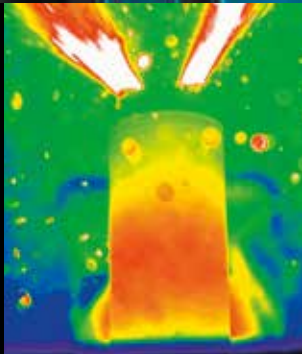
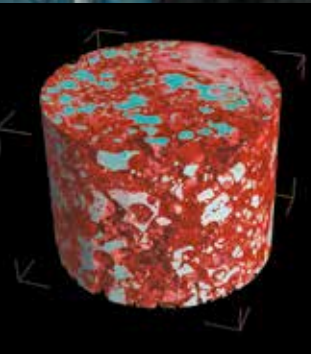





ESRF

The European Synchrotron



LIGHT FOR INDUSTRY

MATERIALS CHARACTERISATION
BEYOND LAB FACILITIES



A light for Science, a vision for Industry

Imagine a source that produces X-rays 100 billion times brighter than the X-rays used in hospitals. These X-rays, endowed with exceptional properties, are produced at the ESRF, a unique research facility which produces the world's most intense synchrotron light.

The ESRF, which opened in 1994, has become a global leader, welcoming thousands of scientists from around the world. It is a centre of excellence for fundamental research. It is also committed to applied and industrial research for which it has forged dynamic partnerships and services for strategic and innovative industrial sectors. This strategy is fully supported by its 21 partner countries and shared by the ESRF staff.

Understanding the structure of matter to tailor new smart and sustainable materials is at the centre of today's current challenges for industry. The ESRF synchrotron light allows researchers to see into the heart of matter, fostering technological breakthroughs of the future and accelerating innovation by industry.

Following on from 20 years of successful user operation, the ESRF has launched an ambitious

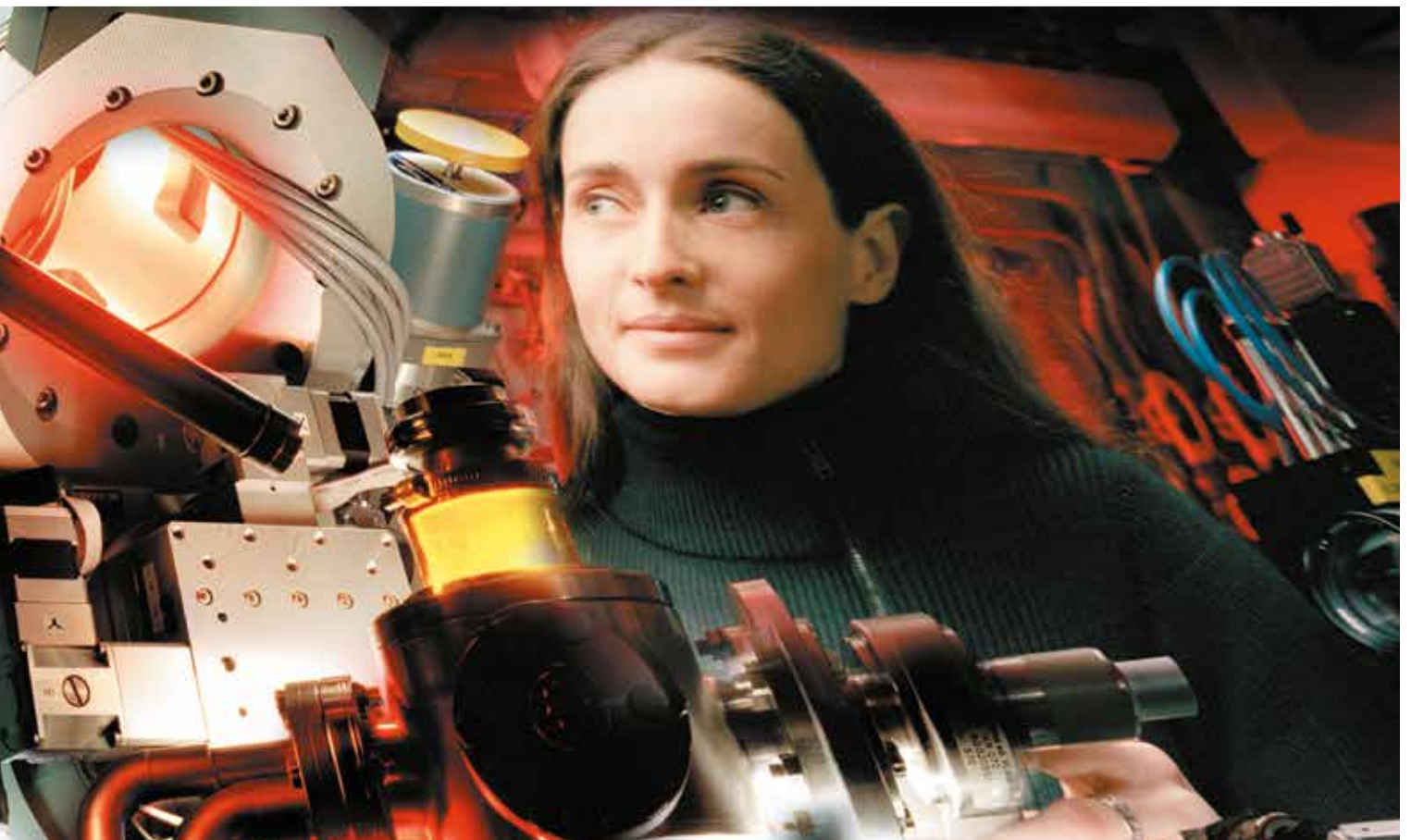
and innovative modernisation project, the Upgrade Programme. With the Upgrade Programme, the ESRF is responding to the future research challenges by constructing the first of a new generation of synchrotrons. This will enable the following generations of scientists to discover further fields in the scientific exploration of matter, and contribute to answering the great technological, economic and industrial challenges confronting our society.

