Report

2024

IFOM

Report 2024

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IFOM

It is with great pleasure that we present the IFOM 2024 Report, a document that reflects our Institute's ongoing and collective commitment to advancing cutting-edge oncology research for the benefit of the wider community.

In 2024, IFOM further consolidated its role as a leading institution in the biomedical research landscape, both nationally and internationally. This recognition stems not only from the excellence of our scientific outputs but also from our ability to attract and nurture talent, foster innovation, and establish strategic collaborations. The IFOM community, which at present includes over 340 individuals from 29 countries, represents a model of interdisciplinary, multicultural, and highly specialized scientific excellence.

In close partnership with our founder and strategic supporter, The AIRC Foundation, we continued to implement the Athena Strategic Plan in 2024. This plan is guiding IFOM's transformation into a hub for translational research and biotechnological innovation. A key milestone in this journey was the inaugural AIRC-IFOM Joint Meeting, fostering scientific and institutional dialogue to strengthen our shared vision and coordination.

This past year, IFOM expanded its scientific scope by integrating new research programs and launching advanced technological platforms aligned with Athena's strategic vision. In parallel, we consolidated the Physician Scientist Program, which is designed to train clinician-researchers who combine medical and scientific expertise to improve patient outcomes through translational research.

In addition to our scientific achievements, 2024 marked significant progress in our commitment to social responsibility. IFOM was awarded Gender Equality Certification, a testament to our concrete, structural commitment to equity, inclusion, and individual well-being. This effort was further recognized with a Special Mention for Best Practices in Equality from the Lombardy Region, affirming our dedication to making diversity a core value of our Institute.

The 2024 Report reflects our journey, where vision meets action, and our commitment to science that supports a growing community and research that creates shared value.

I extend my heartfelt thanks to AIRC for its continued support, to our partners and stakeholders, and to everyone who brings the IFOM mission to life with dedication and passion. Together, we are forging a path of excellence, responsibility, and social impact.

Giovanni Azzone
IFOM Chairman

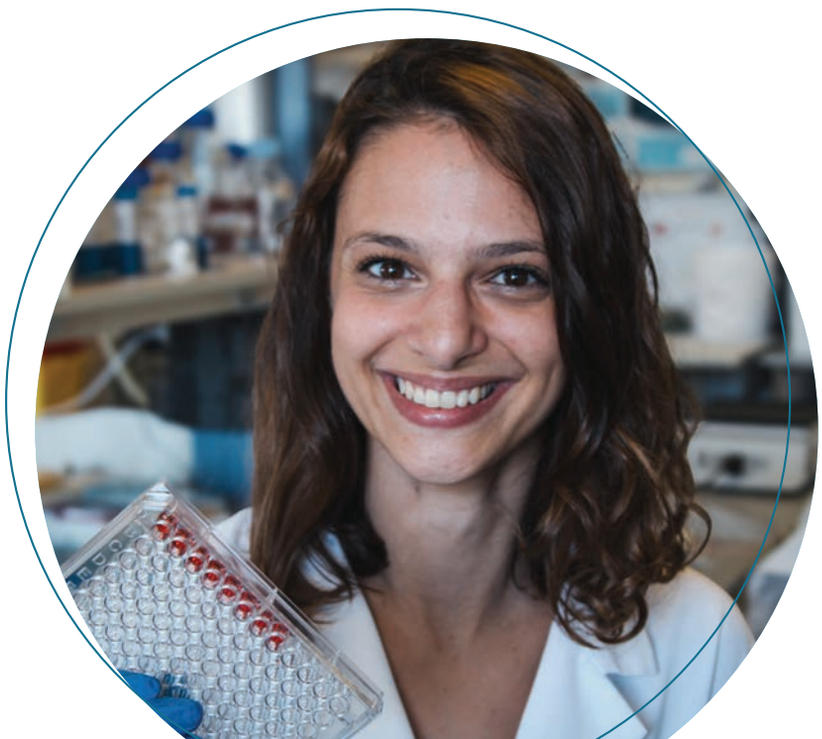
2. IFOM identity: history, mission and governance

Founded in 1998 from a visionary idea of The AIRC Foundation, IFOM, the AIRC Institute of Molecular Oncology represents a unique force in the field of cancer research.
IFOM's mission? Fighting cancer through research, a guiding principle that shapes every initiative and action we undertake.
At IFOM, cutting-edge technology meets scientific curiosity, creating an incubator of knowledge. In our laboratories, international scientists, driven by talent and passion, focus on understanding the molecular mechanisms behind cancer. From DNA repair and chromosome replication to metabolism and organoid development, every scientific question is approached with both rigor and innovation, with a clear goal in mind: improving human health.

> "It is a true privilege to witness the next generation of IFOM cancer scientists developing innovative projects to unlock the cancer code, using technologies that were unimaginable just a few years ago."

Alberto Bardelli
Scientific Director of IFOM and Full Professor at the University of Turin

IFOM's scientific journey began in the early 2000s with a deep dive into the cellular processes that drive tumor formation, with particular attention to the mechanism of cancer initiation and DNA repair.
With the launch of the Athena Strategic Plan in 2023, IFOM has continued to expand its scope toward translational cancer research. This includes advancing into fields such as molecular mechanism of metastasis, diagnostics and pharmacogenomics and initiating international collaborations for cutting-edge clinical trials.
IFOM is distinguished by its adoption of pioneering experimental approaches, including mechanobiology, 3D tumor tissue modelling, digital pathology, genomics, liquid biopsy, and artificial intelligence applied to oncology. These innovative tools enable us to explore the frontiers of cancer research, always striving for excellence and transformative impact.



IFOM in numbers

348 Total personnel

80% Research staff

20% Research support staff

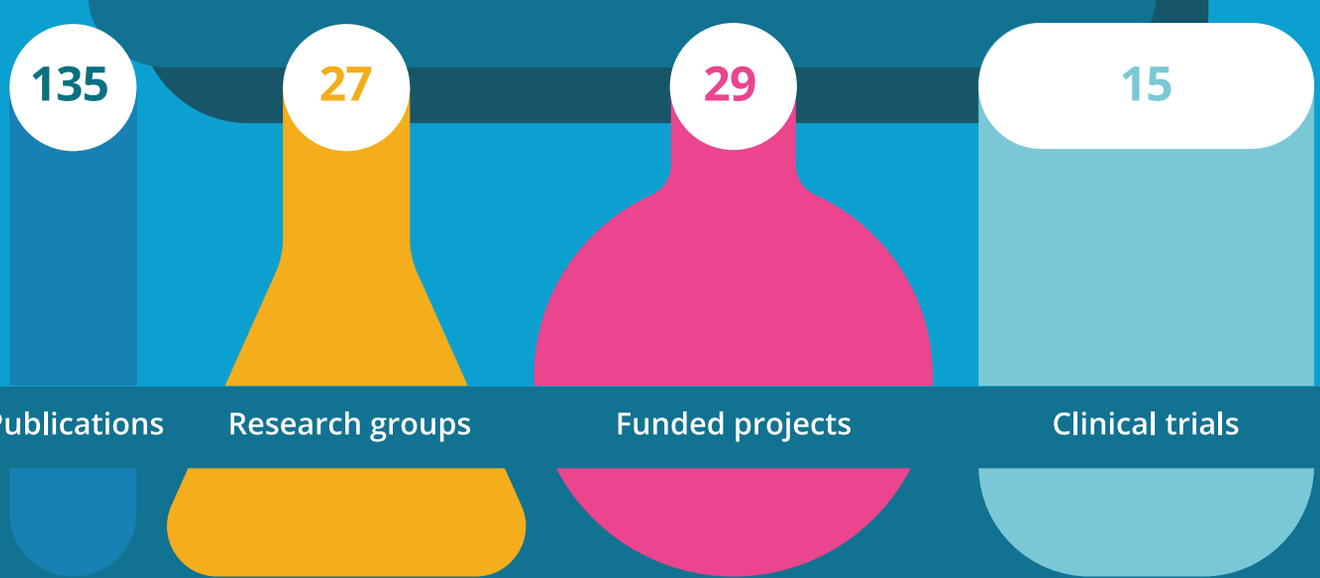
75%
Italian researchers

25%
International researchers

55%
Female researchers

45%
Male researchers

- **17%** Researchers returned from abroad
- **29** Countries



IFOM in numbers (Data updated to 2024, except for the research groups, updated to 2025)

The strategic link between IFOM and The AIRC Foundation

IFOM was founded in 1998 at the initiative of the AIRC Foundation, with the goal of creating a centre of excellence dedicated to studying the molecular mechanisms involved in the onset and progression of cancer.

Since late 2003, IFOM has operated as a private-law foundation with its own autonomous statute, while maintaining a structured and strategic relationship with AIRC, its primary financial and scientific partner.
From the very beginning, IFOM has benefited from AIRC's support, providing the resources necessary to implement its development plan. AIRC directly funds cancer research activities conducted within IFOM's facilities, home to world-class scientific expertise and advanced technological infrastructure.

AIRC's support is formalized through an annual grant, as outlined in its regulations. This grant sustains IFOM's strategic plan by such operational research costs, including scientific personnel, materials, and core technical equipment. It also supports overhead expenses and the launch of new, high-potential research lines with strong innovation prospects.
This close partnership is also reflected in governance: AIRC appoints representatives to IFOM's Board of Directors, the Scientific Director and the General Director actively shaping the Institute's strategic direction.
The partnership between IFOM and AIRC is continuous and synergistic, further reinforced by Athena 2023–2027 five-year strategic plan, which aims to significantly expand the Institute's research activities with a strong focus on translational cancer medicine.

1998 Foundation established by AIRC on the proposal of Professor Giuseppe Della Porta

2000 Launch of the scientific program and establishment of the first laboratories
Recognition as a "Center of Excellence" by the Lombardy Region

2001 Appointment of the first scientific director, Professor Pier Paolo Di Fiore
Establishment of the European School of Molecular Medicine

2005 Establishment of Cogentech
Creation of the Cancer Genetic Testing Laboratory

2007 Establishment of Lab G for pregnant and postpartum researchers
Creation of additional research units at the IFOM site and creation of a Campus

2008 First ERC funding

2009 Appointment of the second scientific director, Professor Marco Foiani

2010 International expansion
Establishment of the first International Scientific Advisory Board led by Professor Tomas Lindahl

IFOM Governance

IFOM is a non-profit research foundation that places science and people at the heart of its mission. The Institute's governance reflects these core values, being guided by responsibility, transparency, and participation. IFOM's governing bodies ensure alignment between mission, strategic vision, and daily operations, with the ultimate goal of advancing excellence in cancer research for the benefit of society.

The Board of Directors

Giovanni Azzone
IFOM Chairman

Alberto Bardelli
Scientific Director

Enrico De Santis
General Manager

Irene Bozzoni
Member

Alessandra della Porta
Vice President

Andrea Sironi
Member

Gianvincenzo Zuccotti
Member

2011 Life-Work Reconciliation Award by the Lombardy Region for IFOM's welfare plan

2012 IFOM President Giuseppe Della Porta receives the City of Milan Civic Merit Award

2014 Launch of the joint PhD program with the Open University

2015 Nobel Prize in chemistry awarded to Professor Tomas Lindahl, President of IFOM's Scientific Advisory Board

2016 AIFA approval of IFOM's first clinical study

2019 Launch of the genomics laboratory and development of Liquid Biopsy program at the Cogentech location in Catania

2022 Appointment of the third scientific director, Professor Alberto Bardelli

2023 Launch of the Athena Strategic Plan
Establishment of the second Scientific Advisory Board, led by Professor Caroline Dive
Launch of the Physician Scientist program

2024 Launch of Sagittarius, the first EU-funded clinical study coordinated by IFOM
Gender equality certification
Special award from the Lombardy region "Female Empowerment and Well-being"

3. IFOM's laboratories: cancer research from different perspectives

The research laboratories at IFOM focus on studying and identifying the mechanisms that drive the transformation of normal cells into cancerous ones, as well as the processes underlying tumor development and progression.
Since the launch of IFOM's scientific program, more than 50 research groups have contributed to advancing the frontiers of molecular oncology. These laboratories, located at IFOM's Milan headquarters or hosted within partner institutions across Italy and abroad, are led by scientists from diverse national and academic backgrounds. This diversity fosters a strong interdisciplinary approach, spanning fields from biology and medicine to bioinformatics, physics, engineering, mathematics and artificial intelligence.
In 2024, IFOM's research activities were carried out by a team of 28 Principal Investigators (PIs), each working on complementary fronts of cancer research. Of these, 25% have international origin, while among the Italian scientists, 73% returned to Italy after significant research experience abroad.

"The environment at IFOM is exceptionally collaborative: an amazing space to discuss, science, exchange ideas, and open up new ways of thinking. Within this supportive and vibrant community, I am confident we can make important contributions to cancer research."

Marta Kovatcheva
Principal Investigator,
Laboratory of Cell Plasticity & Aging from 2024

In line with its educational mission, IFOM has consistently fostered a strong synergy between research excellence and advanced training. Through close inter-institutional partnerships with leading academic institutions and their essential support for university research positions, most IFOM group leaders not only direct research laboratories but also play a key educational role within the academic system bridging the gap between the lab bench and the lecture hall, and bringing the Institute's experimental expertise into university classrooms.

As of 2024, 15 IFOM group leaders representing 54% of the total, hold faculty positions at major national universities, including the Universities of Milan, Padua, Palermo, Turin, and Trieste, as well as Bocconi University. Additionally, appointments are held at international institutions such as the University of Southern California and Kyoto University.
Equally strategic is IFOM's collaboration with the National Research Council of Italy (CNR): four group leaders carry out their scientific work as CNR Research Directors. This partnership establishes a productive interface between the excellence of Italian public research and the innovation-driven environment of the Milan-based institute. It also entails financial support from CNR for these positions, serving as a concrete example of how public-private collaboration can amplify both scientific and educational impact, while ensuring the continuity and stability required for long-term research initiatives.

