optomechanical programmable integrated circuits

Scientific manager: Clivia Sotomayor
Groups/units involved: Sotomayor
Action type: EIC Grants
Duration: 15/09/2023 – 18/02/202

NIMFEIA: Nonlinear Magnons for Reservoir Computing in Reciprocal Space

Scientific manager: Alex Jenkins
Groups/units involved: R. Ferreira
Action type: Research and Innovation action (RIA)
Duration: 19/05/2023 – 30/09/2026

OBELIX: Large-scale Simulations for Disorder-driven Orbital Transport (HOP-ON OBELIX) LASIDO

Scientific manager: Tatiana Rappoport
Groups/units involved: Rossier
Action type: EIC Grants
Duration: 01/04/2025 – 31/03/2028

ONE-BLUE: Integrated approach to assess the levels and impact of cONTaminants of Emerging concern on BLUE health and biodiversity modulated by climate change drivers

Scientific manager: Laura Rodríguez-Lorenzo
Groups/units involved: Espiña
Action type: Research and Innovation Action (RIA)
Duration: 01/01/2024 – 30/06/2027

OPEVA: OPTimization of Electric Vehicle Autonomy

Scientific manager: João Piteira
Groups/units involved: Piteira
Action type: Research and Innovation Action (RIA)
Duration: 01/01/2023 – 31/12/2025

POEMS: Portuguese competence centre in semiconductors

Scientific manager: Mariana Fernandes
Groups/units involved: Business and Strategic Relations Office, Micro and Nanofabrication Facility
Action type: Coordination and Support Action (CSA)
Duration: 01/03/2025 – 28/02/2029

PRODUTECH DIH

Scientific manager: Marco Martins
Groups/units involved: M. Martins
Action type: Digital Innovation Hubs
Duration: 01/10/2022 – 31/03/2026

PROMISEANG: Alternative PROteins from Microbial fermentation of non-conventional SEA sources for Next-Generation food, feed and non-food bio-based applications

Scientific manager: Manuel Bañobre
Groups/units involved: Bañobre
Action type: Research and Innovation Action (RIA)
Duration: 01/09/2023 – 31/08/2027

RadioSpin: Deep oscillatory neural networks computing and learning through the dynamics of rf neurons interconnected by rf spintronic synapses

Scientific manager: Ricardo Ferreira
Groups/units involved: R. Ferreira
Action type: RIA Research and Innovation action
Duration: 01/01/2021 – 31/10/2026

REMAP: REUsable MAsK Patterning

Scientific manager: Sascha Sadewasser
Groups/units involved: Electron Microscopy and X-Rays Facility, Micro and Nanofabrication Facility, Sadewasser, R. Ferreira, Piteira
Action type: EIC Grants
Duration: 01/03/2022 – 28/02/2026

SCIGLO: Science for Global Challenges

Scientific manager: Catarina Moura
Groups/units involved: CCM
Action type: Coordination and Support Action (CSA)
Duration: 23/05/2024 – 23/02/2026

SENSOPAD: Sensing ENdometriosis ON Portable Auxiliary Devices

Scientific manager: Lorena Diéguez
Groups/units involved: Diéguez
Action type: Research and Innovation action (RIA)
Duration: 01/09/2024 – 31/08/2028

SITA: Stable Inorganic Tandem solar cell with superior device efficiency and increased durability

Scientific manager: Sascha Sadewasser
Groups/units involved: Sadewasser, Salomé
Action type: Research and Innovation action (RIA)
Duration: 01/09/2022 – 31/08/2025

SPARK-e: Solid-state PCMs for Advanced energy Recovery and Key thermal control in electronics

Scientific manager: Clivia Sotomayor
Groups/units involved: Sotomayor
Action type: EIC Grants
Duration: 01/11/2025 – 31/10/2029

SpikePro: SPIKEPro Hop-On: Spiking Photonic-Electronic IC for Quick and Efficient Processing

Scientific manager: Bruno Romeira
Groups/units involved: Nider
Action type: EIC Grants
Duration: 01/03/2025 – 28/02/2028

SpinAge: Weighted Spintronic-Nano-Oscillator-based Neuromorphic Computing System Assisted by laser for Cognitive Computing

Scientific manager: Ricardo Ferreira
Groups/units involved: Nanoelectronics Engineering, R. Ferreira
Action type: RIA Research and Innovation action
Duration: 01/10/2020 – 30/06/2025

SpinCat: Spin-polarized Catalysts for Energy-Efficient AEM Water Electrolysis

Scientific manager: Yury Kolenko
Groups/units involved: Kolen'ko
Action type: RIA Research and Innovation action
Duration: 01/06/2021 – 31/05/2025

SUNLIFE: VerSatility of sUstainable, Low-cost chalcogenide thin-Films solar cells

Scientific manager: Sascha Sadewasser
Groups/units involved: Sadewasser
Action type: CET Partnership
Duration: 01/12/2024 – 30/11/2027

