



*Stay tuned to the Future.  
Impact of research  
infrastructures 2.0*

*Session 4: Collaboration between  
infrastructures to create impact*

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Francesco SETTE  
Director General, ESRF





## 22 PARTNER COUNTRIES

### 13 Member states:

France	27.5 %
Germany	24.0 %
Italy	13.2 %
United Kingdom	10.5 %
Russia	6.0 %
Benesync (Belgium, The Netherlands)	5.8 %
Nordsync (Denmark, Finland, Norway, Sweden)	5.0 %
Spain	4.0 %
Switzerland	4.0 %

### 9 Associate countries:

ESRF  
Grenoble  
France

A POWERHOUSE OF  
INTERNATIONAL  
SCIENTIFIC  
COLLABORATION

BRINGING NATIONS TOGETHER  
TO ADVANCE SCIENCE AND TO CREATE VALUE  
FOR OUR SOCIETY

ACCESS: SCIENTIFIC EXCELLENCE  
OPEN DATA POLICY SINCE 2016

22  
partner countries

10 000  
scientific visits per year

30 %  
of research with industry

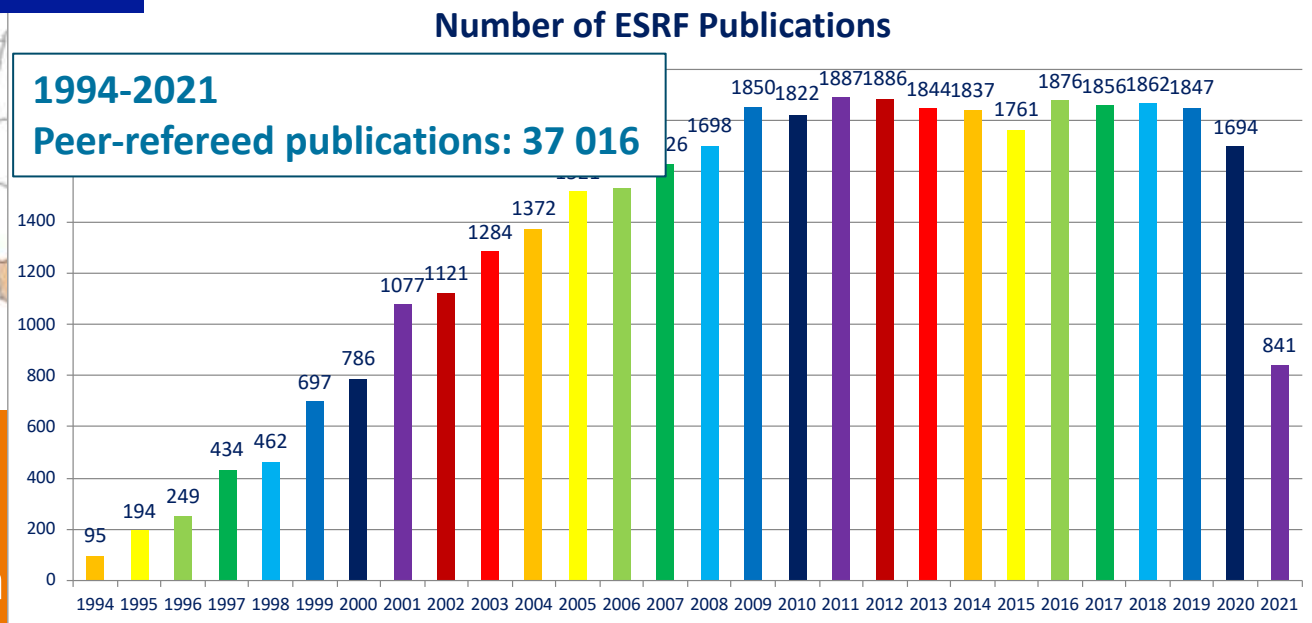
4  
Nobel Prizes

2000  
publications  
per year

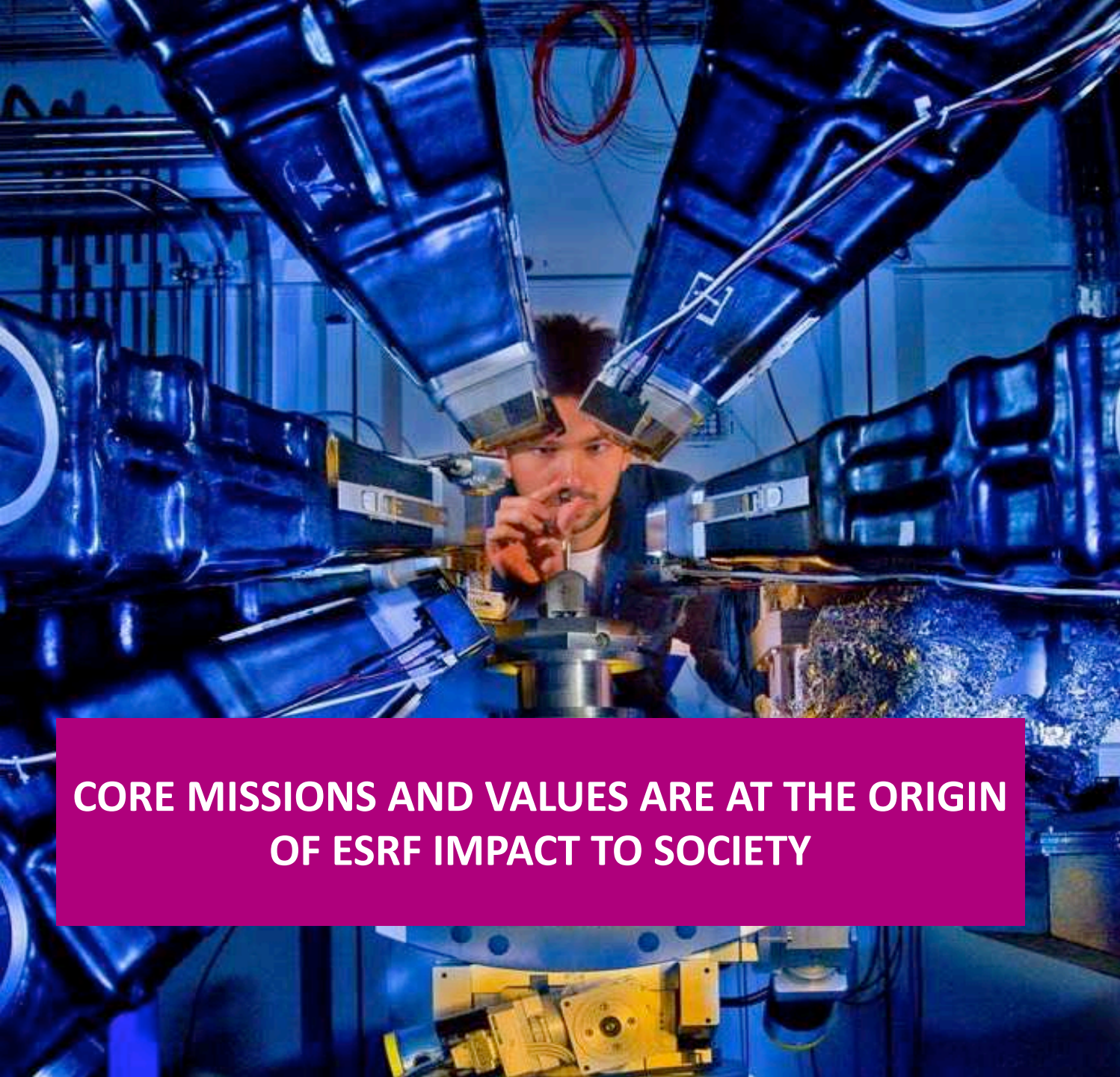
100 M€  
Annual budget

## ESRF Users between 2010-2020: 74 000 users from more than 60 countries

THE LARGEST IMPACT OF A RI IS THE SATISFACTION, COMMITMENT AND LONG TERM ENGAGEMENT OF A WIDE USER BASE







## CORE MISSIONS AND VALUES ARE AT THE ORIGIN OF ESRF IMPACT TO SOCIETY

### ESRF's core missions and values

- Design, construct, operate and develop state-of-the-art X-ray synchrotron instruments to the benefit of the scientific communities of the Member and Associate countries
- Serve the international community for the advancement of knowledge and to address global societal challenges: health, energy, environment and climate
- Engage to create diversity and balance
- Support the use of X-rays by industry from Member and Associate countries to strengthen its competitiveness on the global scale
- Train the next generation of scientists, engineers and technical staff
- Strive for carbon neutral footprint and energy consumption





**PUSHING THE BOUNDARIES OF TECHNOLOGIES  
TO OPEN NEW VISTAS FOR SCIENCE**



# ESRF-EXTREMELY BRILLIANT SOURCE: A NEW STANDARD FOR SYNCHROTRON LIGHT SOURCES

25 August 2020

Start of User  
Operation:  
on time and  
within the budget

1 527

1 527 experiments  
since 25 August 2020  
from international  
scientific teams, of  
which 1262 fully remote  
(68%).