The international Scientific Advisory Board (SAB)

To guarantee the excellence of research at IFOM, an International Scientific Advisory Board has been in place since 2010, whose president is appointed by the IFOM Board of Directors and proposed by the Scientific Director. The Committee's role is to provide support to the Scientific Director in directing research development strategies, in periodically reviewing all scientific activities, collaborating in the selection of new PIs and in evaluating their career paths. The International Scientific Committee carries out its role according to an international model of research evaluation, based on the criteria of originality of research and contribution to the scientific advancement in its field of reference.
The careers of IFOM's research directors follow the internationally recognized tenure-track model, with regular evaluations conducted by the SAB. This structured approach ensures both scientific excellence and transparency in career development.

Caroline Dive, President
Cancer Research UK,
Manchester Institute

Keith Caldecott
University of Sussex
(UK)

Julian Downward
Crick Institute
(UK)

Giulio Draetta
MD Anderson
Cancer Center (USA)

Gillian Griffiths
University of Cambridge (UK)

Jan Hoeijmakers
Erasmus MC (NL)

Benoit Ladoux
CNRS (FR)

Nuria Lopez Bigas
Institute for Research in
Biomedicine-IRB (ES)

Patricia Lo Russo
Yale School of Medicine
(USA)

Manuel Salto-Tellez
The Institute of Cancer
Research-ICR (UK)

Andreas Trumpp
HI-STEM (DE)

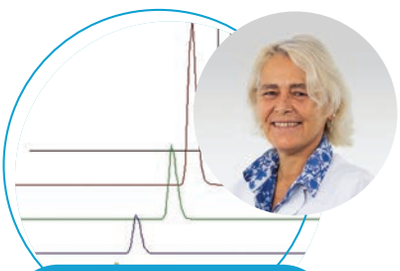
Matthew Vander
Heiden Koch Insti-
tute (UK)

"As Chair of the International Scientific Advisory Board of IFOM for the past 2 years, it has been a pleasure to witness the extraordinary and ongoing revolution that has delivered truly exciting cancer research from bench to bedside, tackling challenging aspects of tumour evolution and heterogeneity that incorporates the tumour and host. The inclusive research culture at IFOM is exhilarating with new initiatives, new recruitment and enabling operational processes supporting the ambitious Athena Plan and ensuring even more impressive achievements to come."

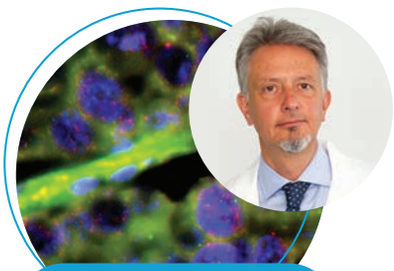
Caroline Dive
Chair of the Scientific Advisory Board

Research labs

Scan the QR code to explore IFOM research groups on our website

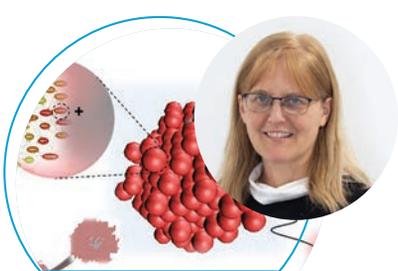


Functional proteomics
Bachi Lab

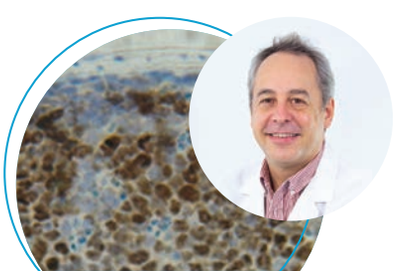


Genomics of cancer and targeted therapies
Bardelli Lab

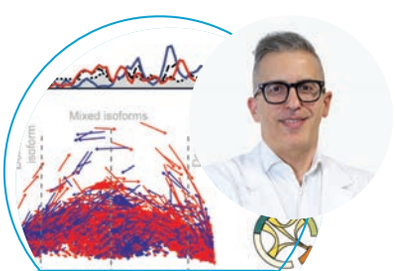
DNA repair
Branzei Lab



Artificial intelligence & Systems biology
Buffa Lab



Genetics of B cells and lymphomas
Casola Lab



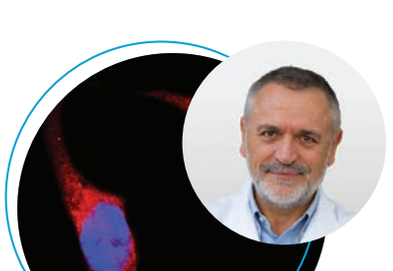
RNA regulatory networks in translation oncology
Cereda Lab

Quantitative biology of cell division
Ciliberto Lab

Statistical physics of cells and genomes
Cosentino Lagomarsino Lab

DNA Metabolism
Costanzo Lab

DNA damage response and cellular senescence
d'Adda di Fagagna Lab



Signalling, tumor environment and cell metabolism
Del Sal Lab

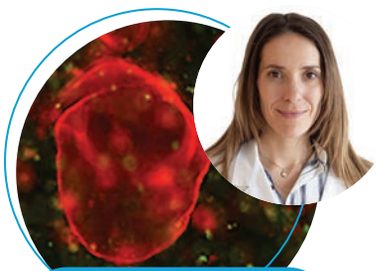
Replication stress response
Doksani Lab

Computational genomics
Ferrari Lab

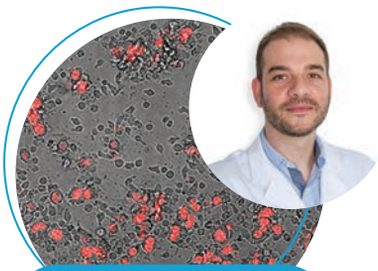
Genome integrity
Foiani Lab

Mechano-oncology
Gauthier Lab

Chromosome instabilities
Hayashi Lab

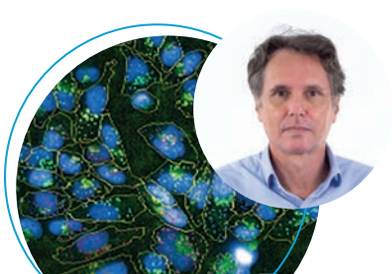


Cell plasticity
& Aging
Kovatcheva Lab



Functional genomics
of cancer immunity
Leuzzi Lab

Precision oncology
Marsoni Lab

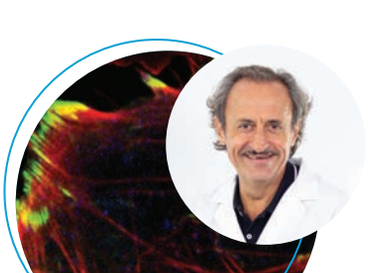


Experimental Therapeutics
Program
Mercurio Lab

Molecular oncology
and immunology
Pagani Lab

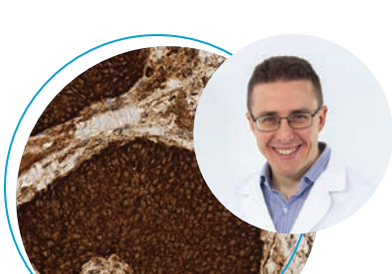
Tissue biology and
tumorigenesis
Piccolo Lab

Molecular machines in
signalling pathways
Polo Lab

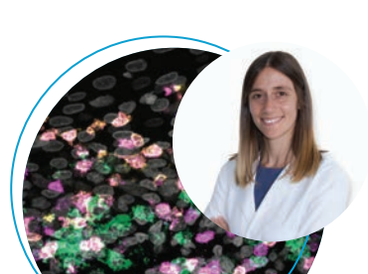


Mechanisms of tumor
cell migration
Scita Lab

Advanced pathology
laboratory
Tripodo Lab



Metabolic reprogramming
in solid tumors
Vernieri Lab



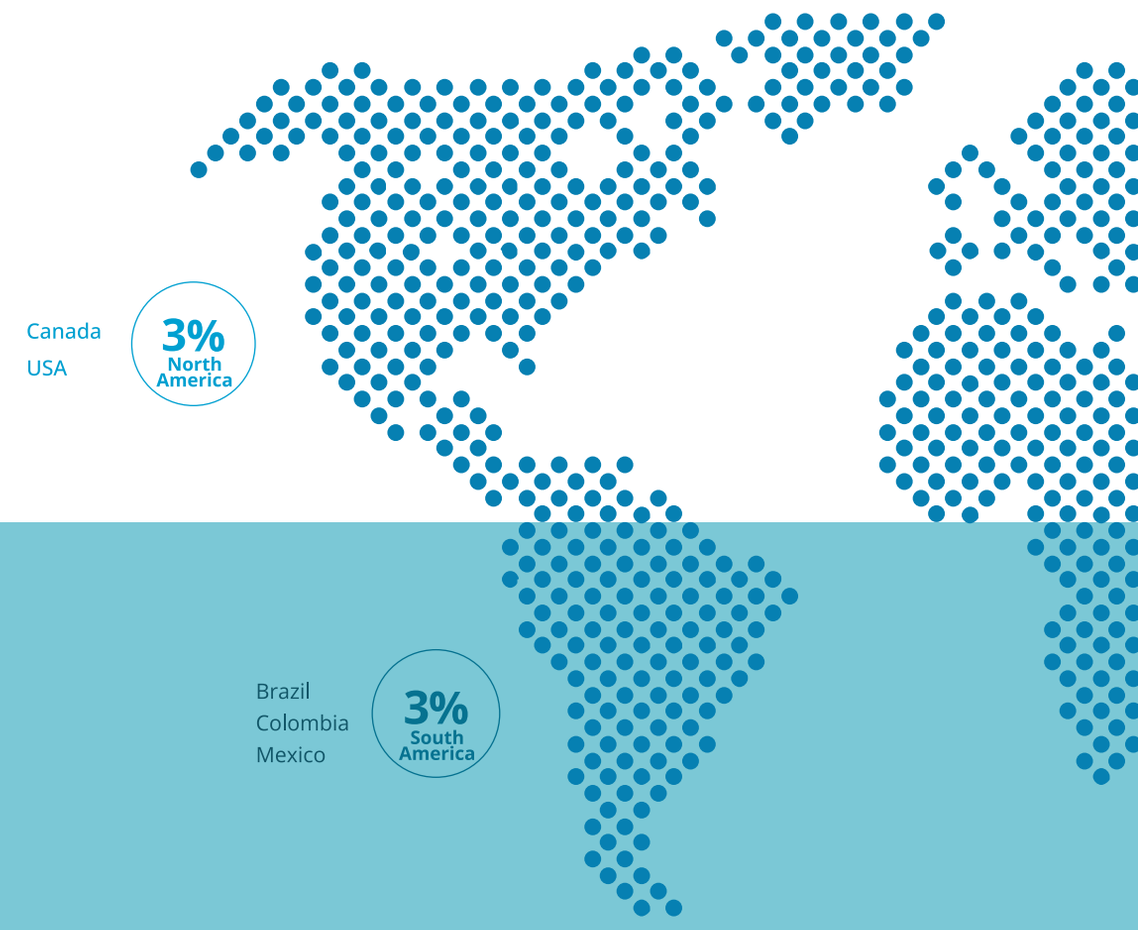
Tumor microenvironment
and immunotherapy
Zitti Lab

The identity of researchers

IFOM is composed of 348 individuals, characterized by a well-balanced gender distribution (45% men and 55% women) and an average age of 39, reflecting the dynamic and youthful spirit of the Institute. The composition of the workforce highlights the scientific nature of the organization: approximately 80% of staff are directly involved in research activities, while the remaining 20% provide essential operational and administrative support to ensure the smooth functioning of the laboratories.

Research without borders

Cancer is a global issue, thus requiring an inherently international approach. One of IFOM's most valuable assets is the international composition of its research staff, which represents a cultural richness.
To support integration, IFOM provides an international welcome service, offering linguistic mediation and assistance with the bureaucratic processes required to live and work in Italy.
To date, IFOM hosts professionals from 30 different nationalities, and over the years, the Institute's laboratories have consistently included an average of 25% international researchers, representing more than 50 countries.
At IFOM, scientists advance collaboration and excellence by embracing diverse perspectives, interdisciplinary thinking, and intercultural exchange, driving innovation with global impact.



46%
Europe

Albania
Cyprus
Estonia
France
Greece
Hungary
Portugal
Romania
Russia
Serbia
Spain
The Netherlands
Ukraine
United Kingdom

46%
Asia

China
India
Japan
Lebanon
Nepal
Sri Lanka
Turkey

2%
Africa

Lybia
Nigeria

Graphic representation of the origin of international IFOM research personnel, excluding Italy

IFOM and the return of Italian scientists

Training new generations of scientists is a top priority for IFOM, but equally important is encouraging the return of Italian researchers who have pursued part of their careers abroad. Supporting talent mobility is a core value at IFOM, enriching both the Institute's research and contributing to Italy's scientific, social, and economic growth.