SWAN-on-chip: Low power spintronics wireless autonomous node (SWAN) integrated circuits developed via spintronics technology accelerator platform

Scientific manager: Alex Jenkins
Groups/units involved: R. Ferreira
Action type: Research and Innovation action (RIA)
Duration: 01/10/2022 – 30/09/2026

TEAPOTS: AgriculTurE wAste PyrOlysis and Thermocomposting for renewable energy in Sustainable agri-food sector

Scientific manager: Marco Martins
Groups/units involved: M. Martins
Action type: Innovation Action (IA)
Duration: 01/01/2024 – 31/12/2027

TEN4CARE: Tendon Engineering for Comprehensive Advanced Rehabilitation and Enhancement

Scientific manager: Manuel Bañobre
Groups/units involved: Bañobre
Action type: Innovation action (IA)
Duration: 01/09/2025 – 31/08/2029

TITAN: Transparency solutions for transforming the food system

Scientific manager: Andrey Ipatov
Groups/units involved: Food Quality and Safety
Action type: Innovation action (IA)
Duration: 01/09/2022 – 31/08/2026

TRANSMIT: Semi-transparent micro-striped thin-film photovoltaics for energy-harvesting windows

Scientific manager: Pedro Anacleto
Groups/units involved: Sadewasser
Action type: CET Partnership
Duration: 01/12/2023 – 30/11/2026

UPRISE: Unravelling ultrafine particulate matter and micro nano plastic's mechanisms of impact on fetal health

Scientific manager: Ernesto Alfaro-Moreno
Groups/units involved: Alfaro-Moreno
Action type: Research and Innovation Action (RIA)
Duration: 01/01/2025 – 31/12/2029

VERIQUB: Efficient Verification of Quantum computing architectures with Bosons

Scientific manager: Leonardo Novo
Groups/units involved: Novo
Action type: EIC Grants
Duration: 07/04/2025 – 31/08/2027

PT Programmes

2DM4EH: Energy harvesters based on engineered 2D materials

Scientific manager: Andrea Capasso
Groups/units involved: Alpuim
Action type: International Cooperation
Duration: 01/07/2022 – 30/06/2025

Agenda Microeletrónica

Scientific manager: Margaret Costa
Groups/units involved: Business and Strategic Relations
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2022 – 31/12/2025

Agenda Microeletrónica — 2.1 Advanced Packaging

Scientific manager: Margaret Costa
Groups/units involved: Business and Strategic Relations, Hanay, Micro and Nanofabrication Facility, Nieder
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2022 – 31/12/2025

APTAcoli: NAM-aptamers for blocking enterotoxins in pig colibacillosis

Scientific manager: Pablo Fucinos
Groups/units involved: Pastrana
Action type: SR&TD Projects in all scientific domains
Duration: 01/01/2022 – 30/09/2025

ATE: 12.02 — Development of an Advanced Digital Asset Management solution for the Energy Sector — Current and voltage meter system for transmission lines

Scientific manager: Hugo Oliveira
Groups/units involved: Hanay, Piteira
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2022 – 30/06/2026

ATE: 12.02 - Development of an Advanced Digital Asset Management solution for the Energy Sector — Dissolved mixed gas sensor in transformer's oil

Scientific manager: Hugo Oliveira
Groups/units involved: Piteira
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2022 – 30/06/2026

ATE: 14.01 Collaborative Lab Network for Energy Transition

Scientific manager: João B. Rodrigues
Groups/units involved: Business and Strategic Relations
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2022 – 30/06/2026

ATE: 6.04 Development of a new photovoltaic solar energy generation solution integrated into agricultural practices (Agri-PV)

Scientific manager: Alexander Eeles
Groups/units involved: Salomé
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2023 – 30/06/2026

ATE: 8.07 Adsorbents for CO2 capture in buildings (including photocatalyser)

Scientific manager: Juliana Sousa
Groups/units involved: Kolen'ko
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2022 – 30/06/2026

BE.Neutral — E1 WP2: Projeto de I&D+I: Conetividade de 2Rodas, Conetividade de 4Rodas, Conectividade para autocarros

Scientific manager: Filipe Alves
Groups/units involved: Hanay, Micro and Nanofabrication Facility, R. Ferreira
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2023 – 30/06/2026

BE.Neutral — Promoção e divulgação

Scientific manager: Ana Matos Silva
Groups/units involved: Business and Strategic Relations
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2022 – 30/06/2026

BInd: Bosonic indistinguishability as a resource for quantum technologies

Scientific manager: Leonardo Novo
Groups/units involved: Novo
Action type: PEX
Duration: 01/02/2025 – 31/07/2026

Bioeconomia Azul — Development of new tools for preventing widespread bivalves' contamination by harmful algal blooms

Scientific manager: Begonia Espiña
Groups/units involved: Espiña, M. Martins, Micro and Nanofabrication Facility
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/10/2022 – 30/06/2026