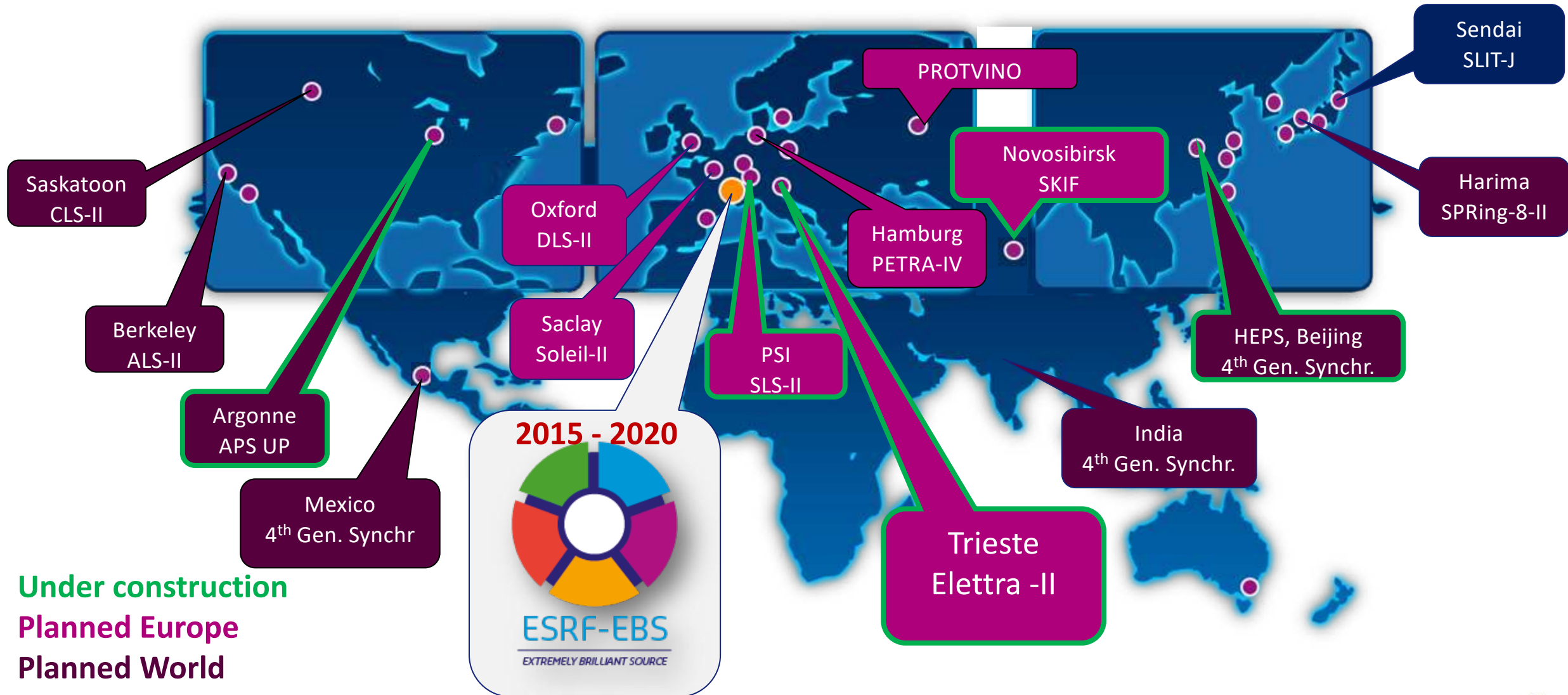
## ESRF UPGRADE PROGRAMME 2009-2022 A « landmark » in the ESFRI roadmap



- Investments: 330 M€
- Staff cost: 220 M€
- TOTAL : 550 M€



## ESRF-EBS R&D SPILLOVER EFFECT TOWARDS THE WORLD COMMUNITY







**A DRIVER FOR EUROPEAN SCIENCE**



# ESRF-EBS, AN EXTREMELY BRILLIANT SOURCE TO TACKLE GLOBAL CHALLENGES

1. **Health, Health Innovation**, overcoming diseases and pandemics
2. **Material for tomorrow**, and innovative and sustainable industry
3. **Clean Energy transition**, sustainable energy storage and clean hydrogen technologies
4. **Planetary research** (terrestrial and extra-terrestrial)
5. **Environmental and climatic challenges**,
6. **Bio-based economy and food security**
7. **Humanity and world cultural heritage**