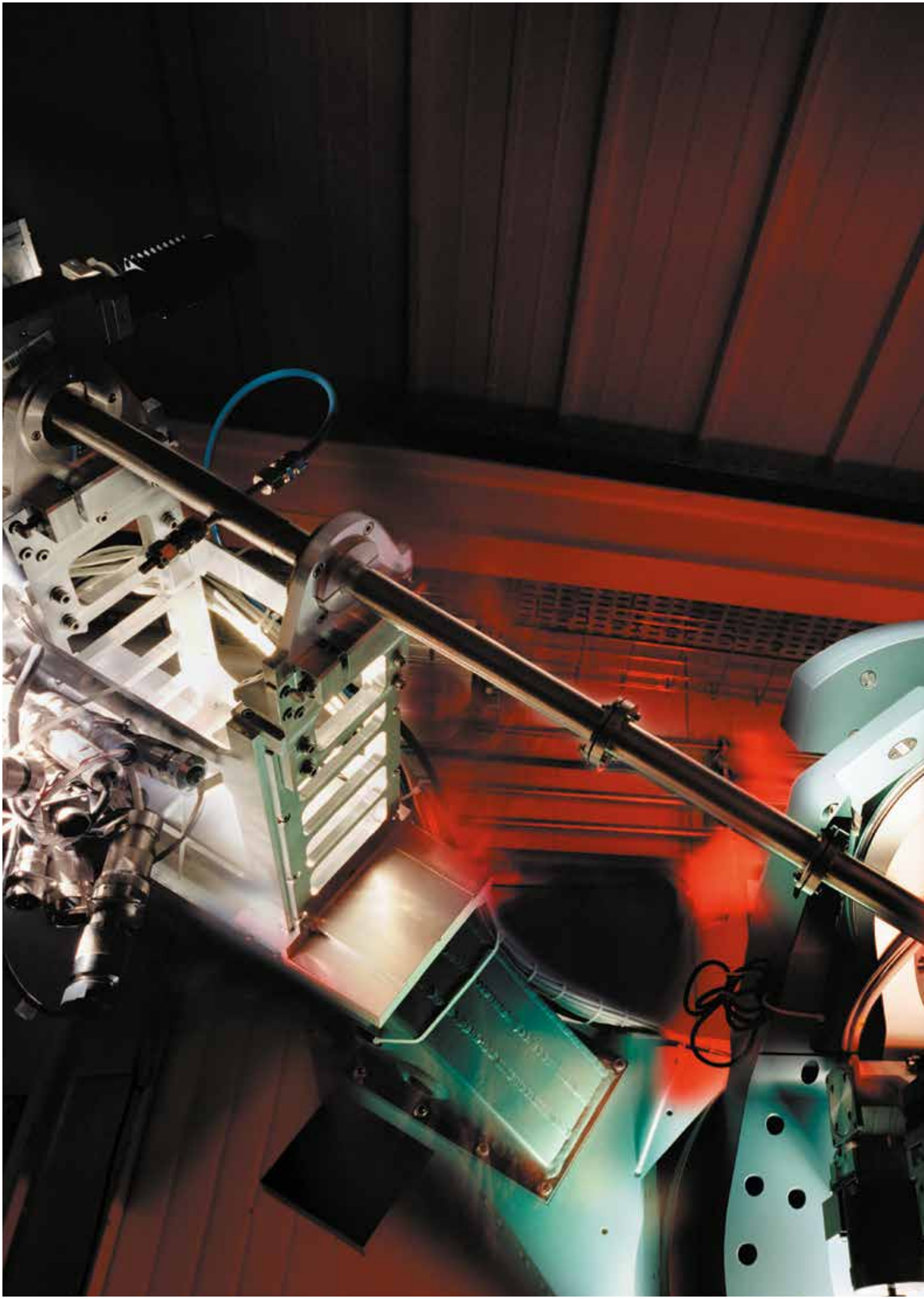
Building partnerships with the ESRF offers you privileged and practical access to over 40 highly specialised experimental stations ("the beamlines"), each equipped with high performance instrumentation and offering a large variety of analytical tools. It also provides the opportunity to work with expert staff and world-class multidisciplinary research teams. We are ready to work with your business to find solutions for your R&I and technological innovation challenges.