CEECINST/00062/2018

Scientific manager: Paulo Freitas
Groups/units involved: Business and Strategic Relations, Novo
Action type: Concurso Estímulo ao Emprego Científico
Duration: 01/03/2019 – 02/03/2026

Charm: Supported Covalent Organic Frameworks for the Monitoring of Pharmaceutical Pollutants

Scientific manager: Laura Salonen
Groups/units involved: Espiña, Kolen'ko
Action type: SR&TD Projects in all scientific domains
Duration: 01/01/2022 – 31/12/2025

CiNTech — WP1: Project Management

Scientific manager: Manuel Bañobre
Groups/units involved: Business and Strategic Relations
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2023 – 31/07/2026

CiNTech — WP3: Design and synthesis of new therapeutic entities (nucleic acids) and Research and Innovation (R&I) of novel lipid (LNPs) technological platforms

Scientific manager: Manuel Bañobre
Groups/units involved: Bañobre
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2023 – 31/12/2025

CiNTech — WP4: Development and scale-up of novel Lipid and/or Polymer -based nanoparticles for the delivery of therapeutic agents

Scientific manager: Manuel Bañobre
Groups/units involved: Bañobre
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2023 – 31/07/2026

DefCom2D: Defect engineering in quantum memristors for neuromorphic computing

Scientific manager: Andrea Capasso
Groups/units involved: Alpuim
Action type: PEx
Duration: 01/10/2025 – 30/09/2026

DIAMOND-CONNECT: Development of a Diamond Photonic Platform to assess connectivity in neuronal cell models

Scientific manager: Jana Nieder
Groups/units involved: Nieder
Action type: SR&TD Projects in all scientific domains
Duration: 01/03/2021 – 28/02/2025

DrivenPhonon4Me: Non-linear phononics: Manipulating the hidden quantum phases and dynamical multiferroicity

Scientific manager: Leonard Francis
Groups/units involved: P. Ferreira
Action type: SR&TD Projects in all scientific domains
Duration: 02/01/2023 – 28/02/2026

EAGER: pyroElectricAlly GeneRated electrons for chips-scale devices

Scientific manager: Filipe Alves
Groups/units involved: Hanay
Action type: PEx
Duration: 01/04/2024 – 30/06/2025

EMERALT: Emerging AgBiS2 photovoltaics

Scientific manager: Pedro Anacleto
Groups/units involved: Sadewasser
Action type: PEx
Duration: 01/01/2025 – 30/06/2026

GreenAuto — Develop superhydrophobic polymers and nanostructured materials for coating of metallic surfaces

Scientific manager: Juliana Sousa
Groups/units involved: Kolen'ko
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/07/2022 – 30/06/2026

GreenAuto — Development of new methods for silica extraction from rice husk residues (Green Silica)

Scientific manager: Juliana Sousa
Groups/units involved: Kolen'ko
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/07/2022 – 30/06/2026

GreenAuto — ENERTEX: Development of efficient photovoltaic cells (CIGS — Copper indium gallium selenide) on textile substrates

Scientific manager: Pedro Anacleto
Groups/units involved: Kolen'ko, Piteira, Sadewasser
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/05/2022 – 30/06/2026

GreenAuto — Quality control system for welding industrial processes

Scientific manager: Abdulsalam Muhrat
Groups/units involved: R. Ferreira
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/07/2022 – 30/06/2026

H2 Green Valley — 4.3: Hydrogen sensors' development for detection and security

Scientific manager: Denis Santos
Groups/units involved: Piteira
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2023 – 30/06/2026

HfPT — A1.01: New early oncology diagnostic tools using 'reagent-less' sensors and smart spectroscopy

Scientific manager: Jana Nieder
Groups/units involved: Nieder
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/11/2021 – 30/06/2026

HfPT — A1.3 Biosensors for intrapartum monitoring

Scientific manager: Raquel Queirós
Groups/units involved: Espiña, Piteira
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/11/2021 – 30/06/2026

HfPT — A2.1: Development of advanced topical and transdermal drug delivery systems

Scientific manager: Manuel Bañobre
Groups/units involved: Bañobre
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/11/2021 – 30/06/2026

HfPT — A3.1.4: Connected thermometer to identify otitis from the evaluation of tympanic membrane color variation

Scientific manager: Marco Martins
Groups/units involved: M. Martins
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/11/2021 – 30/06/2026

HfPT — A3.2.1: Textile devices for neuromuscular rehabilitation based on Electromyography and Electrostimulation

Scientific manager: Patrícia Sousa
Groups/units involved: Hanay, Micro and Nanofabrication Facility
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/11/2021 – 30/06/2026

HfPT — AlzERS: A1.2: Detection of Alzheimer's markers in blood samples

Scientific manager: Sara Abalde
Groups/units involved: Diéguez
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/11/2021 – 30/06/2026

HfPT — EVolving: A1.5: Extracellular vesicles with biomarkers for metabolic diseases and chronic inflammation associated diseases

