

DE LA RECHERCHE À L'INDUSTRIE

cea

DRF

THE KNOWLEDGE FACTORY

**CEA
Fundamental
Research
Division**

Nora BENHABLES
Director, External Collaborations and Industrial
Partnerships

FuSuMaTech Workshop, CERN, April 20, 2018

www.cea.fr



CEA

**Alternative Energies &
Atomic Energy
Commission**



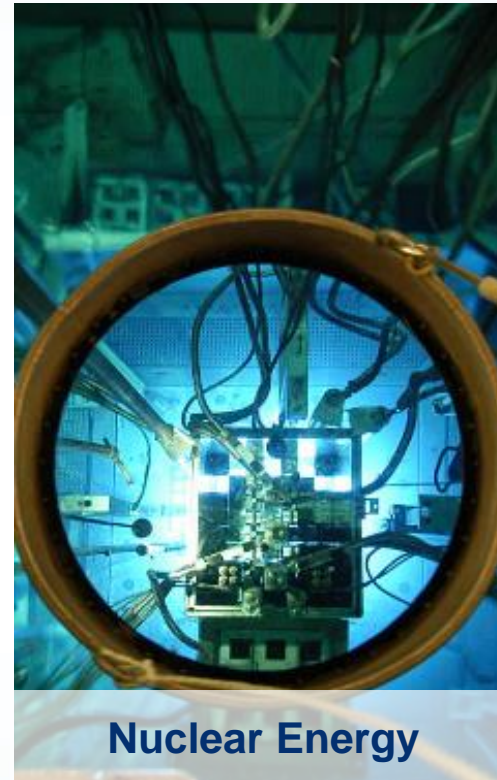
16 000
Employees



4 400 M€



Defense



Nuclear Energy



Industry

FUNDAMENTAL RESEARCH



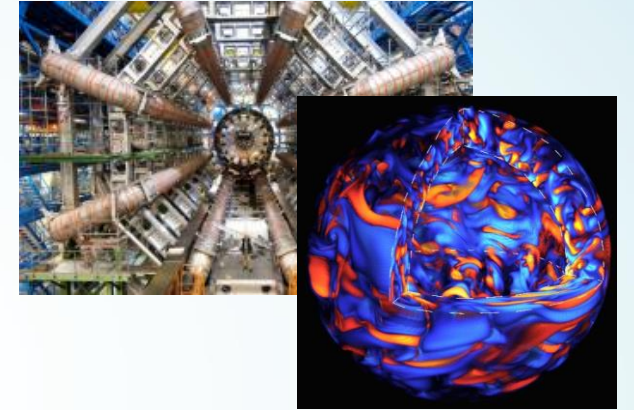
Basic research

- Physics (Nuclear physics, high energy physics, astro- or particle physics)
- Material sciences
- Chemistry
- Biology and biotechnologies
- Climate & environmental studies

Knowledge

MISSIONS OF THE CEA

Know-how



Infrastructures and instrumentation

- Cryotechnologies, accelerators, magnets, lasers, detectors
- Radioisotopic tagging
- Genomics, proteomics, radiobiology, bio-imaging
- High performance computing



THE KNOWLEDGE FACTORY

DRF

FUNDAMENTAL RESEARCH
DIVISION OF CEA

Key features

DE LA RECHERCHE À L'INDUSTRIE



FUNDAMENTAL RESEARCH DIVISION

MAIN FIGURES



630 M€

budget



3500

scientific
publications/year



42

joint labs



83

European Research
Council grants since 2007
(over 1200 scientists)



6300 staff

Among which:

- 3500 permanent CEA staff
- 1200 University, CNRS and INSERM staff
- 700 PhD (50% foreigners)
- 900 post-doc and non permanent