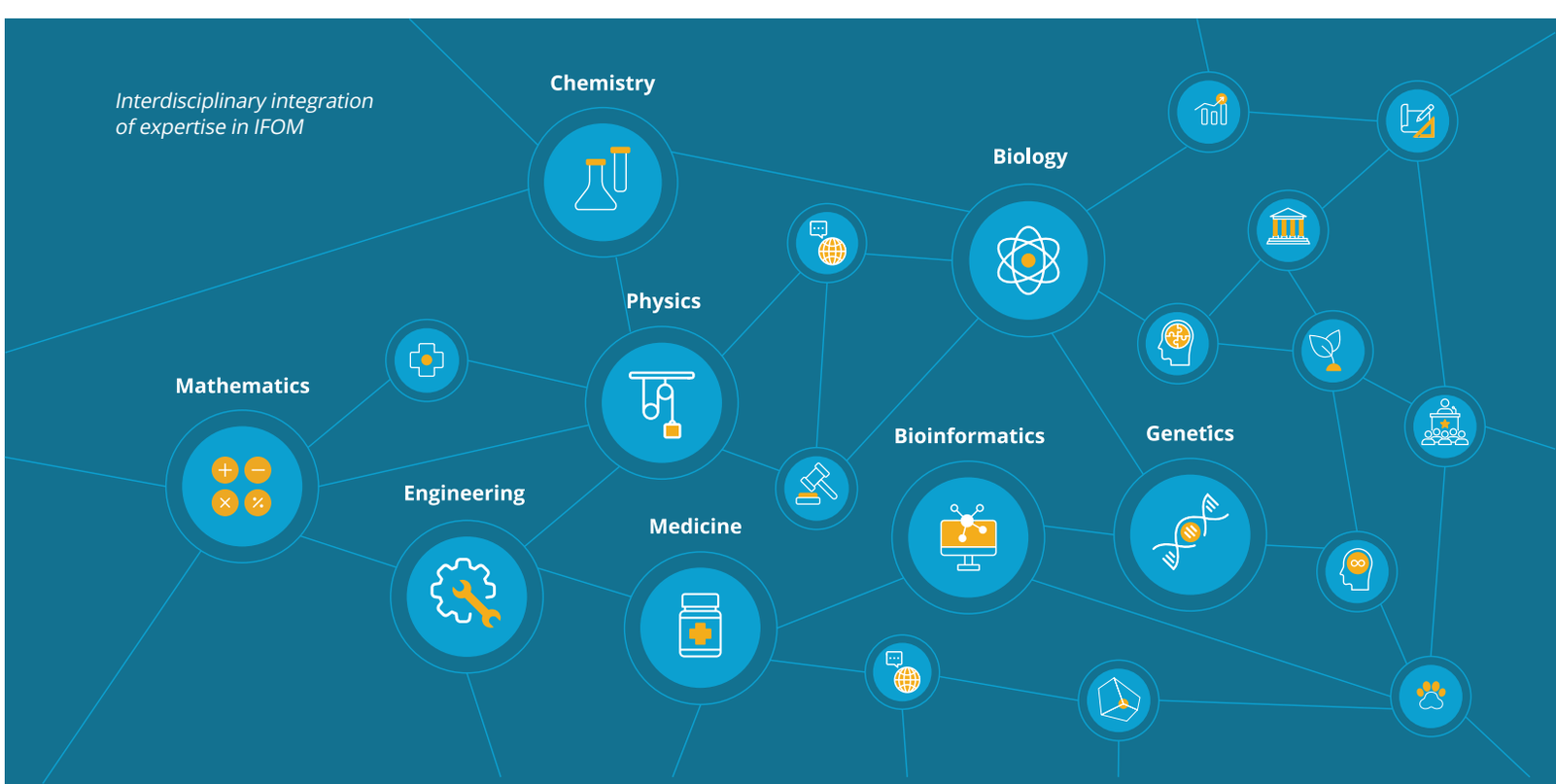
The return of researchers who have gained significant international experience enables IFOM to benefit from skills developed in leading global research environments. These scientists bring with them not only advanced knowledge, but also diverse mindsets and innovative approaches, enriching the work and stimulating intercultural exchange.
IFOM is strongly committed to identifying and attracting Italian talent from abroad, thus offering a world-class research environment, competitive with the best international centres. Among IFOM's 210 Italian researchers, 17% have returned from significant professional experiences abroad. This figure is a clear indicator of the effectiveness of IFOM's strategy to invest in human capital and of its ability to create an attractive workplace for top Italian talent, regardless of where they began or developed their careers.

As part of its commitment to internationalization and talent attraction, IFOM also actively supports the integration of international researchers and promotes the opportunities provided by Italy's "Brain Gain" tax regime (Article 16 of Legislative Decree 147/2015 and subsequent amendments). This initiative offers significant tax incentives for Italian researchers returning from abroad and for international researchers who live in Italy.
Such efforts strengthen the national scientific ecosystem and promote a more inclusive, sustainable, and globally connected research model.

Giuseppe Leuzzi and Beatrice Zitti, research directors at IFOM from 2025, returned to Italy respectively from Columbia University in New York and the University of Geneva

One mission, a range of expertise

Interdisciplinarity is the foundation of scientific innovation. The complexity of cancer research demands an integrated approach, bringing together diverse skills and perspectives. IFOM firmly believes that intellectual cross-fertilization is the true engine of innovation, and that cancer research cannot be a solitary effort, but it relies on the convergence of diverse professional backgrounds.
In this scenario, IFOM has always actively promoted collaboration among experts from diverse fields, united in a common challenge: to diagnose and cure cancer. This integration creates a perfect complementarity between IFOM's scientific specialization, focused exclusively on oncology research, and its cultural diversity, which enables a multi-angled approach to complex scientific questions.
The composition of IFOM's research staff and research support team clearly reflects this interdisciplinary spirit, which is essential for addressing the multifaceted nature of cancer today. IFOM's researchers and support personnel come from a remarkably wide range of academic backgrounds: 25 disciplinary areas spanning biology, medicine, chemistry, engineering, physics, and bioinformatics.
This multidisciplinary expertise enables IFOM to tackle cancer with an innovative, systematic approach focused on real-world impact.



4. Athena: the strategy for the future of cancer research

Athena is the five-year strategic plan developed by IFOM and supported by The AIRC Foundation, aimed at significantly expanding the institute's research activities. This plan gives IFOM's cancer research a clear direction, focusing on critical strategic areas.

Why Athena? Inspired by mythology, Athena represents wisdom, the arts, and strategy, qualities also linked to healing. These values reflect IFOM's approach to cancer research: progress depends on balancing knowledge, creativity, and purpose.

Launched in 2023 and strengthened in 2024, Athena follows an integrated, strategic approach built around four key goals and four foundational pillars. Its mission is to translate discoveries into effective solutions for patients, fostering long-term vision, innovation, and international collaboration.

As part of the Athena Strategic Plan, IFOM set a goal to establish 10 new research groups between 2023 and 2027, launching an ambitious international recruitment program. In line with this objective, Francesca Buffa (from University of Oxford, UK), Marta Kovatcheva (from Institute for Research in Biomedicine IRB, Spain), and Claudio Tripodo (from University of Palermo) began their research activities at IFOM in 2024. Additionally, Giuseppina D'Alessandro returned to Italy from the University of Cambridge to lead the Functional Genomic Screening Technology core facility.
Also in 2024, two additional PIs were recruited: Giuseppe Leuzzi from Columbia University and Beatrice Zitti from the University of Geneva, research groups starting activities in early 2025.

The four Athena goals

1. **Expanding translational research from basic science:** Athena aims to turn basic research findings into concrete clinical and therapeutic applications to improve cancer diagnosis and treatment.

2. **Strengthening synergies with national and international research ecosystems:** The plan promotes closer collaboration with academic, clinical, and research institutions in Italy and abroad to accelerate the translational impact of scientific discoveries.

3. **Building new partnerships with industry:** Athena supports the development of partnerships with pharmaceutical and biotech companies to speed up the creation and commercialization of innovative therapies and diagnostic tools.

4. **Focusing on advanced technological platforms:** Athena invests in cutting-edge technologies and ensures their accessibility and sharing with the broader national and international scientific community.

The research themes

Research themes: Address key questions in cancer research to better understand the causes and mechanisms of the disease.

Research programs: Investigate cancer development and progression to enable diagnostics and therapies, through academic and industry collaborations.

Technological platforms: Leverage advanced technologies to support discovery, accessible to both IFOM and the broader AIRC scientific community.

IFOM & AIRC: Strengthen the partnership with AIRC to boost fundraising and support nationally relevant research platforms.

The research programs

IFOM's research programs are cross-disciplinary, aiming to understand the mechanisms behind cancer onset and progression, and to develop more effective diagnostic tools and therapies through partnerships with academia and industry.

In 2023, aligned with its educational mission, IFOM launched the Physician Scientist program, further expanded in 2024 in collaboration with the University of Milan. The program trains a new generation of clinician-scientists from oncology-related fields, such as haematology, radiology, and immunology, by integrating them into preclinical, translational, and/or clinical research projects.

IFOM collaborates with major Italian cancer institutes (including the National Cancer Institute, Niguarda, and IEO) and participates in national and international clinical networks. The goal is to strengthen collaboration between labs and Cogentech, IFOM's Benefit Corporation, to design innovative clinical studies, and to partner with pharmaceutical companies to access promising new molecules.

IFOM has strong expertise in bridging academic research and the private sector, thus aiming at conducting molecular screenings to identify or repurpose drugs, and enhancing connections with investors, entrepreneurs, and pharmaceutical companies, with support from AIRC.

The Avatar program will expand IFOM's collection of organoids and patient-derived xenografts from colon and breast cancer cases. These models retain the genetic and functional traits of the original tissue, making them valuable for studying disease mechanisms.

The Data Science program applies AI and machine learning to next generation, "omics" data, such as proteomics and metabolomics, to accelerate personalized medicine, improve molecular understanding of cancer, and identify new biomarkers.

6

Liquid Biopsy

As a pioneer in liquid biopsy, IFOM uses this diagnostic tool to detect residual micro-metastases after colon cancer surgery. Clinical studies like Pegasus and Sagittarius help personalize post-surgical therapy based on biopsy data, thus advancing precision medicine.

7

Digital Diagnostics

By integrating omics technologies, IFOM aims to combine histopathological analysis with advanced molecular data to explore the tumor microenvironment, fully leveraging AI capabilities.

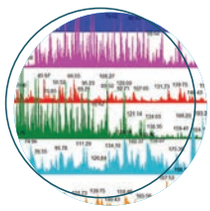
8

Scientific Communication Hub

Communicating the results of the research is an essential requirement for the researchers themselves. IFOM has developed strong expertise in *SciComm* (Science Communication) and *SciCult* (Science Culture) programs, promoting dialogue between scientists, media, and society.

The technological platforms

Technological innovation is essential for uncovering the mechanisms behind cancer development and for advancing diagnostic and therapeutic solutions. In this context, IFOM hosts several specialized core facilities that provide support to research groups. These units use cutting-edge tools to explore new therapies and deepen our understanding of cancer causes.
Thanks to the Athena strategic plan, IFOM significantly expanded its technological infrastructure in 2024, acquiring new advanced platforms and equipment.
IFOM also pursues technological excellence through its collaboration with Cogentech, the Institute's Benefit Corporation. Cogentech delivers advanced technologies and expertise, tailored to research and diagnostic needs. It also offers diagnostic services for hereditary cancers, personalized medicine, and high-level technological support for clinicians, laboratories, and hospitals.
The core facilities of IFOM and Cogentech include:



Proteomics and Metabolomics

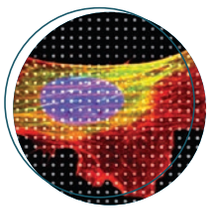
Managed by Cogentech, this core facility provides services for the identification, characterization, and quantification of proteins, metabolites, and lipids.
• Proteomics: focuses on proteins, the building blocks of cells, and can help identify new drug targets.
• Metabolomics: analyzes small molecules (metabolites) within cells or organisms, offering insights into cancer classification and potential biomarkers.
• Lipidomics: studies lipids and fatty acids in cell membranes, helping to understand tumor growth.
The integration of metabolomics and lipidomics into the facility's services was made possible by the acquisition of an Orbitrap in 2023, an ultra-precise mass spectrometer that measures the weight of tiny particles like proteins. The system was validated in 2024.

Cell and Tissue Electron Microscopy & Single-Molecule Electron Microscopy

These are two distinct core facilities that use highly sophisticated techniques to study both cellular structures and molecular components such as nucleic acids (e.g. DNA). They explore the invisible world of cells and delve into biological processes to better understand cancer at the molecular level. In 2023, the unit acquired the top-notch Talos F200C electron microscope, validated in 2024. This instrument enables ultra-high-resolution imaging and 3D reconstruction of molecular structures.

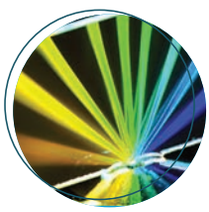
Talos F200C, the new electron microscope available since 2024 in the Single-Molecule Electron Microscopy core facility

New Orbitrap instrument in the Proteomics and Metabolomics core facilities



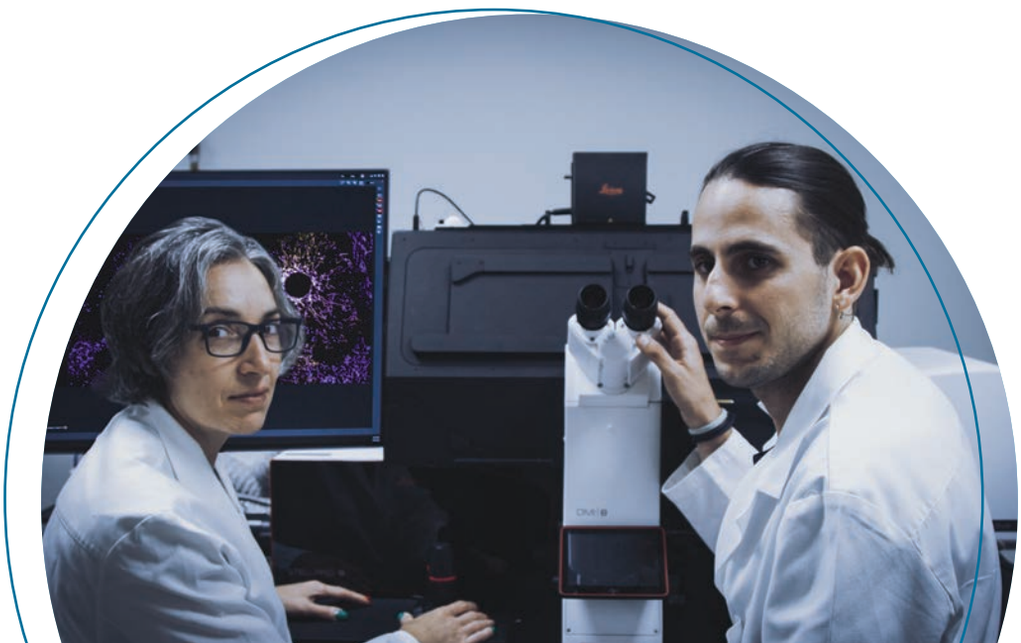
Cancer Engineering R&D

This core facility develops innovative biomedical technologies and devices. Cancer is not only a genetic disease; it is also influenced by physical forces and the mechanical properties of cells and tissues. Understanding how these forces affect tumor growth, metastasis, and drug resistance opens new frontiers in cancer research.
This unit provides researchers with advanced microfabrication and 3D printing technologies, enabling the development of experimental models and diagnostic tools that bridge basic research and clinical applications.