Scientific manager: Lorena Diéguez
Groups/units involved: Diéguez
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/11/2021 – 30/06/2026

HfPT — IMPAct-L2: A1.4: Multiplex diagnostic and classification platform enabling personalized therapy in patients with acute myeloid leukemia

Scientific manager: Lorena Diéguez
Groups/units involved: Diéguez
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/11/2021 – 30/06/2026

HfPT — LBB: A1.7: Liquid biopsy unit

Scientific manager: Lorena Diéguez
Groups/units involved: Diéguez
Action type: Agendas Mobilizadoras para a Inovação
Empresarial
Duration: 01/11/2021 – 30/06/2026

IDfoods: Food System of The Future (Investigação e Desenvolvimento em Sistemas Agroalimentares Sustentáveis e Nutrição Saudável)

Scientific manager: Ana Isabel Bourbon
Groups/units involved: Pastrana
Action type: SI — Programas Mobilizadores
Duration: 02/01/2020 – 30/06/2026

ILLIANCE: Sensors for presence detection (INERGY)

Scientific manager: Marco Martins
Groups/units involved: M. Martins
Action type: Agendas Mobilizadoras para a Inovação
Empresarial
Duration: 01/10/2021 – 30/06/2026

IngredientIA — Ingredients, microbiome, and digestion models for health through the application of Artificial Intelligence

Scientific manager: Catarina Gonçalves
Groups/units involved: Pastrana
Action type: I&D Empresarial — Operações em Copromoção
Duration: 01/10/2025 – 30/09/2028

InsectERA — In2Market: Promotion

Scientific manager: Lorenzo Pastrana
Groups/units involved: Pastrana
Action type: Agendas Mobilizadoras para a Inovação
Empresarial
Duration: 01/01/2023 – 31/12/2025

InsectERA - InFood: Use of insects as an alternative nutritional source in innovative food products

Scientific manager: Lorenzo Pastrana
Groups/units involved: Pastrana
Action type: Agendas Mobilizadoras para a Inovação
Empresarial
Duration: 01/01/2023 – 31/12/2025

KaleidosQope: Contextual partial views: a logical foundation for quantum computational advantage

Scientific manager: Rui Soares Barbosa
Groups/units involved: Novo
Action type: PEx
Duration: 16/02/2025 – 15/08/2026

LightSensorAI

Scientific manager: Bruno Romeira
Groups/units involved: Nieder
Action type: ERC PT
Duration: 14/03/2025 – 13/03/2026

LIL4NOEMS: Laser Interference Lithography setup for NOEMS and diffractive optics fabrication

Scientific manager: Diogo Aguiam
Groups/units involved: Hanay
Action type: PEx
Duration: 03/02/2025 – 02/08/2026

M2N — ALK: #2 Development of ALK electrolysers

Scientific manager: Yury Kolenko
Groups/units involved: Electron Microscopy and X-Rays Facility, Kolen'ko, P. Ferreira, Sadewasser
Action type: Agendas Mobilizadoras para a Inovação
Empresarial
Duration: 01/01/2023 – 30/06/2026

M2N — PEM: #1 Development of PEM electrolysers

Scientific manager: Yury Kolenko
Groups/units involved: Electron Microscopy and X-Rays Facility, Kolen'ko, P. Ferreira, Sadewasser
Action type: Agendas Mobilizadoras para a Inovação
Empresarial
Duration: 01/01/2023-30/06/2026

META-LED: META-learning in neurosynaptic nanoscale memristor-LEDs for brain-inspired photonic artificial intelligence

Scientific manager: Bruno Romeira
Groups/units involved: M. Martins, Micro and Nanofabrication Facility, Nieder, Piteira
Action type: SR&TD Projects in all scientific domains
Duration: 01/03/2023 – 28/02/2027

MSenOoC: Multiorgan-on-a-chip device integrated with multi(bio)sensors

Scientific manager: Patrícia Sousa
Groups/units involved: Hanay
Action type: SR&TD Projects in all scientific domains
Duration: 17/01/2022 – 31/12/2025

NASCADIA: Biotechnology of photonic microalgae for bio-based nanodevices

Scientific manager: Laura Rodriguez-Lorenzo
Groups/units involved: Natural and Artificial Photonic Structures and Devices
Action type: SR&TD Projects in all scientific domains
Duration: 01/07/2022 – 16/11/2025

NEUROMOR4µLed: Neuromorphic computing chip for a neuron array based on µLEDs

Scientific manager: Accel Abarca
Groups/units involved: Piteira
Action type: PEx
Duration: 01/02/2025 – 31/10/2026

NGS — BP11: Stationary batteries for renewable energy self-consumption of small-to-medium size facilities

Scientific manager: Marco Martins
Groups/units involved: M. Martins
Action type: Agendas Mobilizadoras para a Inovação
Empresarial
Duration: 01/01/2022 – 30/06/2026