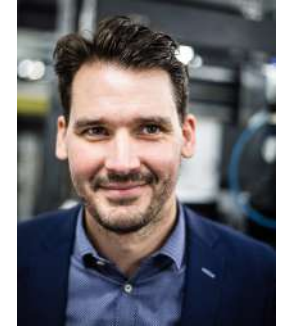






**SEVEN** ongoing ERC grants which are ESRF-based on public and CRG beamlines and facilities

Grant Holder	Grant Type	Project Title	Period
Kristina KVASHNINA, Helmholtz-Zentrum Dresden- Rossendorf (DE) – ROBL BM20	Starting	Towards the bottom of the Periodic Table (TOP)	2018-2022
Hugh SIMONS, DTU (DK) – ID06 & UPBL2-ID03	Starting	3D piezoresponse X-ray microscopy (3D-PXM)	2019-2023
Marie-Ingrid Richard, Aix- Marseille University (F) – ID01	Consolidator	Nanostructures towards atomic resolution: catalysis and interface (CARINE)	2019-2024
Alexandra-Teodora JOITA- PACUREANU, ESRF – ID16A	Starting	Bright, coherent and focused light to resolve neuronal circuits (BRILLIANCE)	2020-2025
Beatrice RUTA, CNRS (F) – ID10 & UPBL1-ID18	Starting	A coherent view of Glasses: complex dynamics of glasses with coherent X- rays the (CoherentGlasses)	2020-2025
Henning Friis POULSEN, DTU (DK) – ID06 & UPBL2-ID03	Advanced	The physics of metal plasticity (PMP)	2020-2025
François RENARD, University of Oslo and (CNRS-UGA) – UPBL3-BM18, ID19 and ID11	Advanced	Break-Through Rocks” (BREAK)	2021-2026







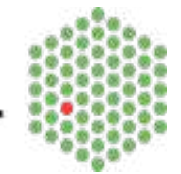
### NEW ACCESS MODELS TO ENHANCE THE SCIENTIFIC USE OF ESRF-EBS

- To **STRUCTURE** the user community
- To **BOOST** collaborative scientific projects
  - Technique-driven access for the « shock » community
  - Science-driven access: « degradation of paintings »
  - Science-driven hub: « European battery Hub »

# EPN SCIENCE CAMPUS : A UNIQUE SITE FOR RESEARCH AND INNOVATION



- +500 scientists in the Campus
- The most powerful research reactor and the brightest synchrotron source
- THREE INTERNATIONAL ORGANISATIONS and IBS – a French Institute for Structural Biology – working together to welcome users from all over the world





## **LEAPS** – the League of European Accelerator-based Photon Sources –



A strategic consortium initiated by the Directors of the Synchrotron Radiation and Free Electron Laser user facilities in Europe.

Aims:

- to ensure and promote the quality and impact of fundamental, applied and industrial research carried out at each facility
- to foster open innovation based on accelerator technology and state-of-the-art beamlines and instruments