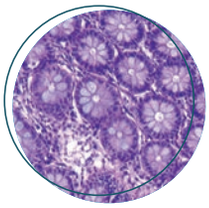


Advanced Light Microscopy

The Advanced Light Microscopy core facility is a technological hub offering cutting-edge tools that leverage the unique interactions between light, cells, and tissues. These tools enable innovative contrast methods to investigate the molecular mechanisms of cancer. In 2024, the unit validated a time-lapse microscope for long-term observation of cultured cells and a two-photon microscope for studying interactions between tumor cells and their microenvironment.



The new two-photon microscope of the Optical Microscopy core facility



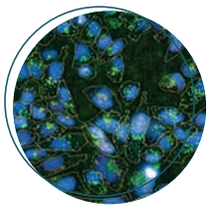
Histopathology and Digital Pathology

Managed by Cogentech, this core facility provides histological evaluation of normal and pathological tissues. It plays a crucial role in diagnosing cancer, assessing disease progression, and determining treatment effectiveness. Histological analysis helps researchers and clinicians better understanding tissue structure and function, supporting accurate diagnoses and personalized treatment plans.
To implement this core facility, two new instruments were acquired in 2024:
• MACSima, a spatial biology tool that maps the exact location of cells and molecules, like a biological "Google Maps", allowing simultaneous visualization of dozens or hundreds of molecules in a single tissue sample.
• A high-precision scanner for digitizing histological images.

Biological Research Facility

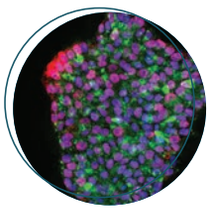
Managed by Cogentech, this core facility oversees the animal facility, where laboratory mice are bred with a strong focus on animal welfare, following the EU's "3Rs" principle: Replacement, Refinement, and Reduction. These guidelines aim to minimize animal use in research and ensure the highest standards of care.
Mice are valuable models in biomedical research due to their genetic and physiological similarities to humans. They still remain essential for studying biological mechanisms, testing hypotheses, and developing new therapies.

MACSima, the new instrument of the Histopathology core facility



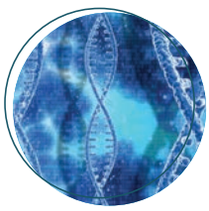
ETP – Experimental Therapeutics Program

Only 2% of drug development projects reach the market, due to the biological complexity of diseases and the limitations in identifying effective molecular targets. The Experimental Therapeutics core facilities at IFOM addresses these challenges by combining academic excellence with industrial expertise to translate basic research findings into new drugs and therapeutic opportunities. This is achieved through the identification, design, and synthesis of molecules that specifically interact with cancer-related targets, using an iterative process of biochemical, cellular, and in vivo characterization.
The Unit leverages cutting-edge technologies and has access to a vast collection of 300,000 compounds, including approved drugs, clinical-stage molecules, target-specific libraries, and molecular fragments. Current projects range from DNA repair mechanisms to ubiquitination processes, tumor cell mechanics, and drug repurposing, while also developing innovative technologies to improve the success rate of oncology drug discovery.



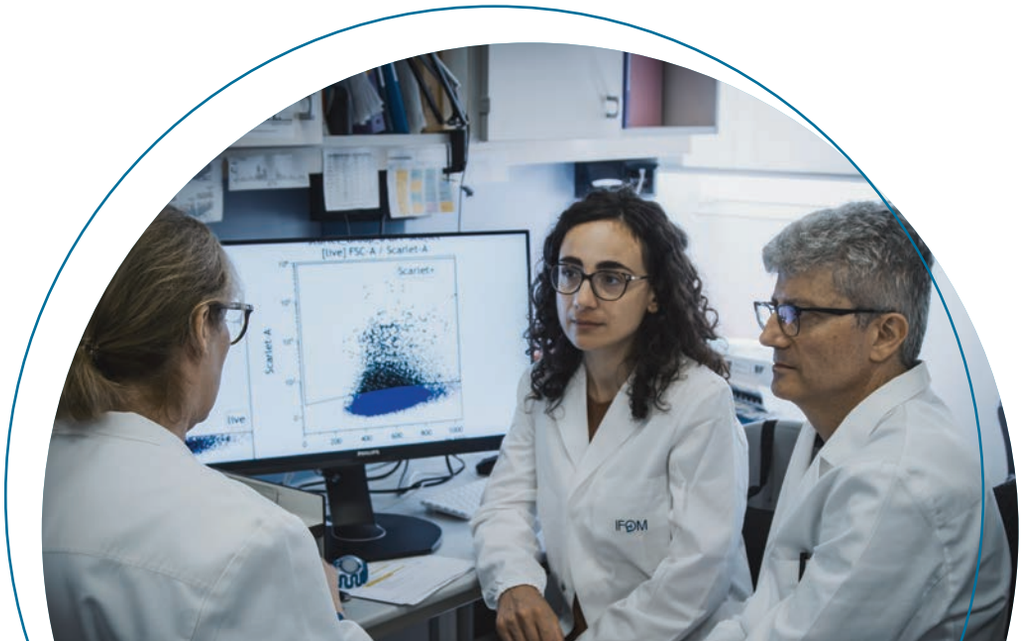
Cellular and Preclinical Models

In vitro models are essential for cancer research, providing controlled systems to study the molecular mechanisms of tumor development, progression, and treatment response. Immortalized cell lines, capable of indefinite growth, and organoids derived from tumor tissues help researchers investigate cancer origins, test new therapies, and explore drug resistance mechanisms. By supporting the creation and use of advanced cellular and preclinical models, this core facility plays a key role in advancing cancer research and improving future therapies.



Functional Genomic Screening

The Functional Genomic Screening core facility focuses on identifying key players in cancer development, clarifying the role of individual genes in disease mechanisms, and discovering new therapeutic targets. This core facility uses genome editing technologies, molecular "scissors and tweezers" that precisely cut and modify DNA. In 2024, Giuseppina D'Alessandro was appointed head of this new technology platform.



The new Functional Genomic Screening technology platform, led by Giuseppina D'Alessandro

The new instrument of the Genomics and Integrated Genomics core facility, NovaSeq 6000 DX located in Catania

Research Computing and Data Science

IFOM's science generate a continuous stream of experimental data, requiring high-performance and innovative computing solutions. These systems support the development of new AI algorithms for biomedical data analysis. In 2024, the unit underwent a major reorganization and expanded its computing power alongside traditional IT infrastructure. The unit also provides bioinformatics support, developing new analysis protocols and assisting other technology units and research groups with scientific data interpretation.

Scientific Computing and Data Science: a strategic response to the big data challenge

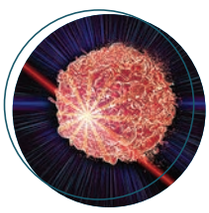
Modern cancer research generates unprecedented volumes of data, demanding increasingly sophisticated computational tools to turn complex information into meaningful scientific discoveries. In response to these new challenges of cancer research, IFOM established the Research Computing & Data Science unit in 2024, a strategic investment to accelerate research through supercomputing and artificial intelligence.

This unit has become a key component of IFOM's technological ecosystem. While other platforms generate a continuous stream of experimental data, this specialized unit transform them into knowledge. Through high-performance computing solutions and dedicated bioinformatics support, it enables the development of new analysis protocols that make research outcomes faster, more accurate, and reproducible.

The goal is ambitious yet concrete: to harness the power of scientific computing to translate knowledge into tangible benefits, enhancing accessibility, efficiency, and the impact of cancer research across the scientific community.

Genomics & Integrated Genomics

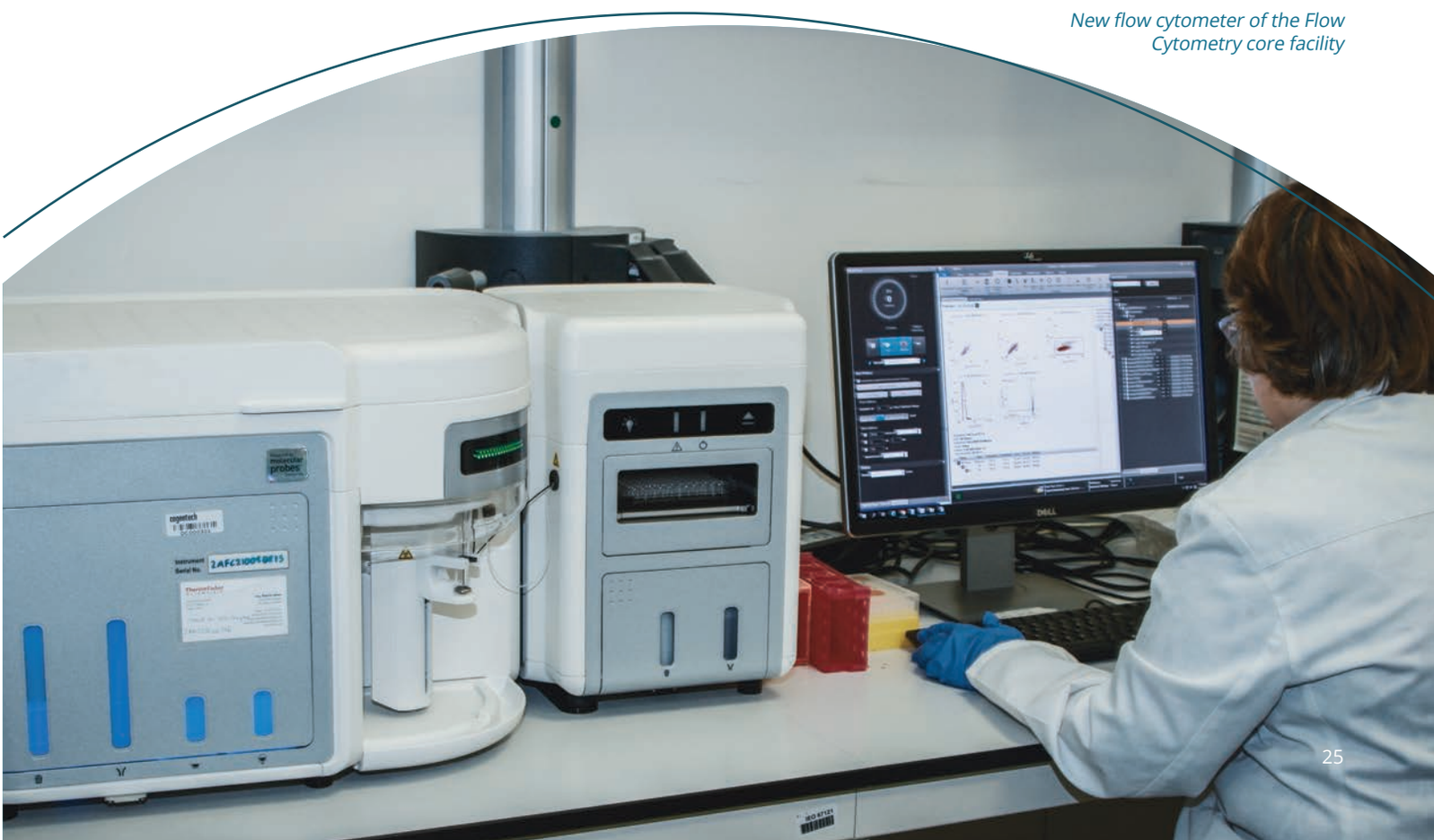
Managed by Cogentech, these two units are based on Next-Generation Sequencing (NGS) technology and combine expertise in genomics and bioinformatics. NGS has revolutionized DNA and RNA analysis, enabling rapid and highly accurate sequencing of entire genomes, crucial for personalized medicine and targeted therapies.
The Genomics and Integrated Genomics units are developing new protocols based on liquid biopsy, a technique that detects circulating tumor DNA through a simple blood withdrawal. This method allows for real-time molecular profiling of tumors and enables early, advanced diagnosis. In 2023, the high-performance NovaSeq 6000 DX was acquired for clinical and research sample sequencing and was validated in 2024.



Flow Cytometry

The Flow Cytometry core facility supports various areas of cancer research and clinical diagnostics. It enables detailed analysis of tumor cell composition by identifying and classifying individual cells within a mixture into subpopulations. In 2023, the unit purchased a new cytometer and cell sorter, allowing precise analysis and isolation of both cancerous and non-cancerous cells for further characterization. The equipment was validated in 2024.

New flow cytometer of the Flow Cytometry core facility



5. Advanced education programs: the scientific impact of research

The advanced education: a key ingredient in research

Advanced training in the scientific field represents a strategic investment for the entire community: it not only promotes the advancement of knowledge, but also nurtures talent, facilitates the exchange of expertise, and drives innovation, ultimately contributing to economic and social growth.

This vision has been a core part of IFOM's mission since its foundation. The Institute, a pioneer in training young scientists, was one of the founders the European School of Molecular Medicine (SEMM) in partnership with prestigious institutions such as the University of Milan, IEO, the University of Naples "Federico II" and the Telethon Foundation. Other leading Italian academic and research institutions have since joined this initiative, including the University of Turin, Human Technopole, Humanitas University, and the Italian Institute of Technology.
Building on this initial PhD program, additional highly competitive training pathways have been developed through international collaborations of excellence, enabling doctoral candidates to explore complementary areas within molecular oncology.