NGS — BP15: BAtteries as the key elements in virtual power plants

Scientific manager: Pedro Salomé
Groups/units involved: M. Martins, Salomé
Action type: Agendas Mobilizadoras para a Inovação
Empresarial
Duration: 01/01/2022 – 30/06/2026

NGS — BP18: End-of-life assessment and diagnosis, 2nd life and recycling pilot line

Scientific manager: Pedro Salomé
Groups/units involved: Salomé
Action type: Agendas Mobilizadoras para a Inovação
Empresarial
Duration: 01/01/2022 – 30/06/2026

NGS — BP1: Sustainable refinery

Scientific manager: Juliana Sousa
Groups/units involved: Kolen'ko
Action type: Agendas Mobilizadoras para a Inovação
Empresarial
Duration: 01/01/2022 – 31/12/2025

NGS — BP20: Technological platform

Scientific manager: Mariana Fernandes
Groups/units involved: Business and Strategic Relations, Salomé
Action type: Agendas Mobilizadoras para a Inovação
Empresarial
Duration: 22/11/2022 – 30/06/2026

NGS — BP21: NGS dissemination

Scientific manager: Mariana Fernandes
Groups/units involved: Business and Strategic Relations, Salomé
Action type: Agendas Mobilizadoras para a Inovação
Empresarial
Duration: 22/11/2022 – 30/06/2026

NGS — BP22: Gestão técnica

Scientific manager: Mariana Fernandes
Groups/units involved: Business and Strategic Relations, Salomé
Action type: Agendas Mobilizadoras para a Inovação
Empresarial
Duration: 10/05/2023 – 30/06/2026

NGS — BP23: LI regeneration cycle

Scientific manager: Juliana Sousa
Groups/units involved: Kolen'ko, Micro and Nanofabrication Facility, P. Ferreira
Action type: Agendas Mobilizadoras para a Inovação
Empresarial
Duration: 01/01/2022 – 30/06/2026

NGS — BP24: Battery cathode recycling

Scientific manager: Juliana Sousa
Groups/units involved: Kolen'ko, P. Ferreira
Action type: Agendas Mobilizadoras para a Inovação
Empresarial
Duration: 01/01/2022 – 31/12/2025

NGS — BP25: Lithium-based compounds for battery components

Scientific manager: Miguel Munoz
Groups/units involved: P. Ferreira, Muñoz
Action type: Agendas Mobilizadoras para a Inovação
Empresarial
Duration: 01/01/2022 – 30/06/2026

NGS — BP2: Monitoring and modelling for sustainable lithium refining

Scientific manager: Raquel Queirós
Groups/units involved: Espiña, Piteira
Action type: Agendas Mobilizadoras para a Inovação
Empresarial
Duration: 01/01/2022 – 30/06/2026

NGS — BP3: Valorization and prospecting
Scientific manager: Juliana Sousa
Groups/units involved: Kolen'ko
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2022 – 30/06/2026

NGS — BP4: Production of flexible cells and cellulose-based components
Scientific manager: Leonard Francis
Groups/units involved: P. Ferreira
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2022 – 30/06/2026

NGS — BP5: Production of sodium-ion based structural batteries
Scientific manager: Miguel Munoz
Groups/units involved: P. Ferreira, Muñoz
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2022 – 30/06/2026

NGS — BP6: Solid state thin film batteries
Scientific manager: Sascha Sadewasser
Groups/units involved: P. Ferreira, Piteira, Sadewasser, Salomé
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2022 – 30/06/2026

NGS — BP7: Development of a powerpack case (battery with embedded power electronics) aiming for its thermal management and weight reduction
Scientific manager: Marco Martins
Groups/units involved: M. Martins
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2022 – 30/06/2026

Norte em Movimento: Norte em Movimento — Rumo à Sustentabilidade Energética | Impulsionar a mobilidade sustentável e a transição energética para um futuro mais verde e inovador no Norte de Portugal
Scientific manager: Ana C. Martins
Groups/units involved: Business and Strategic Relations Office
Action type: Dinamização de Plataformas Regionais para a Especialização Inteligente
Duration: 01/04/2025 – 31/03/2028

PRODUTECH R3 — Tech4Decarb — Sensors for characterisation of NG+H2 mixtures
Scientific manager: Roberto Laranjeira
Groups/units involved: Piteira
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2022 – 30/06/2026

PRODUTECH R3: Tech4Decarb — Sensors for the characterisation of industrial gas effluents
Scientific manager: Rosana Dias
Groups/units involved: Hanay
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/07/2023 – 30/06/2026

QUEST2D: Excitations in 2D Materials
Scientific manager: Joaquín Fernández-Rossier
Groups/units involved: Rossier
Action type: SR&TD Projects in all scientific domains
Duration: 01/01/2022 – 30/09/2025

R2U — Task 2.1.11 — Dissemination of R&D results
Scientific manager: Jennifer Teixeira
Groups/units involved: Business and Strategic Relations
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2023 – 30/06/2026