230

research contracts with
industrials



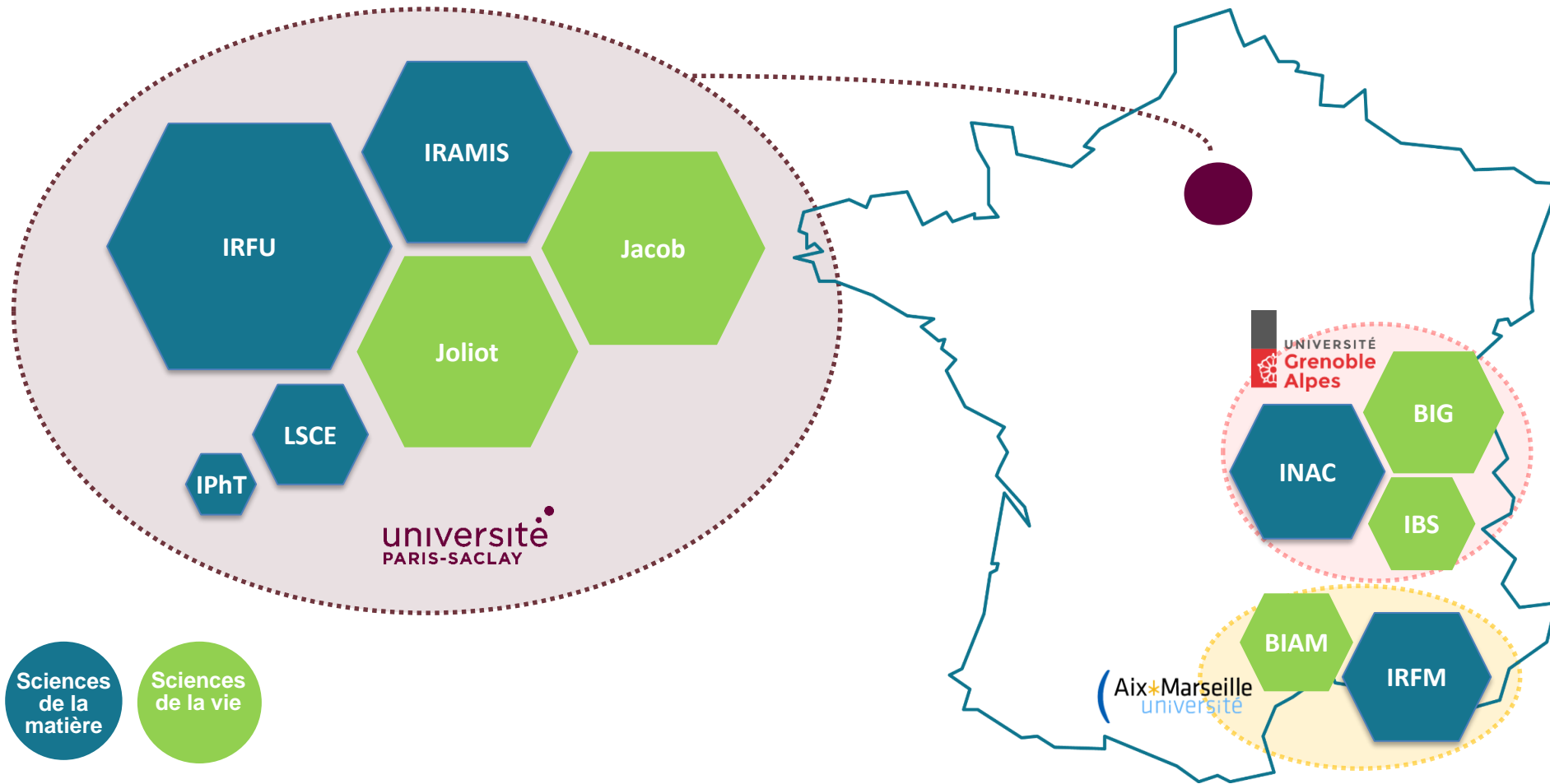
566

active patents



33

startups since 2000





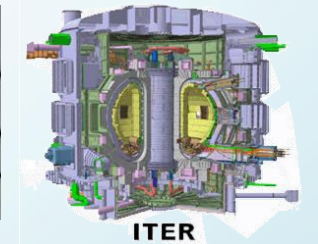
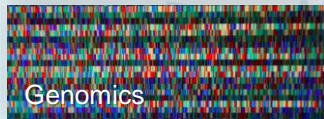
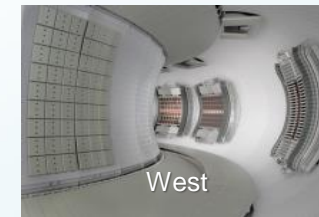
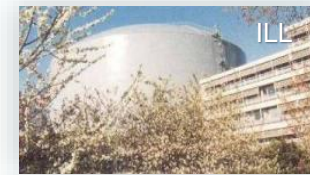
THE KNOWLEDGE FACTORY

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FUNDAMENTAL RESEARCH
DIVISION OF CEA