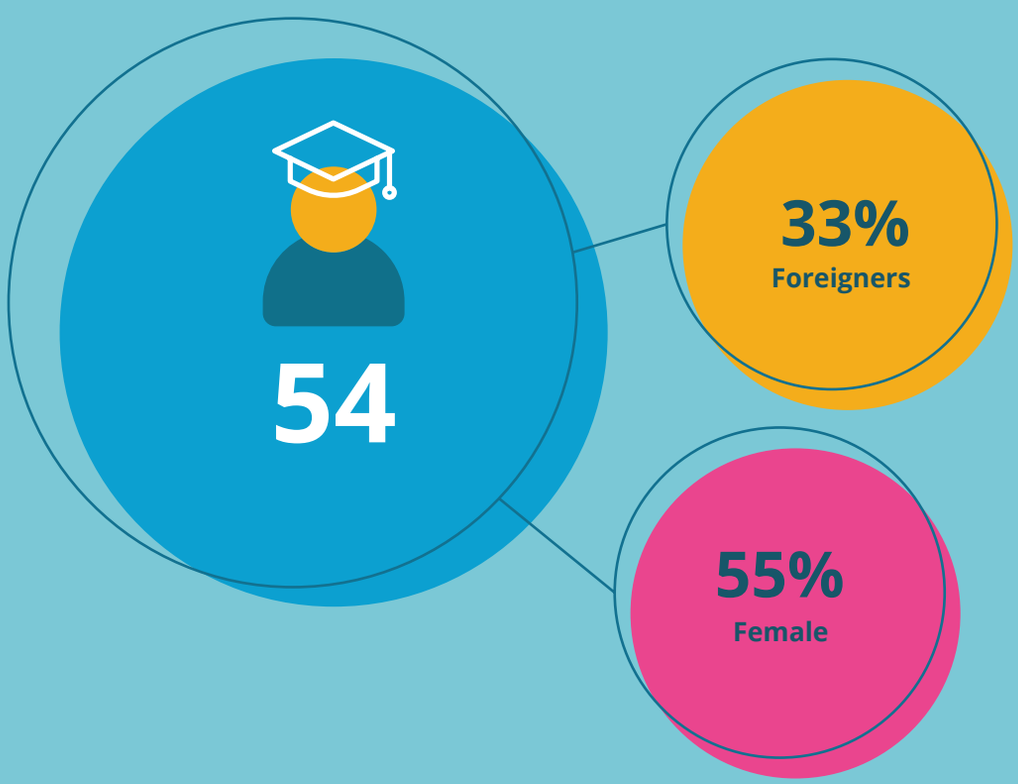
Today, the educational offering at IFOM includes:

- PhD in *System Medicine* (SEMM)
- PhD in *Fundamentals of Cancer Biology* (Open University, UK)
- PhD in *Chromosome Biology* (University of Galway, Ireland)
- PhD in *Biology/Bioinformatics* (Pázmány Péter Catholic University, Hungary)

IFOM's PhD programs, which last four years and are entirely in English, take place within the Institute's laboratories, creating a bridge between basic, translational, and clinical research. This model attracts talent from both Italy and abroad, reinforcing the Institute's international reputation.

The training path for PhD students is based on a rigorous selection process and is closely supervised by PIs. The intensive 4 years program culminates in the promotion of international mobility for researchers; a strategy designed to enrich their acquired skills and stimulate scientific creativity.

Total PhD students at IFOM in 2024



Geographical and gender composition of IFOM PhD students in 2024

The Physician Scientist program

As part of the Athena strategic plan, IFOM's advanced training was expanded in 2023 with the launch of the Physician Scientist program, an initiative supported by AIRC Foundation and developed in collaboration with prestigious institutions such as the University of Milan, Grande Ospedale Metropolitano Niguarda, the European Institute of Oncology (IEO), the National Cancer Institute (INT), and, since 2024, ASST Santi Paolo e Carlo.

The program was created in response to a growing need in medicine, and particularly in oncology, for professionals capable of integrating clinical expertise with advanced research skills. Recent studies highlight the crucial role of Physician Scientists, medical professionals with specialized training who can bridge scientific discoveries and clinical applications, thus improving medical practice and developing innovative solutions for patients. However, despite their importance, these professionals remain underrepresented globally, and especially in Italy, where their role is not yet clearly defined and struggles to emerge due to its absence from formal hospital staffing structures.

Key barriers to this career path include the difficulty of balancing clinical duties with research activities, the lack of structured training programs that support the dual expertise, and the absence of dedicated job positions.
IFOM's Physician Scientist program combines academic excellence, cutting-edge research resources, and a multidisciplinary environment focused on innovation in molecular oncology. Targeted at residents in Medical Oncology, Pathology, or Medical Genetics, the program aims to train professionals capable of merging medicine and science to tackle the challenges of translational cancer research, facilitating the transition from lab discoveries to clinical practice and strengthening the synergy between research and care.

In 2024, this program, now a benchmark in the Italian training landscape, recruited 3 new PhD students, who joined those recruited in 2023 for a total to 9 future physician scientists actively pursuing their academic at IFOM.

PhD students who are or have been part of the Physician Scientist program, listed alphabetically: Beatrice Conti, Emanuele Frigo, Alessandro Lazzarin, Francesca Ligorio, Gianluca Mauri, Giacomo Mazzoli, Giorgio Patelli, Nadia Saoudi Gonzalez, Hajdhica Thanasi

IFOM for the patient: clinical trials and diagnostics

At IFOM, ideas and discoveries evolve into clinical studies, essential tools for assessing the safety and effectiveness of new medical treatments before they are integrated into therapeutic protocols. Translating scientific knowledge into clinical trials accomplishes IFOM's mission, enabling the Institute to offer tangible solutions to improve patients' lives in the fight against cancer.
Over the years, IFOM has broadened its research horizons, initiating numerous clinical studies in collaboration with universities, research centres, and national and international clinical institutions. In 2024, IFOM participated in 15 clinical studies, 7 of which were directly sponsored by the Institute. Of these, 5 focused on colorectal cancer (Arethusa, Pegasus, Alfaomega, Alfaomega-R, Sagittarius) and 2 on breast cancer (Metamech, Atribrave).

These studies fall into two main categories:

- 8 observational studies, which monitor patient outcomes and collect data without direct intervention;
- 7 interventional studies, which involve administering new treatments or drugs to patients to evaluate their safety and efficacy, often engaging large patient cohorts.

Studies enrolling more than 100 patients are classified as Phase II. At the beginning of 2024, IFOM launched the multicentre clinical study "SAGITTARIUS", coordinated by IFOM and supported by AIRC. The study involves 7 partners across 5 European countries and a network of over 25 clinical centres in Italy, Spain, and Germany. Funded by Horizon Europe, SAGITTARIUS aims to personalize therapy for patients who have undergone surgery for colon cancer, improving treatment effectiveness, quality of life, and healthcare costs. SAGITTARIUS is classified as a Phase III study, thus enrolling over 300 patients.

15	8	7	7	33	15
Clinical trials	Observational studies	Interventional studies	Promoted by IFOM	Italian partners	Foreign partners

Some studies are described below.

ALFAOMEGA

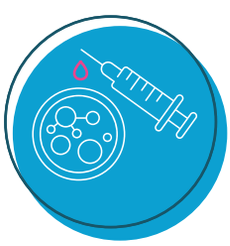
Launched in 2019 as part of a 5x1000 AIRC Foundation Project and coordinated by Dr. Marsoni, ALFAOMEGA is a prospective observational study in the field of colorectal cancer. It supports translational research laboratories in exploring the genetic and functional principles underlying the evolutionary process of metastasis, through the longitudinal collection of clinical data and biological samples from patients.
Italian partners: Grande Ospedale Metropolitano Niguarda, Istituto Nazionale dei Tumori, Istituto Oncologico Veneto, Istituto Europeo di Oncologia, Ospedale Policlinico San Martino, Istituto di Candiolo, A.O. Ordine Mauriziano, Ospedale San Luigi Gonzaga, Ospedale Santa Maria della Misericordia, AUSL della Romagna, A.O.U. Pisana, ASL Biella, A.O.U. Luigi Vanvitelli, Istituto Clinico Humanitas.
European partners: University Hospital del Mar, Vall d'Hebron Institute of Oncology, INCLIVA Biomedical Research Institute, Hospital de Sant Joan Despí Moisès Broggi.

ALFAOMEGA-RETRO

Launched in 2020 as part of a 5x1000 AIRC Foundation Project and coordinated by Dr. Marsoni, this is a retrospective observational study designed as the counterpart to ALFAOMEGA. Its goal is to enable research access to clinical data, radiological images, and biological samples from colorectal cancer patients who cannot be reached for consent (e.g., deceased or lost to follow-up).
This protocol supports validation and discovery studies of new prognostic and predictive markers within Radiomics and/or Digital Pathology (Pathomics) research projects.
Italian partners: Grande Ospedale Metropolitano Niguarda, Istituto Nazionale dei Tumori, Istituto Oncologico Veneto, Ospedale Policlinico San Martino, Istituto di Candiolo, A.O. Ordine Mauriziano, Ospedale San Luigi Gonzaga, A.O.U. Pisana, Istituto Clinico Humanitas.
European partners: University Hospital del Mar, Vall d'Hebron Institute of Oncology, INCLIVA Biomedical Research Institute, Catalan Institute of Oncology Hospitalet.

ARETHUSA

Launched in 2019 with support from MSD and coordinated by Dr. Marsoni, this is a phase II interventional clinical trial aiming to determine whether an increase in tumor mutational burden—induced by treatment with an alkylating agent (temozolomide)—can sensitize tumors to immune checkpoint inhibitors such as pembrolizumab in patients with microsatellite-stable, RAS-mutated metastatic colorectal cancer. This is a highly aggressive cancer subtype with limited treatment options.
The study also includes a cohort of microsatellite instability–high (MSI-H) patients, who are directly treated with pembrolizumab. The concept and design of the study are based on preclinical evidence generated by IFOM researchers (Alberto Bardelli's group).
Partners: Grande Ospedale Metropolitano Niguarda, Istituto Nazionale dei Tumori, Istituto Clinico Humanitas, Istituto Europeo di Oncologia.



ATRiBRAVE

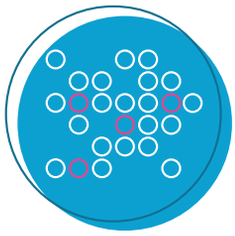
Launched in 2023 as part of a 5x1000 AIRC Foundation Project and coordinated by Dr. Marsoni, this is a phase II interventional clinical trial whose primary objective is to assess the efficacy of a therapeutic strategy aimed at restoring sensitivity to immunotherapy. The approach uses an ATR protein inhibitor, ceralasertib, in patients with locally advanced or unresectable metastatic triple-negative breast cancer previously exposed to immunotherapy in the first-line setting.
The concept and design of the study are based on preclinical evidence generated by IFOM researchers (Marco Foiani's group).
Partners: Istituto Oncologico Veneto, Istituto Nazionale dei Tumori, Ospedale Maggiore della Carità, Arcispedale Santa Maria Nuova – AUSL Reggio Emilia, Istituto Nazionale dei Tumori "G. Pascale", ASST Papa Giovanni XXIII.

BREAKFAST-2

Started in 2023 and coordinated by Dr. Vernieri, BREAKFAST-2 is phase II interventional trial is funded by the Giuliani Foundation and Istituto Nazionale dei Tumori. BREAKFAST-2 tests whether cyclic severe calorie restriction can enhance the response to preoperative chemo-immunotherapy in patients with stage II–III triple-negative breast cancer. The study also aims to uncover new metabolic vulnerabilities in tumors.
Partners: Istituto Nazionale dei Tumori, IEO, IOV, Ospedale Policlinico San Martino, Università Federico II, Azienda Policlinico Umberto I, Centro Oncologico Modenese, CRO di Aviano, Istituto Ricerca Tumori "Dino Amadori" IRST, Istituto Clinico Humanitas.

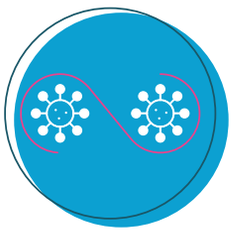
FASTIMMUNE

Started in 2023 and led by Dr. Vernieri, FASTIMMUNE is a phase II interventional clinical trial involving patients with small cell lung cancer, a highly aggressive subtype of lung cancer. It focuses on patients who have already undergone four cycles of chemo-immunotherapy. The study explores the effects of maintenance immunotherapy combined with cyclic calorie restriction, aiming to enhance the immune system's ability to recognize and eliminate cancer cells.
Partners: Istituto Nazionale dei Tumori, ASST Grande Ospedale Metropolitano Niguarda.



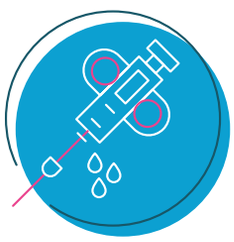
FF-BCR2

FF-BCR2 is an observational study launched in 2020 and coordinated by Dr. Casola, focusing on B-cell non-Hodgkin lymphomas. FF-BCR2 investigates the role of the B-cell receptor (BCR2) in tumor development and progression by analyzing immunological, molecular, and genetic aspects of lymphoma biology according to the treatment response.
Partners: Spedali Civili di Brescia, Ospedale San Raffaele, Università di Padova.



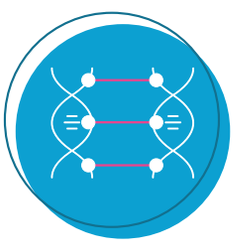
METAMECH

Started in 2020 under a 5x1000 AIRC-funded project and coordinated by Dr. Marsoni, METAMECH is an observational study on breast cancer. It investigates how mechanobiology, the study of how cells and tissues respond to mechanical stimuli, affects tumor aggressiveness, with the goal of reducing recurrence and improving survival.
Partners: ASST Papa Giovanni XXIII, Istituto Nazionale dei Tumori, Istituto Neurologico Besta, Azienda Ospedaliero Universitaria Maggiore della Carità di Novara, IOV, Policlinico San Matteo Pavia, IFO - Istituto Nazionale Tumori Regina Elena, Istituto Clinico Humanitas.