photon and neutron  
open science cloud



**THE AFRICAN LIGHTSOURCE**  
Towards a Lightsource for the African Continent

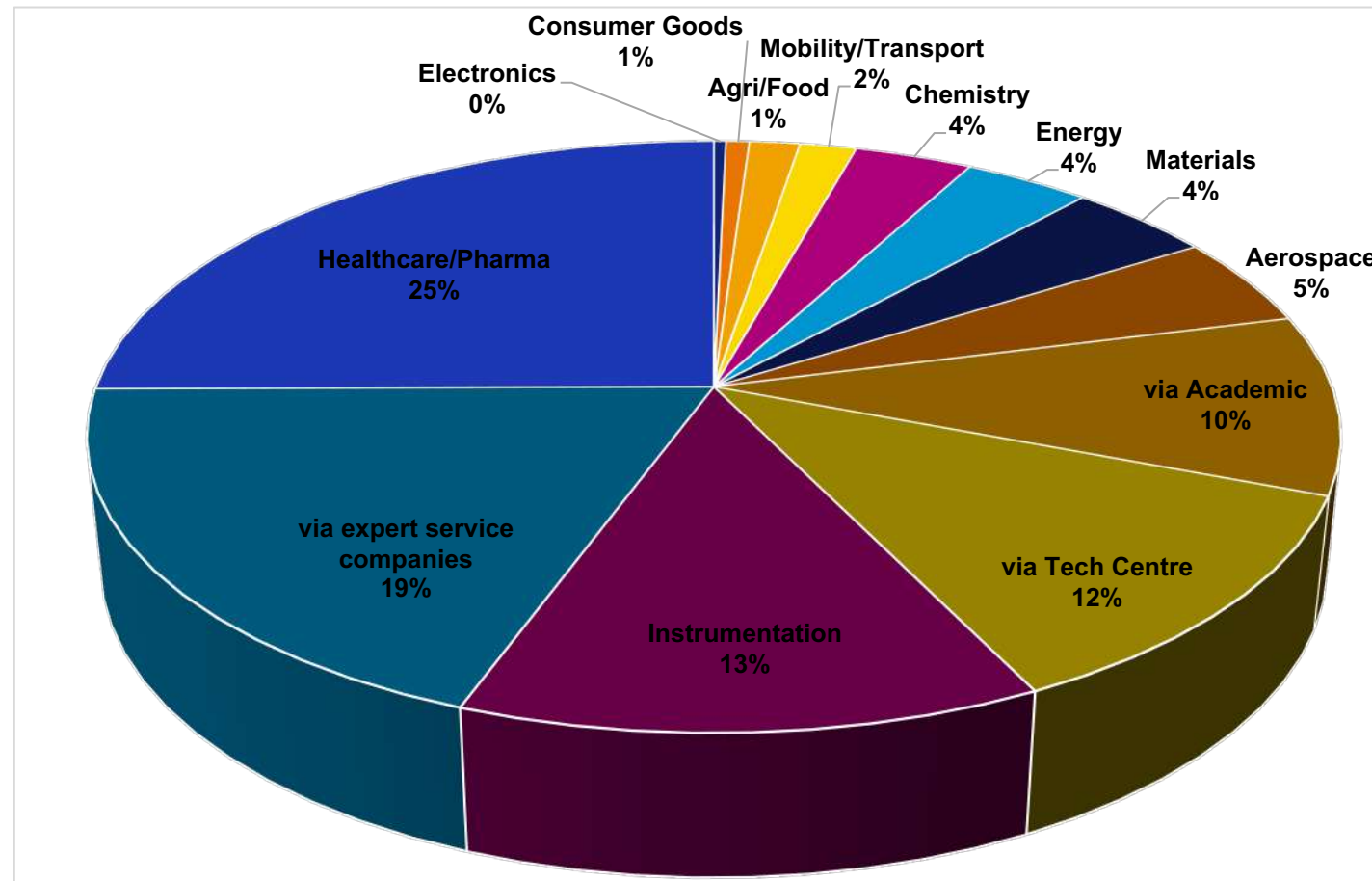




**DRIVING INNOVATION AND EU COMPETITIVENESS**

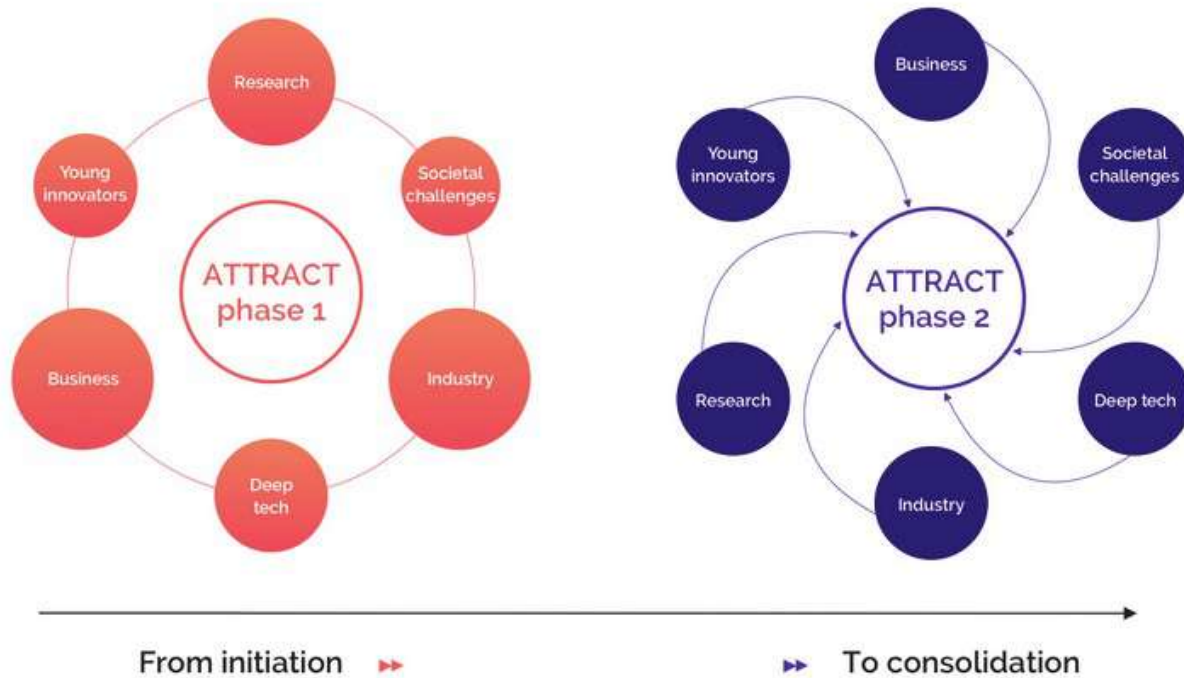


## Industry income at the ESRF per sector





# ATTRACT – IDENTIFYING BREAKTHROUGH TECHNOLOGIES FROM FUNDAMENTAL RESEARCH



An initiative launched in 2018  
funded by the EU's Horizon 2020 programme