Partners

FRENCH LEVEL INVOLVEMENT IN LARGE SCALE RESEARCH FACILITIES



STRONG INTERNATIONAL COLLABORATIONS

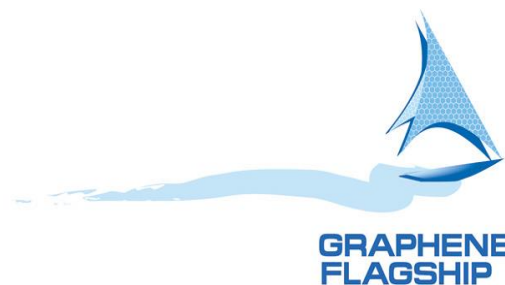




74 projects funded by
Horizon 2020 (2014-2015)

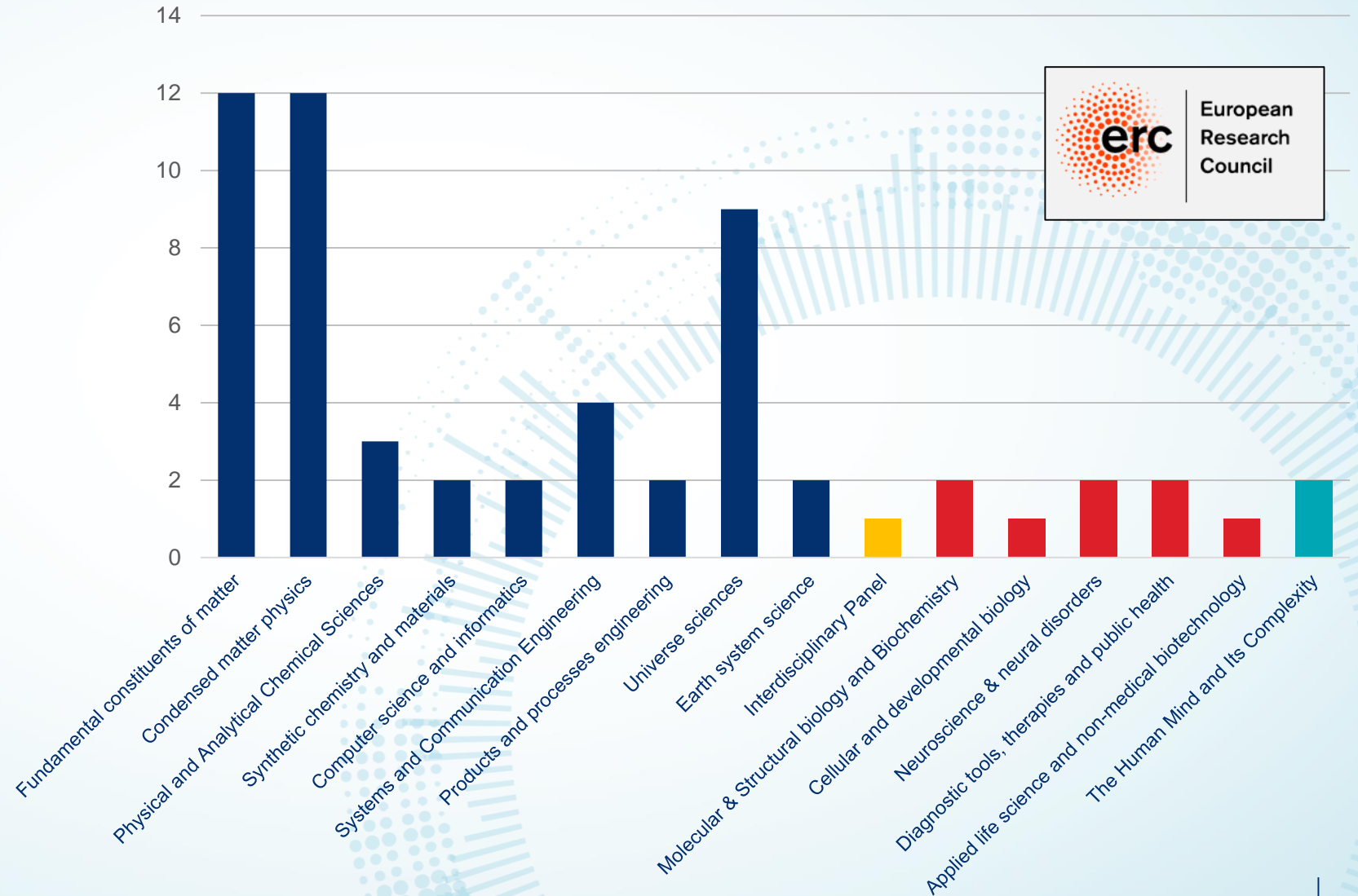
Success rate
22,8%

Total EC
contribution
60,5 M€





83 ERC