R2U — Task 2.1.5 – Structural Steel
Scientific manager: Enrique Carbo
Groups/units involved: Electron Microscopy and X-Rays Facility, Micro and Nanofabrication Facility
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2023 – 30/06/2026

R2U — Task 2.1.8 — High performance glass
Scientific manager: Jennifer Teixeira
Groups/units involved: Salomé
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2023 – 30/06/2026

R2U — Task 3.1.10 — Energy Generation (BIPV)
Scientific manager: Jennifer Teixeira
Groups/units involved: Salomé
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2023-30/06/2026

R2U — Task 3.1.14 — Dissemination of R&D results
Scientific manager: Jennifer Teixeira
Groups/units involved: Business and Strategic Relations
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 22/01/2023 – 30/06/2026

R2U — Task 3.1.2 — Minimal window frame systems
Scientific manager: Enrique Carbo
Groups/units involved: Electron Microscopy and X-Rays Facility, Micro and Nanofabrication Facility
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 22/11/2022 – 30/06/2026

R2U — Task 3.1.3 — Variable geometry panels
Scientific manager: Daniel Rocha
Groups/units involved: M. Martins, Salomé
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2023 – 30/06/2026

R2U — Task 3.1.6: Ceramic bathroom solutions
Scientific manager: Marco Martins
Groups/units involved: M. Martins
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2023 – 30/06/2026

R2U — Task 3.1.7: Climatization / HVAC
Scientific manager: Juliana Sousa
Groups/units involved: Kolen'ko
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2023 – 30/06/2026

R2U — Task 5.1.3: Smart Modular Building
Scientific manager: Marco Martins
Groups/units involved: Hanay, M. Martins, Piteira
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2023 – 30/06/2026

R2U — Task 5.1.6 — Dissemination of R&D results
Scientific manager: Jennifer Teixeira
Groups/units involved: Business and Strategic Relations
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 22/11/2022 – 30/06/2026

SCALPEL: Understanding nanoscale properties of chalcogenide perovskite for emerging climate neutral photovoltaics
Scientific manager: Sascha Sadewasser
Groups/units involved: Sadewasser
Action type: International Cooperation
Duration: 11/11/2025 – 10/11/2026

Sensitive Industry
Scientific manager: Diogo Aguiam
Groups/units involved: Hanay
Action type: SI — Programas Mobilizadores
Duration: 01/06/2023 – 31/12/2025

SHanay ERC-PT
Scientific manager: Selim Hanay
Groups/units involved: Hanay
Action type: ERC PT
Duration: 17/04/2025 – 31/12/2026

Smartagnostics — PPS1 — Lab-on-a-chip device for bacteria and AMR genes detection
Scientific manager: Carla Carvalho
Groups/units involved: Alpuim, Food Quality and Safety, Micro and Nanofabrication Facility, Piteira
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2023 – 30/06/2026

SMARTgNOSTICS — PPS2: Artificial nose — device for bacterial detection and ID in the environment
Scientific manager: Pieter De Beule
Groups/units involved: Diéguez, Micro and Nanofabrication Facility
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2023 – 30/06/2026

SMARTgNOSTICS — PPS3: Portable SERS platform for antibiotic residues detection
Scientific manager: Laura Rodríguez-Lorenzo
Groups/units involved: Espiña
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2023 – 30/06/2026

SMARTgNOSTICS — WP 15: Demonstration and Valorization of R&D results
Scientific manager: Mariana Fernandes
Groups/units involved: Business and Strategic Relations
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 22/11/2022 – 30/06/2026

SMARTgNOSTICS — WP14: Marketing and Production Strategy
Scientific manager: Mariana Fernandes
Groups/units involved: Business and Strategic Relations
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/01/2023 – 30/06/2026

SmartPack: Smart & Eco-efficient Flexible Films
Scientific manager: Miguel Cerqueira
Groups/units involved: Diéguez, Pastrana, Kolen'ko, Piteira
Action type: SI — Programas Mobilizadores
Duration: 01/09/2024 – 28/02/2027

UnTAM: Unleashing tumour associated macrophages to win the fight against cancer
Scientific manager: Juan Gallo
Groups/units involved: Bañobre
Action type: SR&TD Projects in all scientific domains
Duration: 01/01/2022 – 31/12/2025

uPGRADE-next — Miniaturized Prototype for a Gravity field assessment using Distributed Earth-orbiting assets — payload and software engineering, testing, launch and operations
Scientific manager: Filipe Alves
Groups/units involved: Hanay
Action type: I&D Empresarial — Operações em Copromocção
Duration: 01/03/2025 – 30/06/2027

VIIAFOOD — A1.9: Development of healthier and sustainable food products
Scientific manager: Miguel Cerqueira
Groups/units involved: Pastrana
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/07/2022 – 31/12/2026