**ATTRACT phase 1: €100K** awarded to each of 170 promising projects in the domain of detection and imaging technologies across Europe to develop a proof-of-concept.

**ATTRACT phase 2: €25M** to take forward the most promising opportunities generated in phase 1, with the goal to reach private investment and the market.



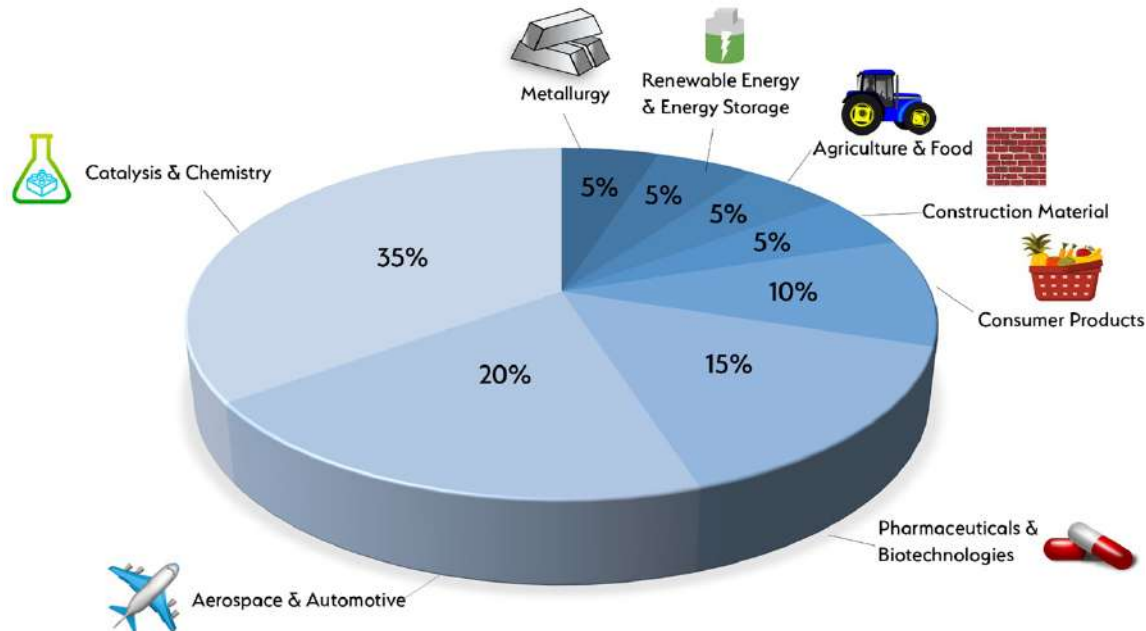
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 101004462