PEGASUS

Started in 2020 as part of a 5x1000 AIRC project and led by Dr. Marsoni, this phase II interventional trial evaluates the feasibility of using liquid biopsy to guide post-surgical treatment in stage III or high-risk stage II colon cancer patients. By detecting circulating tumor DNA, the study aims to identify micrometastases, predict recurrence, and tailor adjuvant therapies more effectively.
Italian partners: Ospedale Policlinico San Martino, Istituto Nazionale dei Tumori, IEO, Grande Ospedale Metropolitano Niguarda, IOV, Ospedale Santa Maria della Misericordia, AUSL della Romagna.
European partners: University Hospital del Mar, Vall d'Hebron Institute of Oncology, INCLIVA Biomedical Research Institute, Hospital de Sant Joan Despí Moisès Broggi.



SAGITTARIUS

Funded by the Horizon Europe program and launched in 2024, the SAGITTARIUS trial is coordinated by Dr. Silvia Marsoni in collaboration with AIRC, involving 7 European partners and 26 clinical centres across Italy, Spain, and Germany. SAGITTARIUS is a randomized phase III clinical study that will enrol between 700 and 900 patients with high-risk stage II or stage III colon cancer who have undergone surgical resection. The study aims to personalize therapy using post-surgical liquid biopsy. Patients who test positive on the liquid biopsy will receive targeted treatments based on the molecular profile of their tumor (such as immunotherapy, targeted therapies, or specific chemotherapy) versus standard therapy.
Patients who test negative will be randomized to either intensive active surveillance using liquid biopsy or standard adjuvant chemotherapy, with the goal of optimizing therapeutic efficacy and quality of life.
Partners: AUSL della Romagna, Ospedale Maggiore della Carità, Grande Ospedale Metropolitano Niguarda, Istituto di Candiolo, Policlinico Universitario Fondazione Agostino Gemelli, Ospedale Policlinico San Martino, Ospedale Santa Maria della Misericordia, ASL Biella, Fondazione Poliambulanza Istituto Ospedaliero, Humanitas, Istituto Europeo di Oncologia, A.O.U. Parma, University Hospital del Mar, Vall d'Hebron Institute of Oncology, INCLIVA Biomedical Research Institute, Catalan Institute of Oncology Hospitalet, Consortium General University Hospital of Valencia, Marqués de Valdecilla University Hospital, Sant Pau Hospital, Reina Sofia University Hospital, Miguel Servet University Hospital, Santiago Clinic University Hospital, San Carlos Clinic University Hospital, Navarra Hospital Complex, Parc Taulì University Hospital, Charitè University Hospital.

The importance of diagnostics

In oncology, early diagnosis is fundamental, enabling timely detection, improving survival rates, guiding personalized treatment, and helping monitor disease progression, at the end enhancing patient quality of life.

Diagnostics not only have a major positive impact on healthcare, but also play a fundamental role in cancer research. By integrating diagnostic data with findings from laboratory research, scientists can advance scientific knowledge focused on specific diseases and personalized therapeutic pathways.

IFOM promotes the integration of diagnostics into laboratory studies. One example is the research being conducted on liquid biopsy, an innovative approach that is revolutionizing cancer diagnostics. This non-invasive technique detects and analyses fragments of tumor DNA extracted from the blood, enabling early diagnosis, treatment personalization, and disease monitoring through a simple blood draw, without the need for tissue biopsies.

Over
30.000
tests
since 2005

of which
3.278
tests
in 2024

The Cancer Genetic Testing Laboratory

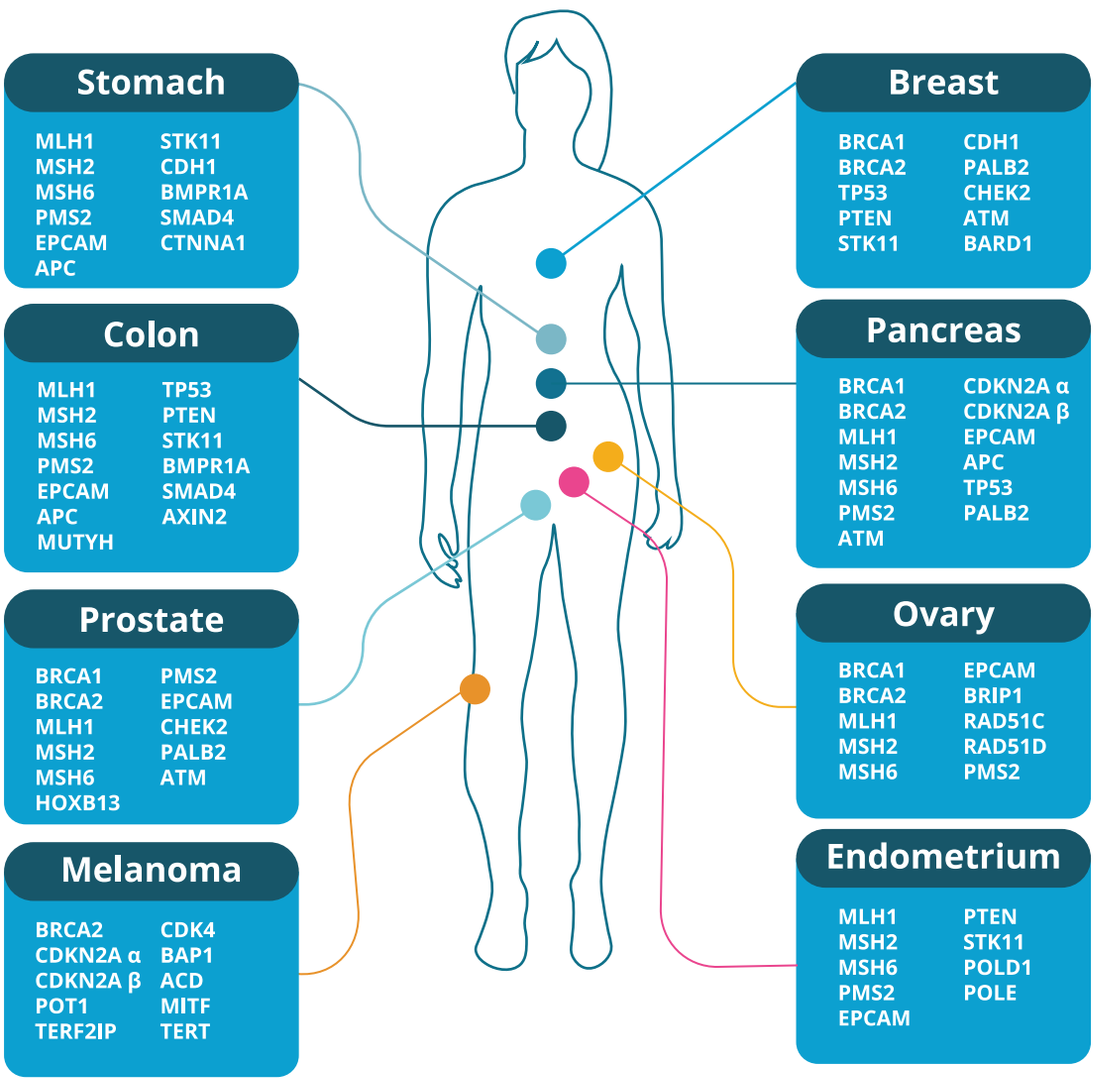
In many cases, diagnostics can help identify risk factors or pre-existing conditions that can be treated to prevent disease development or be properly monitored. For example, genetic testing can reveal predispositions to certain diseases, enabling preventive measures to be taken.
The Cancer Genetic Test Laboratory (CGT Lab) is a certified and accredited centre of excellence in the molecular diagnosis of cancer. The laboratory's mission is to provide a high-quality diagnostic service to selected clinical partners across Italy, supporting cancer prevention and treatment through research, development, and cutting-edge diagnostic techniques.
Established in 2005 and managed by Cogentech, the laboratory performs tests on behalf of genetic counselling services within hospitals, which interface directly with patients.
The lab conducts various types of molecular genetic tests, including germline testing for cancer predisposition genes in both adults and children, as well as prognostic and/or therapeutic analyses on DNA extracted from tumor tissues.
Since its foundation, the laboratory has performed over 30,000 tests, 3,278 in 2024 alone.
The CGT Lab uses Next Generation Sequencing (NGS), an advanced technology for reading DNA or RNA, the "book of life." Thanks to NGS, the lab has developed and validated a range of gene panels; these are tools used to analyse specific DNA sequences for various purposes, including disease diagnosis, genetic risk assessment, personalized treatment selection, and scientific research.
From a simple blood sample, a person's DNA is extracted and sequenced for the genes of interest. The resulting data is then analysed to identify genetic variants associated with diseases or treatment responses. These variants are decoded by laboratory geneticists and shared with clinicians in oncology genetic counselling services.

The laboratory developed three panels, for a total of 55 genes:

1. **OncoPan®**, (since 2019): designed to identify variants linked to hereditary cancers of the breast and ovary (e.g., BRCA1 and BRCA2), colon, pancreas, stomach, and melanoma;

2. **OncoPed®** developed for diagnosing hereditary pediatric cancers and some rare hereditary cancers in adults;

3. **OncoHRD** focused on assessing genomic instability in ovarian cancers and predicting response to PARP inhibitors, a class of drugs used in treating this type of cancer.



6. From the lab to the world: IFOM's scientific impact

Publications and scientific impact

Scientific impact measures the relevance of a research institute's discoveries and publications. Impact is measured not just by publication count, but by their quality, global visibility, and contribution to advancing cancer research.

In 2024, IFOM produced 135 scientific documents, including 118 research articles (87.54%) and 17 reviews (12.6%), all published in international referred journals. Of these, 78 publications (58%) had an IFOM scientist as first, last, or corresponding author, thus signifying key contributions.

Among the 2024 papers, 64 articles were published in journals in prestigious editorial groups such as Science AAAS, Cell Press, The Lancet, Nature Portfolio, Springer Nature, and JAMA, representing approximately 47% of the total. In half of these publications, an IFOM scientist was listed as lead or senior author.

IFOM is committed to making its research widely accessible through an Open Access policy, ensuring that publications are freely available online without access restrictions.

In 2024, 82% of IFOM's published studies were Open Access, helping to advance global scientific progress and reach a broad community of researchers, clinicians, and patients.

135
publications

47%
On journals from the editorial groups AAAS Science, Cell, Lancet, and Nature

58%
IFOM Researchers as first or last authors

Of which
50%
IFOM Researchers as first or last authors

82%
on Open Access journals

The scientific publications of IFOM in 2024

IFOM's scientific standing

In 2024, the IFOM scientific international profile was further reinforced, also demonstrated by its presence in key institutions within the global oncology research landscape. IFOM PIs currently hold 120 significant roles, including positions on scientific editorial boards, in scientific advisory bodies, in international research institute boards, as panel members of the European Research Council, and as members of major scientific societies. Notably, nine are members of the European Molecular Biology Organization, one of Europe's most authoritative institutions in molecular biology.

These roles reflect the recognition of IFOM researchers to assess scientific advances and shape future priorities, while affirming the strength and credibility of the Institute's research environment.

Noteworthy, the Scientific Director, Prof. Alberto Bardelli serves as Secretary General of the EACR, the largest European organisation in the field.

120
Key appointments

- **2** As members of evaluation panels of the European Research Council
- **12** As members of scientific committees
- **19** As members of scientific committees of international institutes
- **37** As members of editorial boards of leading scientific journals
- **50** As members of prestigious scientific societies

  Of which

  > **9** As members of **EMBO** (European Molecular Biology Organization)

Some international conferences attended by IFOM scientists.
In the photos: Angela Bachi, Alberto Bardelli, Silvia Marsoni, Fabrizio d'Adda Di Fagagna

IFOM in the international scientific community

In 2024, IFOM's scientists participated in 232 international meetings and conferences, with 97 speakers representing the institute on some of the most prestigious stages in cancer research. 113 events featured IFOM researchers as keynote speakers, invited speakers, or event organizers, 42 plenary session speakers and 16 international event organizers.

232	97	42	16
International scientific events	Invited speaker	Plenary session speakers	International event organizers

The First AIRC–IFOM Joint Meeting

In June 2024, IFOM hosted the first edition of the AIRC–IFOM Joint Meeting "From Biological Mechanisms to New Therapies". The event was co-chaired by the former Scientific Director of AIRC, Federico Caligaris Cappio, and the Scientific Director of IFOM, Alberto Bardelli. A selected group of AIRC-affiliated researchers and the IFOM scientific community shared their scientific and collaborative vision.

Internationally renowned keynote speakers, including John Dick (Princess Margaret Cancer Center, University Health Network, Toronto), Nicholas Papadopoulos (Johns Hopkins University, Baltimore), and Alexander Rudensky (Ludwig Center, Memorial Sloan Kettering Cancer Center, New York), contributed to an in-depth discussion on current and future challenges in cancer research. The event laid the foundation for future synergies between the two institutions, with the common goal of accelerating therapeutic innovation and enhancing the clinical impact of research.

Scientific collaborations and institutional agreements

Cancer is a global challenge that requires an equally global response. No institute, regardless of its excellence, can face it alone. For this reason, IFOM has made international collaboration not only a strategic priority, but a founding principle of its mission. Each partnership represents a bridge between different areas of expertise and cultures, between complementary scientific approaches. Researchers of different nationalities combine their skills and share methodologies; institutions with diverse histories converge toward common goals. The result is added value that goes beyond the boundaries of any single institutional mission. As of 2024, IFOM is supported by a network of 47 active agreements, reflecting its international and interdisciplinary outlook: 28 with Italian institutions, first and foremost the University of Milan and the National Research Council, 11 with institutions based in other European countries, and 8 with partners outside of Europe.

Academic partnerships: a shared commitment to advancing research and higher education

Fruitful research combines resources, expertise, and visions in a shared commitment to common goals. Thanks to solid inter-institutional partnerships with leading academic and research institutions such as the University of Milan, the National Research Council, the University of Turin, Bocconi University, the University of Trieste, the University of Padua, and Pázmány University in Budapest, as well as their fundamental support in research positions, several IFOM scientists also play a key educational role within the academic system.
Each of these academic positions is supported by co-investment from the respective university, ensuring alignment of scientific objectives and enabling these researchers to contribute significantly and in a coordinated manner to both scientific research and advanced education.