LAUREATES HOSTED
BY THE CEA/DRF
SINCE 2007



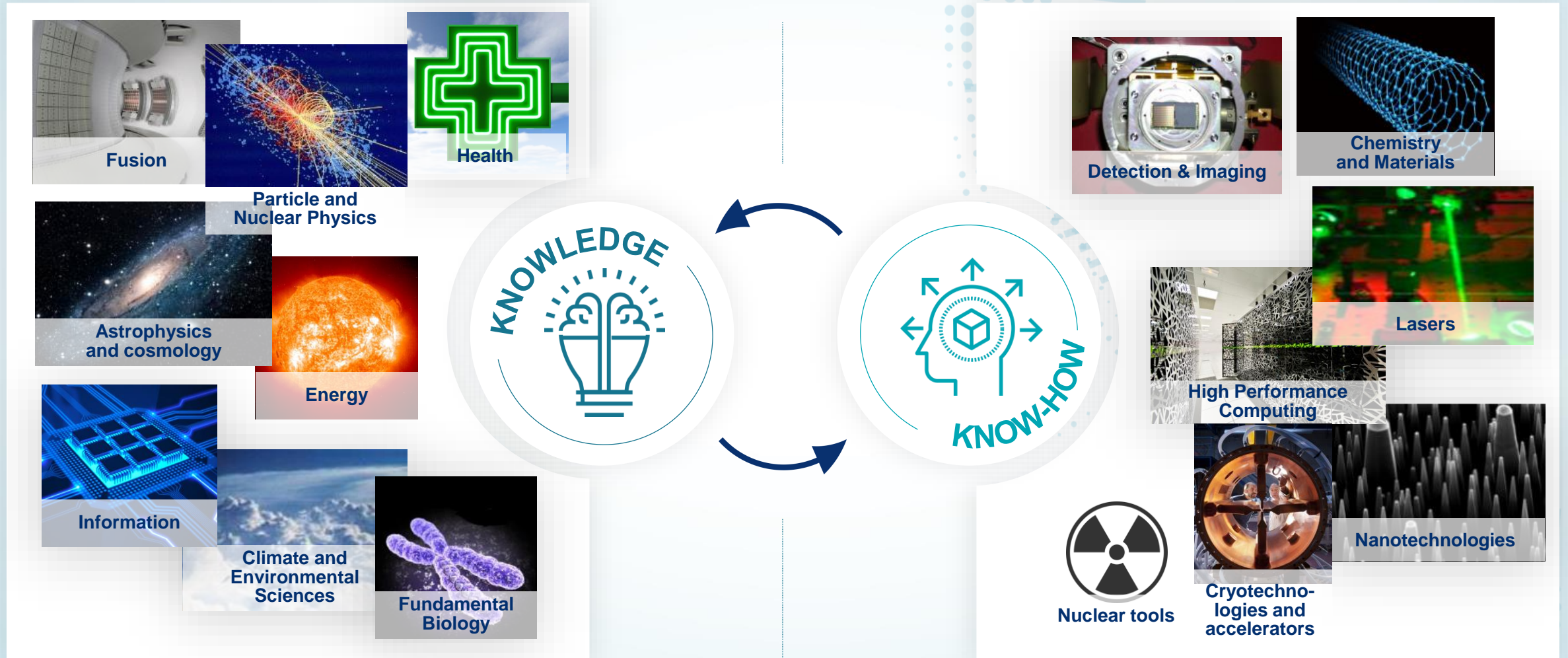


**THE
KNOWLEDGE
FACTORY**

ACTIVITIES OF DRF

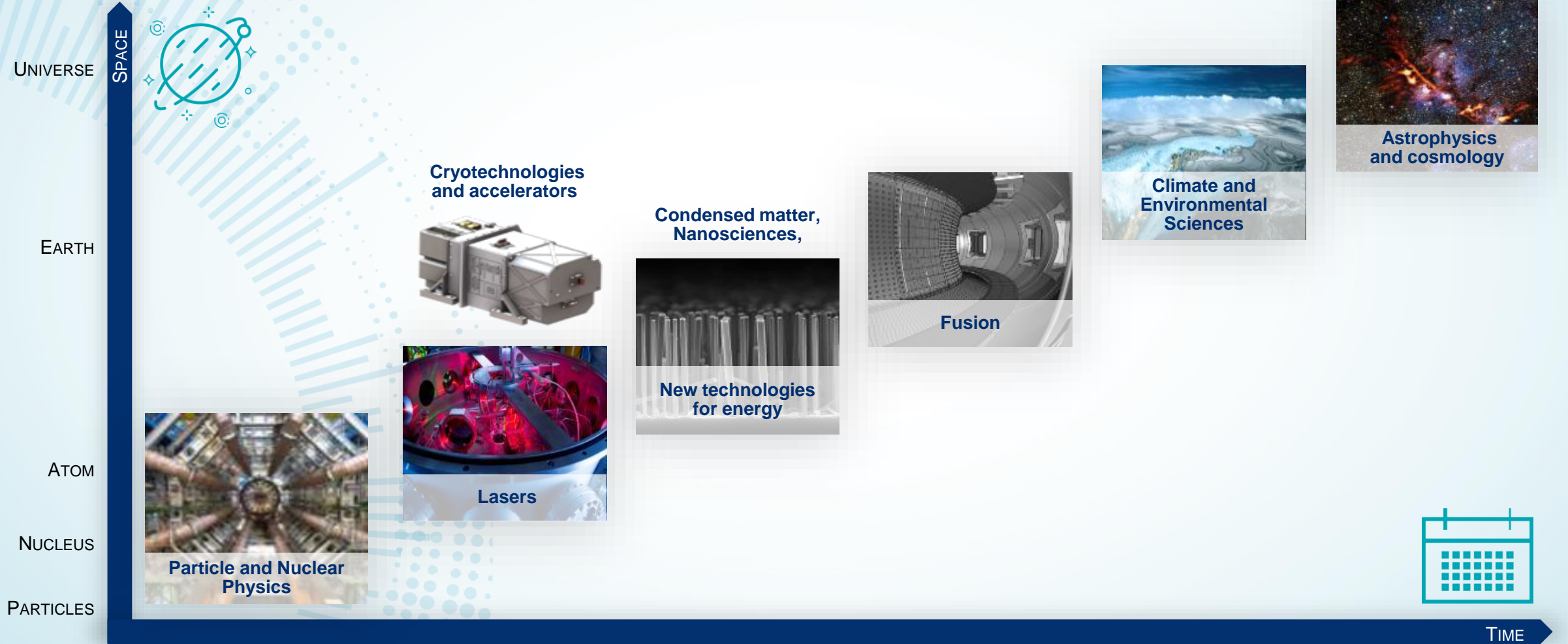
**Fundamental Research
Division of CEA**

FUNDAMENTAL RESEARCH ACTIVITIES



PHYSICAL SCIENCES

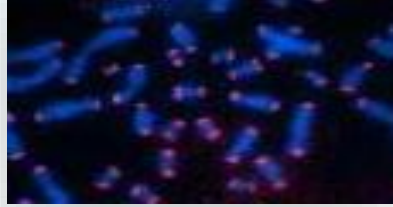