The European Synchrotron

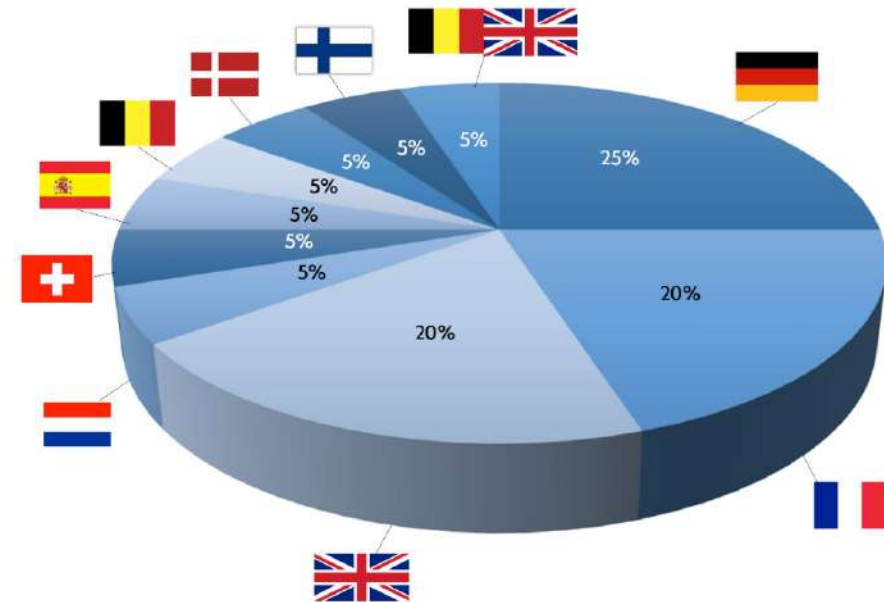


# InnovaXN Marie Skłodowska Curie COFUND Programme

Co-funding of 40 PhD student programmes on research driven  
by precompetitive industrial R&D topics



*Industrial sectors of Round 1 (Sept. 2020)*



*Industrial partner countries in Round 1*

This project has received funding from the EU Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 847439.







**TRAINING THE NEXT GENERATIONS**



An international PhD programme, driving the transfer of expertise to other research labs, to industry and to society at large.