VIIAFOOD — A5.1: Innovative and sustainable solutions for food packaging
Scientific manager: Miguel Cerqueira
Groups/units involved: Hanay, Pastrana
Action type: Agendas Mobilizadoras para a Inovação Empresarial
Duration: 01/07/2022 – 31/12/2026

Wi-Pi: Wireless platform of abiotic nanoactuators to probe PIEZO receptors mechanobiology
Scientific manager: Rui Domingues
Groups/units involved: Domingues
Action type: SR&TD Projects in all scientific domains
Duration: 01/05/2025 – 28/02/2027

Foundations and Associations

Diamond4Brain: Diamond Photonics Platforms for Synaptic Connectivity Assessment in Healthy and Parkinson Disease Neuronal Models
Scientific manager: Jana Nieder
Groups/units involved: Nieder
Action type: La Caixa Health
Duration: 01/12/2020 – 30/06/2025

NeuralGRAB: Graphene aptasensor bioelectronics: a neural interface for neurotransmission probing in neurological disorders
Scientific manager: Pedro Alpuim
Groups/units involved: Alpuim
Action type: La Caixa Health
Duration: 15/11/2021 – 14/11/2025

PiMag: Bottom-up design and exploration of π -electron quantum magnetism
Scientific manager: Joaquín Fernández-Rossier
Groups/units involved: Rossier
Action type: Swiss national science foundation
Duration: 01/04/2022 – 31/03/2026

PROMISE: BioPrinted hydROgel MicrofluidicS to mimic patient-specific tumor mEtastatic microenvironment
Scientific manager: Lorena Diéguez
Groups/units involved: Diéguez
Action type: La Caixa Health
Duration: 01/12/2020 – 31/05/2025

WINGS: Wireless Neural Guidance Device for Spinal Cord Injury Repair
Scientific manager: Alar Ainla
Groups/units involved: Diéguez
Action type: La Caixa Health
Duration: 01/12/2023 – 30/11/2026

Others

AnkaTheraHub: Technical Assistance for the Ankara Innovative Theranostics Development Center Scientific manager: Paula Galvão Groups/units involved: Business and Strategic Relations Office Action type: Tender Duration: 18/07/2024 – 18/07/2026	Net4Food: Net4Food: Red de Investigación e innovación para el sector alimentario en la región transfronteriza Scientific manager: Lorenzo Pastrana Groups/units involved: Pastrana Action type: POCTEP Duration: 01/04/2023 – 31/12/2025
IBEROSmais: Instituto de biofabricación en red para el envejecimiento saludable Scientific manager: Lorena Diéguez Groups/units involved: Pastrana, Diéguez, Bañobre Action type: POCTEP Duration: 01/07/2023 – 30/06/2026	Preclinical Evaluation of Phage Therapy: Preclinical Evaluation of Phage Therapy for Treatment of Bacterial Keratitis Scientific manager: Sanna Sillankorva Groups/units involved: Bañobre Action type: RPB International Research Collaboration Award Duration: 01/10/2023 – 31/12/2025
MUSICIAN: Multifunctional Silicon Integrated NOEMS for broadband Access Networks Scientific manager: Clivia Sotomayor Groups/units involved: Sotomayor Action type: CHIST-ERA Duration: 15/09/2023 – 31/12/2025	

Theses

This appendix lists the PhD and MSc theses successfully completed in 2025 under INL supervision or co-supervision.

PhD

Beatriz Costa Development of Three-Dimensional Diamond Photonic Platforms for Neuronal Research University of Vigo INL supervisors: Jana Nieder	António Oliveira Light management and passivation strategies in chalcogenide thin film technologies University of Aveiro INL supervisors: Pedro Salomé
Bejoys Jacob Nanophotonic resonant tunnelling devices for neuromorphic computing applications University Charles III of Madrid INL supervisors: Bruno Romeira	Michael de Oliveira The interplay between quantum foundations and circuit complexity Doctoral Program in Computer Science of the Universities of Minho, Aveiro, and Porto (MAPi) INL supervisors: Ernesto F. Galvão, Luís S. Barbosa
André Sequeira Quantum Reinforcement Learning: Foundations, algorithms, applications Doctoral Program in Computer Science of the Universities of Minho, Aveiro, and Porto (MAPi) INL supervisors: Luis Paulo Santos	Pedro Cruz Quantum circuit design, discovery and optimization from theory to practice University of Porto INL supervisors: J. Fernández-Rossier
André Violas Novel rear architectures for ultrathin and bifacial CIGS-based solar cells University of Aveiro INL supervisors: Pedro Salomé	

Rafael Wagner
Coherence and contextuality as quantum resources
Doctoral Program in Computer Science of the
Universities of Minho, Aveiro, and Porto (MAP)
INL supervisors: Ernesto F. Galvão, Rui Soares
Barbosa, Mikhail Vasilievskiy

Raman Choudhary
Classical, quantum, and post-quantum aspects of
Kochen-Specker contextuality scenarios
Doctoral Program in Computer Science of the
Universities of Minho, Aveiro, and Porto (MAP)
INL supervisors: Rui Soares Barbosa, Luís Paulo
Santos