Our priority is to build a long-term relationship, with you, with the ultimate goal of making your business more competitive on global markets and creating jobs.



Francesco SETTE
Director General





A LANDMARK FOR SCIENCE AND INNOVATION

Inaugurated in 1994, the ESRF is the world's most intense X-ray source, an international centre of excellence for fundamental science which is also committed to applied and industrial research. The ESRF plays a key role in stimulating innovation and enhancing competitiveness and is accessible for companies of all sizes from all sectors of industry.

A unique research facility

- 6,500 scientist visits every year, including about 400 from industry, to carry out research in a huge variety of fields, ranging from the chemistry and physics of materials to archaeology and cultural heritage, from biotechnology and medical applications to environmental science and nano-technologies.
- 4 Nobel prize-winners amongst the ESRF's users
- A record number of publications
 - More than 25,000 refereed articles from the last two decades
 - Nearly 2,000 publications per year, equivalent to around 5 every day

A landmark for science open to industry

- 30% of our public research involves industrial participation
- Over 100 companies have used the ESRF's facilities for confidential research over the last 5 years

A model of international cooperation: 21 partner nations

- 13 Member States: France, Germany, Italy, United Kingdom, Russia, Spain, Benesync (Belgium, the Netherlands), Nordsync (Denmark, Finland, Norway, Sweden), Switzerland
- 8 Associate Countries: Israel, Austria, Centralsync (Czech Republic, Hungary, Slovakia), Portugal, Poland, South Africa



WHY USE SYNCHROTRON X-RAYS?

Synchrotron radiation is used increasingly as a response to industrial challenges related to the life cycle of materials: development, manufacturing, operation, ageing, wear-and-tear, preservation, restoration, recycling, evaluation, and more. Observing, characterising and understanding the structure of matter are at the heart of these challenges for industry. Our applications cover many fields, including pharmaceuticals and biotechnology, chemistry and catalysis, cosmetics, food products, construction and transport engineering, nanotechnologies, semi-conductors, energy, environment, metallurgy, and advanced materials.

Functioning like a 'super-microscope', due to the brilliance and exceptional qualities of its X-rays (100 billion times brighter than X-rays from conventional sources), the ESRF reveals the structure of matter in all its complexity. These X-rays allow advanced characterisation of materials down to the atomic scale, often with non-destructive experiments, in real time and under real manufacturing or operating conditions.

The ESRF offers industry privileged and practical access to its 43 X-ray beamlines which support a wide range of experimental techniques such as macromolecular crystallography, tomography/CT, powder diffraction and PDF, X-ray fluorescence, stress/strain imaging, XANES/EXAFS, SAXS/WAXS and infrared microscopy, amongst others.

ESRF advantages:

HIGH INTENSITY X-rays, allowing the study of very small samples, focussing on a small area, fast phenomena or high-throughput

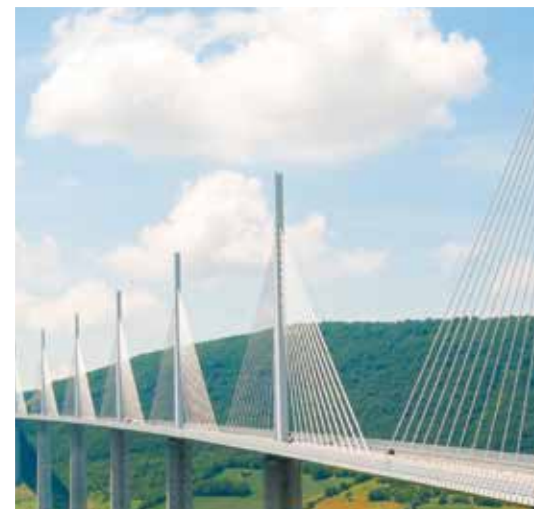
NON DESTRUCTIVE probing of material structure