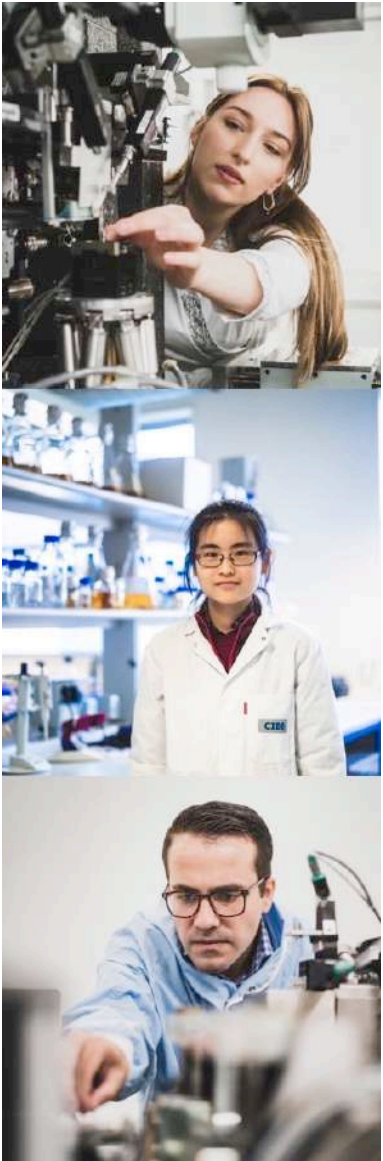
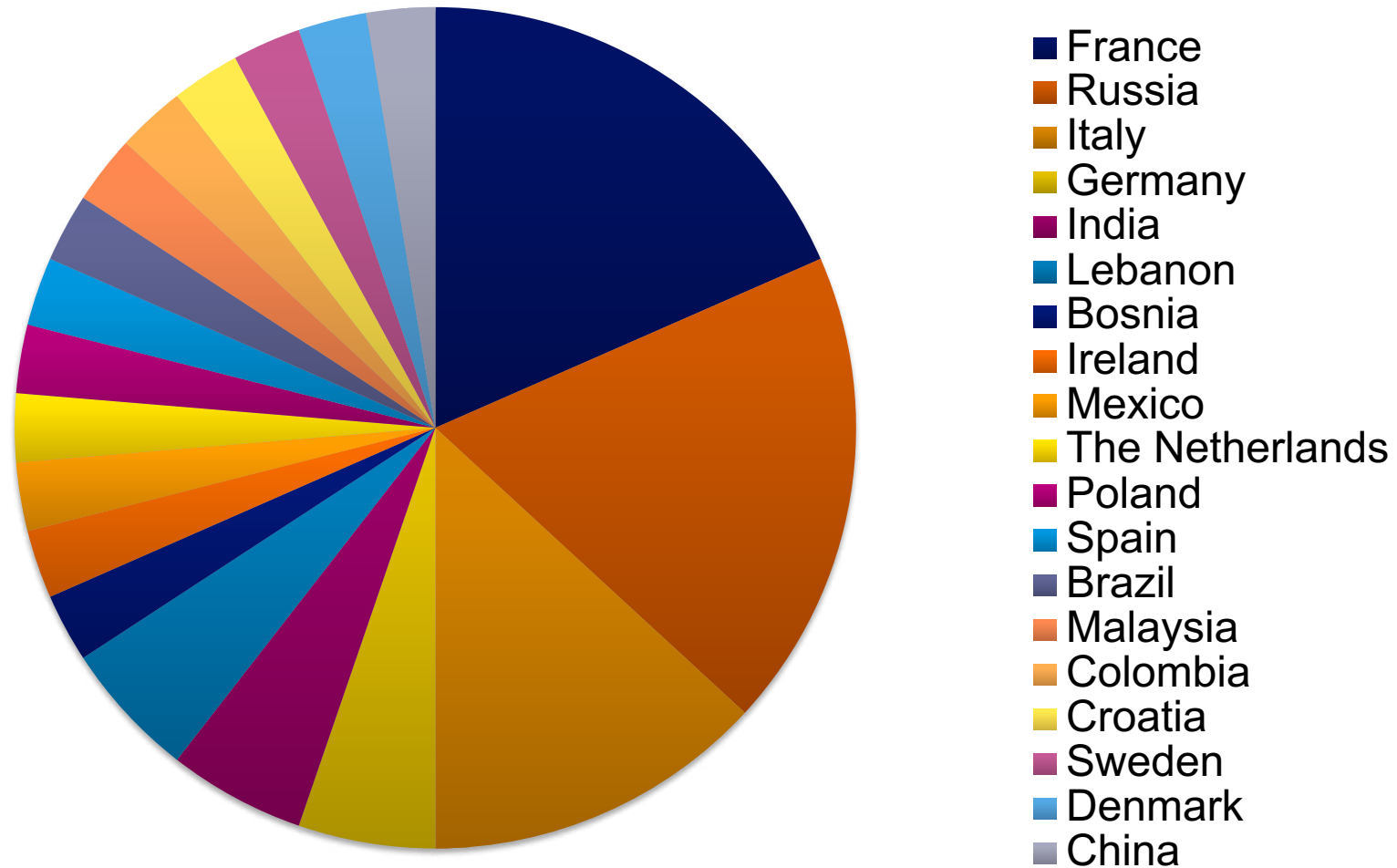
**55 PhD students in 2021, among which  
40% with an industrial partner**

*“Growing up in a country which was being rebuilt after years of war destruction, I learned how important restoration and conservation is. Now here I am, living my dream, studying from world renowned experts, feeling more motivated than ever.”*

Ida Fazlić, Bosnian, ESRF PhD student in collaboration with Rijksmuseum and the company AkzoNobel, analysing how painters' drying methods affect masterpieces.



## An international PhD programme Distribution of ESRF PhD students in 2021





**ACTING FOR A SUSTAINABLE FUTURE**





### Contributing to mitigate climate change is a priority for large scale international infrastructure as the ESRF

- **20% decrease in energy consumption** with the new EBS storage ring technologies
- **Full remote access possibilities to reduce travel**
- **25% of the research carried out at the ESRF** is linked to climate change, clean energy, environment, green engineering and sustainable materials:
  - Battery research for electric transportation
  - Renewable energy technology
  - Geosciences and CO<sub>2</sub> trapping
  - Environmental sciences
  - Bio-environmental engineering
  - Green metallurgy
  - Sustainable materials for industry



# RIs: CREATING TOGETHER VALUE FOR ALL

PIONEERING SYNCHROTRON SCIENCE



## THANKS FOR YOUR ATTENTION



Looking forward to welcoming you at the ESRF!

➤ Twitter @esrfsynchrotron – Instagram @esrf\_synchrotron