Within the framework of its strategic plan, Athena, IFOM has outlined an ambitious vision: to build an ecosystem of European and global collaborations that amplifies the impact of Italian cancer research. In this context, establishing a new partnership means promoting the exchange of knowledge, technologies, and personnel; accelerating discoveries through the sharing of resources and efforts; maximizing clinical impact through broader and more representative networks; and expanding scientific horizons through cultural exchange.
In line with this vision, in 2023 IFOM launched a collaboration with the Mark Foundation for Cancer Research, one of the world's leading philanthropic organizations supporting research in cancer prevention, diagnosis, and treatment. In 2024, IFOM also began a collaboration with the International Agency for Research on Cancer (IARC), the intergovernmental cancer research agency of the World Health Organization.
In the field of clinical collaborations, 2024 marks a significant milestone: the twentieth anniversary of the partnership with the Falck Oncology Unit of ASST Grande Ospedale Metropolitano Niguarda, with which IFOM has conducted dozens of translational research projects on colorectal cancer.

IFOM's Global Network

From research to Impact: innovation and technology transfer

Every day, IFOM scientists work with a clear goal: to transform their findings into concrete solutions that can truly benefit patients.
IFOM is committed to ensuring that every promising scientific innovation can become a new therapy, a more precise diagnostic test, or a tool to improve cancer prevention and treatment. This means building bridges between the research world and clinical practice by collaborating with hospitals, pharmaceutical companies, and international institutions.
IFOM files patent applications to protect its innovations, ensuring they can be developed and delivered to patients in the most effective way. To achieve this, the Institute works with the right partners, ranging from pharmaceutical companies to innovative startups, to turn discoveries into tangible products.

IFOM's current patent portfolio includes 18 patent families.

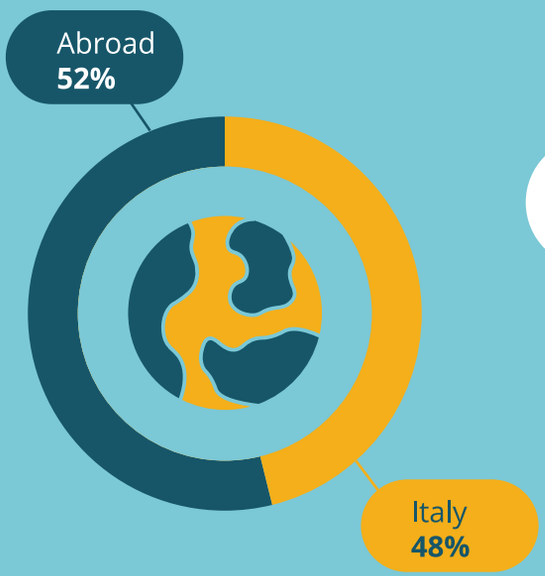
Key achievements include:

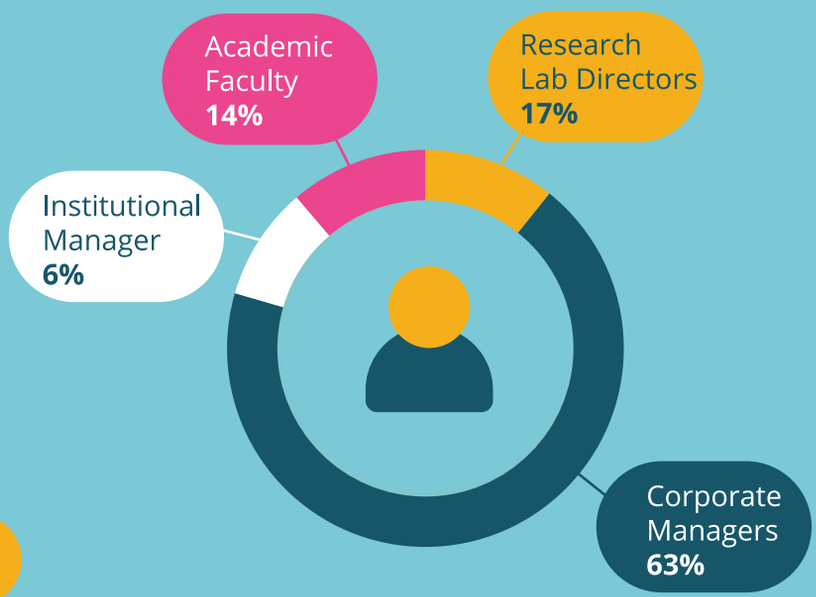
- The first filing of a new European patent application concerning therapeutic combinations capable of enhancing the antitumor effects of standard cancer treatments such as chemotherapy and immunotherapy for triple-negative breast cancer, lung cancer, and colorectal cancer;
- The first filing of a new European patent application covering a therapeutic platform for the treatment of B cell disorders;
- An international PCT extension filing related to therapeutic oligonucleotides for the treatment of Ataxia Telangiectasia (AT);
- The first filing of a new Italian patent application concerning a prognostic signature for the classification of prostate cancer patients;
- An international PCT extension filing regarding a method to predict the progression of Parkinson's disease.

7. Alumni: index of excellence

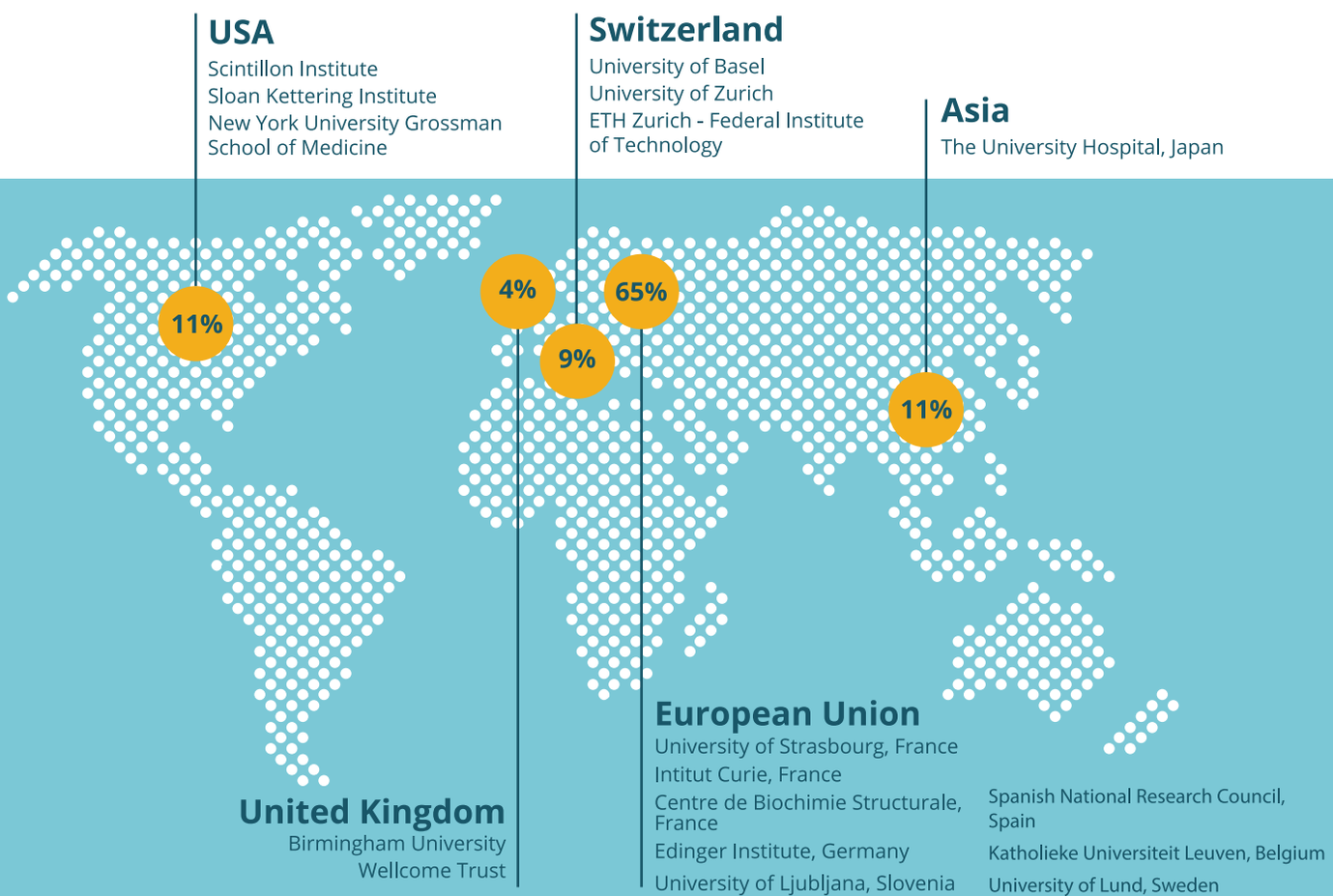
At IFOM, Alumni are considered and ininvaluable asset. Alongside scientific discoveries, they represent the most tangible evidence of the quality and excellence of the advanced training and research conducted in our laboratories. Training new generations of scientists - who, thanks to the tools and inspiration received during their PhD or postdoctoral experience at IFOM, can fully express their talent and apply what they have learned in other excellent institutions - is a core part of IFOM's mission.
IFOM is also fostering the exchange of ideas, innovation, and mentoring for the next generation of researchers, with the goal of enhancing the overall quality of research and education.
Since the launch of its scientific program in 2000, the IFOM community has welcomed hundreds of researchers from all over the world. Their paths crossed in IFOM's laboratories, where they shared experiences, experiments, challenges, and social moments. In keeping with the principle of brain circulation, a value in which IFOM strongly believes, 340 PhD students and postdocs, after receiving training and conducting research at IFOM, have gone on to pursue new opportunities within the global scientific or corporate community. According to their own testimony, the experience gained at IFOM played a fundamental role in shaping their careers.
Of these Alumni, 64% are Italian nationals, while 36% come from other countries. 52% continued their careers abroad, while 48% chose to invest in their professional journey within Italy.

Data updated to 2023





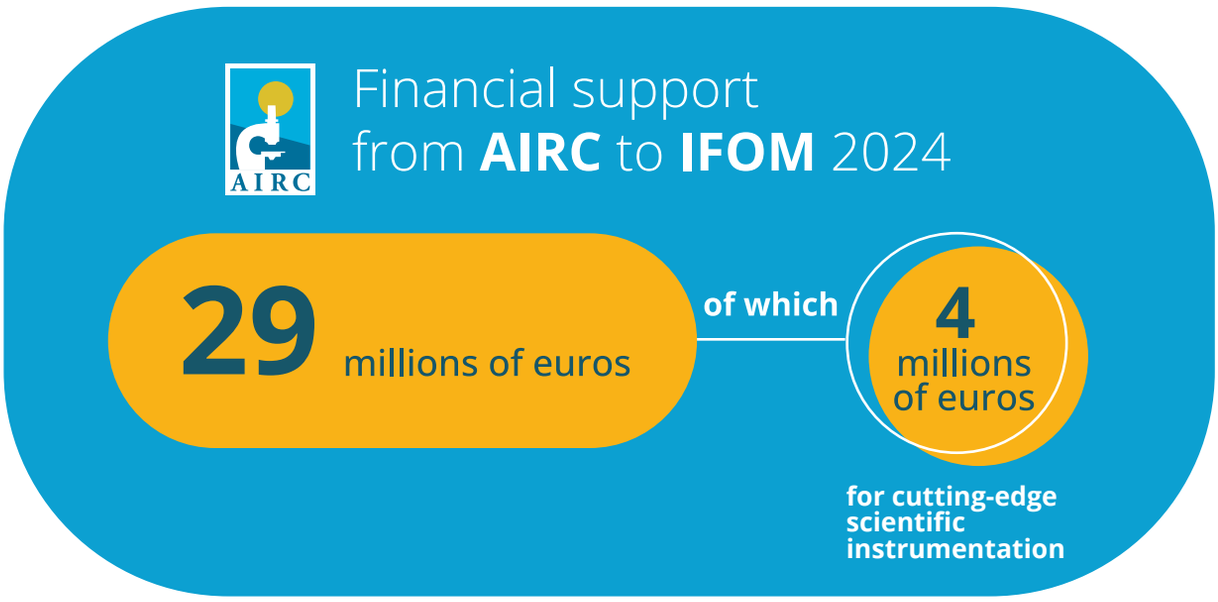
Out of the 340 Alumni, 180 (53%) have achieved outstanding professional milestones. Of these, 53 hold prominent positions in the scientific community, representing 15% of the total.
Twenty-nine are currently leading research laboratories at prestigious institutions such as the Memorial Sloan Kettering Cancer Center, the Spanish National Research Council, the Wellcome Trust, and the universities of Montpellier and New York.
Twenty-four serve as academic faculty at institutions including the University of Basel, the University of Zurich, the University of California, and the Katholieke Universiteit Leuven, as well as the Institut Curie.
Many Alumni have directed their careers toward other sectors, reinterpreting their vocation and applying the skills acquired at IFOM in new fields. These include 107 Alumni who now hold managerial positions in industry, accounting for 31% of the total, 40% of whom occupy top executive roles in leading companies such as AstraZeneca, Novartis, Pfizer, and Roche.
Additionally, 6% hold high-level managerial positions in various areas, including directors of technological service units in clinical institutions, universities, research institutes, scientific publishing houses, funding agencies, and related sectors such as Human Technopole, Fondazione Telethon, the Universities of Basel and Ludwig-Maximilians of Munich, Institut Pasteur, Institut Curie, and the Institute of Cancer Research.
The IFOM Alumni community reflects the quality and excellence that define the Institute.
IFOM is proud to have trained scientists who, thanks to their experience in our laboratories, are now contributing to scientific progress on a global scale, serving as a living and inspiring example for future generations of researchers.