HIGH SPATIAL RESOLUTION from millimetres to nanometres and even to atomic resolution

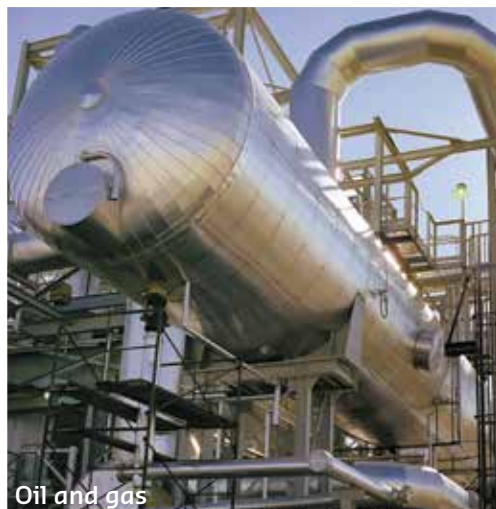
FAST to follow processes in real time with microsecond (or even less) time resolution

OPERANDO for working *in situ* under real manufacturing and operating conditions (extreme temperatures, pressure, mechanical stress, chemical environments, etc.)

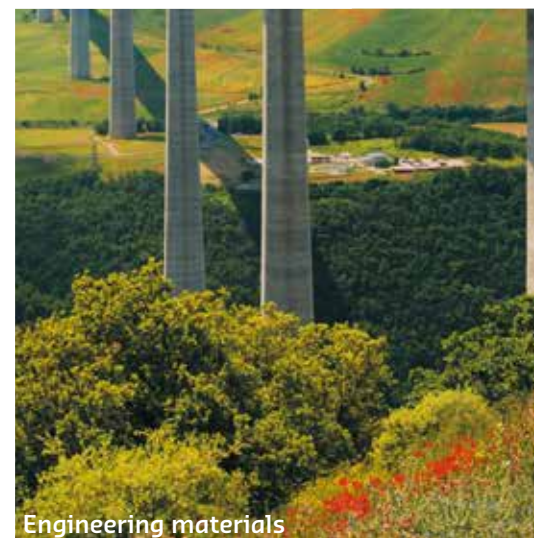
WIDE RANGE OF SAMPLE ENVIRONMENTS: furnaces, cryostats, diamond anvil cells, large volume press, on-line mixing, microfluidics, gas atmospheres...



Health and biotechnology



Oil and gas



Engineering materials



Home, food and body



Energy and environment

WHAT DOES THE ESRF OFFER TO INDUSTRY?

The ESRF has over 20 years of experience in working with and working for industry.

If innovation is part of your strategy, the ESRF's business development team can help you find the best solutions adapted to your technological innovation needs and to your business objectives. Our offer ranges from R&I partnerships to tailor-made experiments and routine and reliable mail-in data collection. Our priority is to build a long-term relationship with the ultimate goal of making your business more competitive on global markets.

ESRF's service line-up for business:

UNIQUE

Industry has rapid access to a world-class research facility, the world's most intense X-ray source, with no requirement for publication of results.

INNOVATIVE

We offer privileged and practical access to 43 specialised experimental stations, or beamlines, each equipped with high performance instrumentation and offering a large variety of analytical tools. Our expert staff, specialised in designing and running experiments and sample environments, will cater for your specific needs.

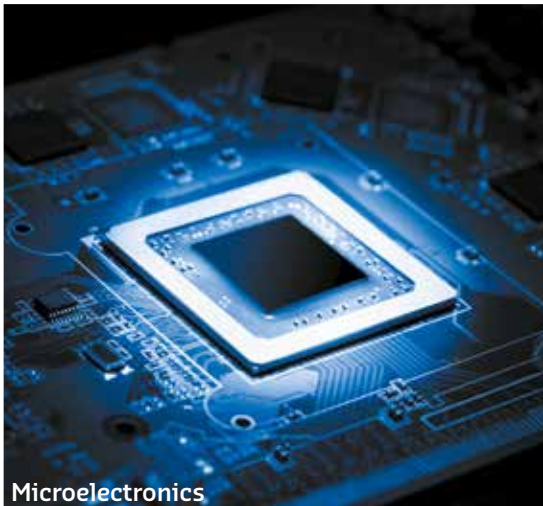
ACCESS TO SUIT YOU

A personal service is provided by our dedicated business development team and experienced staff at every stage of your project. Our offer, for businesses of all sizes,