Yelko del Castillo
Theory of ESR-STM as a probe of surface-spin
quantum magnetism
University of Minho
INL supervisors: J. Fernández-Rossier

MSc

Ana Rodrigues
Surface-Enhanced Raman Scattering (SERS)
metabolomics profiling of breast cancer cells
University of Minho
INL supervisors: Alexandra Teixeira

André Sá e Silva
Fine-tuning of a selenization process to develop
Cu(In,Ga)Se2 thin film solar cells
University of Minho
INL supervisors: Pedro Anacleto

Andreia Antunes Oliveira
Zn1-xSnxOy films by chemical bath deposition as
buffer layers for thin-film solar cells
University of Minho
INL supervisors: Sascha Sadewasser; Diego Garzón

Clara Pinto
Characterisation of flexible CIGS solar cells for
performance assessment and quality control
University of Minho
INL supervisors: Vítor Lopes

Daniel António Coelho de Sousa
Exploring novel electronic devices based on
topological insulators
University of Minho
INL supervisors: Carlos Rosario

Delsy Salinas
Antitumor activity of PMC79 in colorectal cancer 3D
models and vascularized colorectal cancer-on-a-
chip systems
University of Minho
INL supervisors: Miguel Xavier

Diogo Ventura
Molecular excitonic materials for photonic
applications
University of Minho
INL supervisors: Martin López-García

Gonçalo Lopes
Interconnects for heterogenous integration
University of Minho
INL supervisors: Kevin Oliveira

Inês Gonçalves
Characterization of Color Centers in Diamond for
Quantum Sensing
Instituto Superior Técnico, University of Lisbon
INL supervisors: Jana Nieder

Inês Peixoto Ferreira
Nanoscale study on the role of Zn1-XSnXOY (ZTO)
buffer layers on the CIGSe thin film solar cells
performance
University of Minho
INL supervisors: Nicoleta Nicoara

Isabel Silva
Comprehensive analysis of associated by-products
derived from recycled electric vehicle batteries
University of Minho
INL supervisors: Jennifer Teixeira

Joao Leote
Development of photochromic 3D microstructures
using two-photon polymerization on Naphthopyran-
sensitized PETA polymer
University of Minho
INL supervisors: Jana Nieder

José Miguel Silva
Colorectal Cells Under Varying Exosome
Conditions: Exploring Short-Chain Fatty Acid
Mediated Protection Against Fungicides using
Microfluidic Isolation of Extracellular DNA
University of Minho
INL supervisors: Carlos Honrado

Juliana Demasi de Aguiar Thomaz
Covalent organic frameworks-based electrochemical
sensors for Microcystin-LR detection
University of Minho
INL supervisors: Marília Santos; Begoña Espiña

Leonor Losa
Imaging Cellular Response to Anticancer Drug
Treatment Using 3D Phase Holotomographic
Microscopy
University of Coimbra
INL supervisors: Jana Nieder; Temple Douglas

Leonor Sousa
Development of a Raman-based droplet sorter
NOVA University of Lisbon
INL supervisors: Sergio Quintero

Lia Santos
Characterization of the Therapeutic Response of Lung Cancer Cells using Label-free Multiphoton Fluorescence Lifetime Imaging Microscopy
University of Minho
INL supervisors: Christian Maibohm

Mafalda Pinto Couto
Time of arrival measurement
University of Minho
INL supervisors: Luis Paulo Santos

Mariana Teixeira
Instrumentation for Optical Interferometry-based Nanometer Displacement Sensing for MEMS Devices
Instituto Superior Técnico, University of Lisbon
INL supervisors: Diogo Aguiam

Morgana Ferreira
Machine learning approaches for a novel type of biomedical imaging microscopy technique
University of Minho
INL supervisors: Jana Nieder

Oriando Cunha
Pulsed optically detected magnetic resonance (ODMR) protocols and experiments for advanced magnetic field characterization using Nitrogen-vacancies in diamond for the characterization of smart magnetic materials
University of Minho
INL supervisors: Jana Nieder

Ricardo da Silva Magalhães
Semi-transparent Cu(In,Ga)Se₂ Solar Cells for agricultural-integrated photovoltaics applications
University of Minho
INL supervisors: Sascha Sadewasser

Rita Matos
Development of a microfluidic device and EG-GFETs for the isolation and detection of ctDNA
University of Aveiro
INL supervisors: Miguel Xavier

Tiago Alves
Design and fabrication of 3D optical interconnects for neuromorphic photonics platforms
University of Minho
INL supervisors: Jana Nieder

INL Annual Report 2025

Design

Margarida Ferreira Silva

Coordination & Content Production

INL — International Iberian
Nanotechnology Laboratory

This comprehensive report would not have been possible without the support and contributions of many colleagues at INL. We sincerely appreciate the dedication and commitment of all involved.