Composition and distribution of IFOM Alumni careers

8. The strategic support of AIRC foundation

Since its establishment, IFOM has relied on the support of AIRC foundation to secure the resources necessary for its development plan. AIRC plays a pivotal role for IFOM, being bound by its statutory regulations to provide an annual contribution in support of IFOM's multi-year strategic plan. This funding covers operational research costs, including dedicated personnel, specific materials, and scientific instruments of modest value, as well as general expenses that support scientific activities and the promotion of novel research lines.
In 2024, AIRC foundation supported IFOM with a contribution of 29 million euros, of which 4 million euros were allocated to the acquisition of cutting-edge scientific equipment. In addition to this institutional support, IFOM also independently attracts financial resources by participating in competitive calls issued by public and private entities, including AIRC itself, which awarded IFOM an additional 6,1 million euros in 2024 through competitive grant programs.



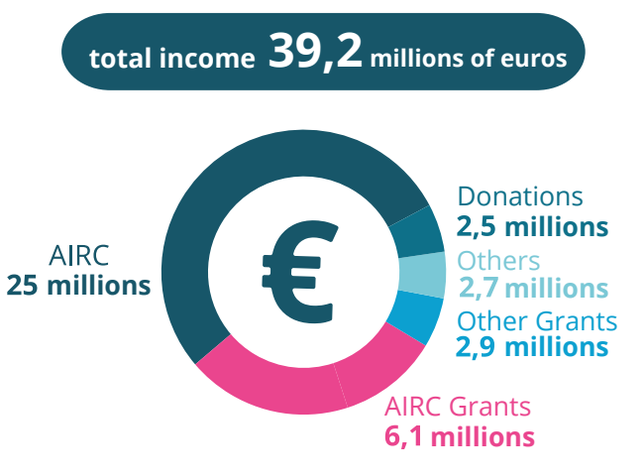
9. Financial sustainability and the funding challenge

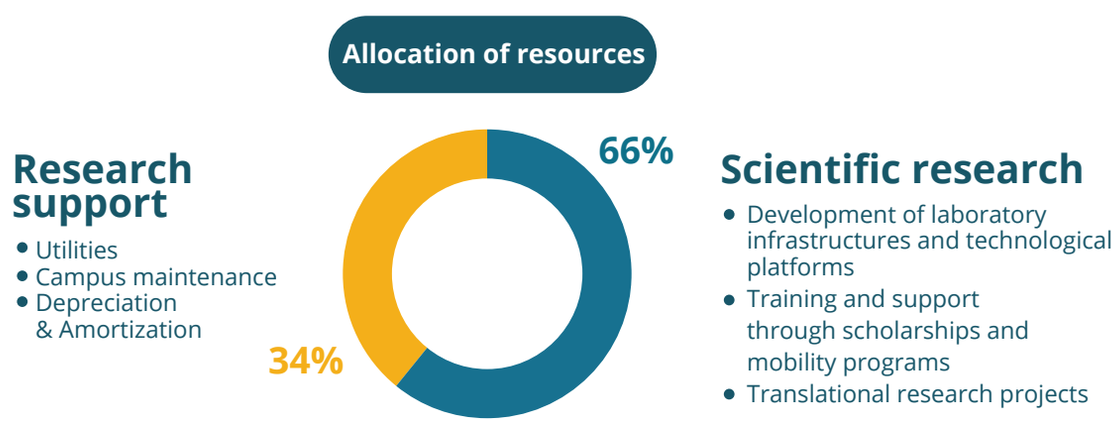
Financial and economic sustainability

During the 2024 fiscal year, IFOM consolidated its economic and financial position, ensuring the sustainability of its research activities.
Total financial resources amounted to 39 millions of euros, coming primarily from public and private funding, national and international grants, and contributions from AIRC and other philanthropic foundations. All revenues are managed according to principles of transparency and accountability, ensuring the proper use of funds in support of IFOM's scientific mission.
The main sources of funding include:

- Institutional contributions from AIRC;
- Research projects funded by public bodies (European Union, MIMIT);
- Partnerships with private entities and companies in the biomedical sector;
- Donations.

This diversification ensures financial stability, enabling continued investment in innovation and development.





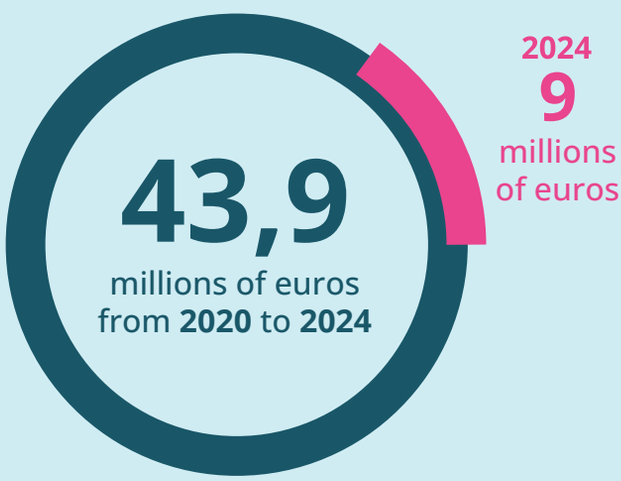
The sources of IFOM's funding in 2024 and the allocation of resources in 2024

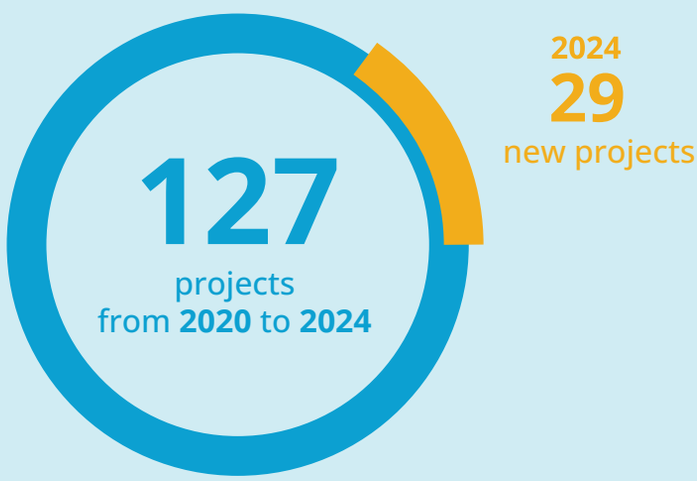
The challenge of research funding

Cancer research represents one of the most complex scientific challenges of our time. Addressing it requires substantial funding to accelerate progress and deepen our understanding of the disease, ultimately enabling the development of more effective diagnostic and therapeutic solutions. To secure such funding, IFOM researchers must present projects that are grounded in the robustness of their work and distinguished by the originality of their scientific ideas. The level of competition is extremely high. Nevertheless, fundraising is not only a necessity, it is also an opportunity to explore new areas of oncological research and to push beyond traditional boundaries with creativity.

Securing financial support from private foundations and public institutions, both nationally and internationally, allows IFOM researchers to access advanced technologies, collaborate with leading scientific minds worldwide, develop innovative therapies and diagnostics, and contribute to the training of a new generation of highly qualified scientists.

In the past five years, IFOM has obtained nearly €50 M in new funding, supporting a total of 127 research projects, approximately 25 new projects per year. In 2024, 29 new competitively awarded projects received funding totalling approximately € 9 M. Of these, 19 were fellowships awarded to early-career researchers.





Funding obtained by IFOM and active research projects in the five-year period 2020-2024

European and International funding

Among the most prestigious sources of research funding in Europe and globally are the competitive grants awarded by the European Research Council (ERC), a body of the European Union dedicated to supporting scientific and technological research conducted within the EU. The ERC program provides funding to outstanding researchers to pursue pioneering projects across all fields of human knowledge.

Since the launch of the ERC program in 2009, IFOM scientists have been awarded 18 ERC grants, a testament to the excellence of the research conducted at the institute.

As of 2024, six ERC grants are active at IFOM:

- **3 ERC Advanced Grant**, awarded to established researchers with a recognized track record of significant achievements in their field, granted to Alberto Bardelli, Fabrizio d'Adda di Fagagna, and Marco Foiani;
- **1 ERC Starting Grant**, awarded to early-career researchers of exceptional talent, granted to Claudio Vernieri;
- **1 ERC Proof of Concept Grant**, aimed at translating frontier research results into innovative concepts with potential for practical application, granted to Fabrizio d'Adda di Fagagna;
- **1 ERC Synergy Grant**, awarded to teams of excellent researchers collaborating on ambitious, interdisciplinary projects, granted to Giorgio Scita.

Additional European grants awarded to IFOM researchers in 2024 include:

- **1 Mission Cancer grant,** supporting innovative research in the fight against cancer;
- **1 Innovative Medicines Initiative (IMI) grant** promoting collaboration between industry and academia in the development of new medical therapies;
- **4 grants under the Marie Skłodowska-Curie programme**, including:
  · 1 Doctoral Network (ITN),
  · 1 Doctoral Network (DN),
  · 1 Doctoral Network (RISE),
  · 1 MSCA Postdoctoral Fellowship (PD)
- **1 Digital Europe grant**, supporting research on innovative digital technologies
- **1 Joint Translational Call (JTC) grant**, aimed at fostering international collaboration and advancing new methodologies and technologies in the biomedical field.

10. Gender equality and inclusion

Gender equality is not only a key objective of the United Nations 2030 Agenda, it is also a core value at IFOM, embedded in every aspect of the institute's mission. From recruitment to career development, from daily research activities to welfare policies, IFOM firmly believes that diversity is a driving force of scientific innovation.
To ensure that gender equality principles are translated into tangible and measurable actions, IFOM has established a Gender Committee in charge of overseeing and implementing related policies.
In 2024, IFOM's structured approach to gender equality was formally recognized with the Gender Equality Certification in accordance with the UNI/PdR 125:2022 standard. This certification attests to the implementation of a comprehensive management system that applies to all personnel and extends to anyone engaging with the institute. It formalizes a long-standing commitment, whereby inclusivity was already embedded as a foundational principle of the institute.
Further recognition came in 2024 with the "Parità Vincente" award, granted by the Lombardy Regional Council for Equal Opportunities, underscoring IFOM's ongoing commitment. This award is not only an achievement, but also a renewed incentive to continue striving for improvement: IFOM remains dedicated to making gender equality a concrete value and a real opportunity for everyone.

IFOM women empowering voices: a campaign that builds value

As part of the February Women & STEM month, IFOM launched the social media campaign "Women: Empowering Voices", featuring eight researchers, managers, and professionals from the institute. These individuals shared inspirational messages and personal reflections aimed at encouraging young women in science.
Through authentic and diverse accounts, the campaign addressed key issues such as gender-equal parenting, career transition flexibility, the transformative power of passion, and brain circulation. Each contribution offered a unique perspective, collectively portraying a multifaceted image of women in scientific research and aiming to inspire the next generation of female scientists.

Two examples from the IFOM women empowering voices campaign. Presented respectively by the researchers Eugenia Haddad and Simona Polo

Welfare and work-life balance

IFOM has adopted a comprehensive system of research support services and work-life balance measures aligned with its mission, to help both the professional and personal needs. These tools enable scientists to focus on their career paths with maximum efficiency and minimal interference from ancillary tasks. IFOM's work-family reconciliation policies offer both economic and motivational benefits to its personnel, ensuring that professional responsibilities do not conflict with personal and family life, but rather support it.

Particular attention is given to equal opportunities, with a special focus on female researchers, approximately one-quarter of whom are mothers. To help them balance motherhood with a scientific career, IFOM has implemented targeted initiatives such as Laboratory G, a dedicated support program for expectant and new mothers in science.

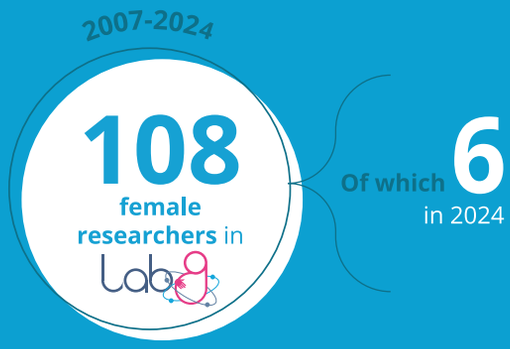
This long-standing, researcher-focused approach has also contributed to IFOM's ability to attract national and international talent, which now represents 24% of its research community.

"The 'Winning Equality' award granted to us by the Council for Equal Opportunities of the Lombardy Region in 2024 represents an important recognition of our commitment. However, it is not a final achievement, but rather a new drive to keep improving: we will continue working to make equality a tangible value and a real opportunity for everyone."

Maria Grazia Filosa
Human Resources Director

Lab G

Established in 2007, Lab G was specifically designed for pregnant researchers (hence the name) and new mothers. In most biomedical research centres, laboratory work is restricted during pregnancy, postpartum, or breastfeeding due to potential exposure to chemical, physical, or biological agents that may pose risks to the foetus or newborn.
As the first initiative of its kind in Italian research, Lab G enables IFOM scientists to continue their careers during maternity in a safe and supportive environment. It offers dedicated facilities that allow researchers to work safely throughout pregnancy and breastfeeding.
From 2007 to 2024, 108 researchers have temporarily carried out their work in Lab G, including 6 in 2024.



Company nursery service

To foster an inclusive work environment that supports employees' family needs and promotes a healthy work-life balance, IFOM offers access to an external, bilingual nursery for children aged 11 to 36 months. The service, 70% funded by the institute, operates throughout the working day, helping staff effectively manage their family responsibilities alongside their professional commitments.
Since its establishment in 2005, the nursery has welcomed 124 children from 8 different nationalities. The bilingual setting ensures that children are cared for in a stimulating, multicultural environment, allowing parents to focus on their work.

Administrative and intercultural support

Since 2012, IFOM has offered an administrative and intercultural facilitation service dedicated to supporting international researchers through the key bureaucratic steps required to live and work in Italy. This service, which has assisted 221 researchers from 57 different nationalities, addresses one of the main challenges faced by foreign scientists: adapting to a new system and culture, and face complex administrative procedures.

According to a 2018 EURAXESS survey, over 60% of international researchers reported that bureaucratic processes in host countries are a major source of stress and hinderance of productivity. In Italy, tasks such as registering for healthcare, opening a bank account, or finding housing can become overwhelming without proper guidance, especially in a foreign language.

IFOM's facilitation service provides comprehensive support in these areas, significantly reducing the administrative burden on researchers, thus contributing to a more productive and efficient environment.

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