ranges from R&I partnerships to routine experiments. Industrial users have the option of sending their samples for the experiment to be carried out by our scientists. We provide fixed-price mail-in services as cost effective solutions for selected X-ray techniques such as protein crystallography, SAXS/WAXS, PDF... Macromolecular crystallography experiments can even be performed by remote access via secure internet services.

PROTECTED

Our proprietary services are confidential, with a clear quotation, and rapid NDA/CDA and MTA when these are required.



Microelectronics



Transportation



ent



Pharmaceuticals



Catalysis

HOW DOES THE ESRF WORK WITH INDUSTRY?

Our business development team is ready to work with you to listen to your technological innovation needs and to either match them with our services or to create customised collaborations and partnerships. We can be a full partner or act as an expert for specific outsourced requirements for your projects, be they in-house, national or Horizon2020. Joint industry-academia consortia are often involved.

Our aim is to provide the right approach for your R&I:

ROUTINE PROPRIETARY ACCESS

Rapid, paid for, and confidential.

TAILORED PARTNERSHIPS

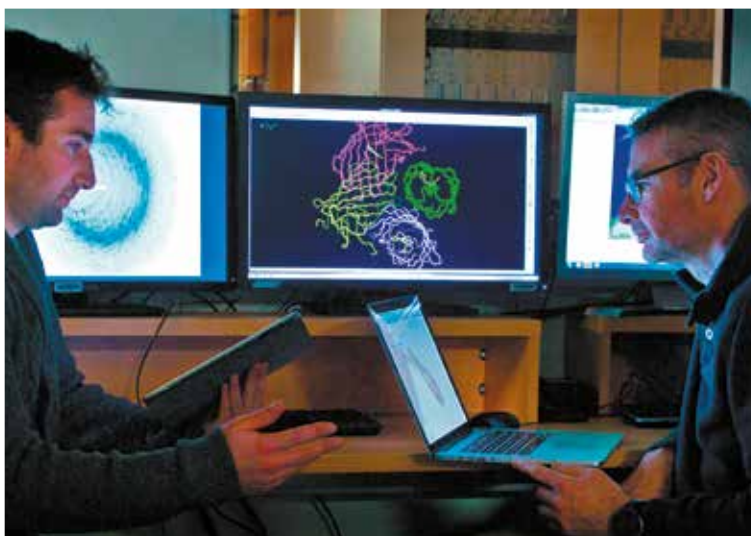
Longer term, deeper research programmes with industry, including training and sponsored PhD studentships, and implication in Horizon2020 grant proposals.

FREE OF CHARGE ACCESS

Available through the ESRF peer review programme, results have to be published. Applications from industry alone or with academia are welcome. In addition, Innovation-Led Long Term Proposals (3 years) open the way to working with business and academia to further develop synchrotron techniques for industrial exploitation.

The IRT Nanoelec: Inventing tomorrow's nanoelectronics technologies

IRT Nanoelec brings together partners from the public and private sectors to conduct groundbreaking research and development in information and communication technologies and, more specifically, micro and nanoelectronics. The competitiveness-enhancing innovations and research developed at IRT Nanoelec are transferred directly to businesses. The IRT Nanoelec programme is focused on 3D assembly integration, nanophotonics on silicon and via technologies, supported by technological infrastructure including an important pathfinder programme "Industrial Micro- and Nano-Electronics Characterisation" which uses neutrons and synchrotron X-rays. Thanks to this programme, the ESRF is greatly strengthening its work with the European micro- and nano-electronics industries.



A unique site for research and innovation

Grenoble attracts scientific talent through its exceptional environment and quality of life. A cosmopolitan city, situated at the heart of the French Alps, Grenoble is a centre of innovation, recognised around the world for its research facilities, its universities, its economic vitality and its future-oriented projects.

The ESRF enjoys a strategic position, located within the European Photon and Neutron (EPN) Science Campus - a science hub hosting three major international institutes for the exploration of life and materials sciences, including the Institut Laue Langevin, the ESRF's sister institute using neutrons. The ESRF is also a partner of GIANT, Grenoble Innovation for Advanced New Technologies, a campus for global innovation and the lifeblood of economic and scientific development in Grenoble.



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