FROM ONE INFINITY TO ANOTHER



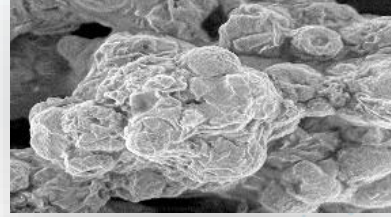


ENERGY

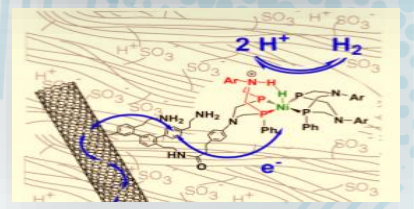
RADIATION BIOLOGY



TOXICOLOGY

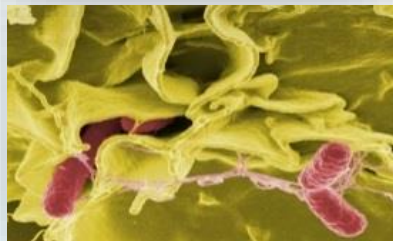
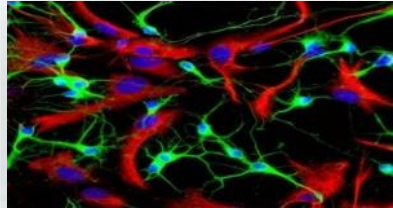


BIOENERGY & ENERGY-EFFICIENT PROCESS



HEALTH

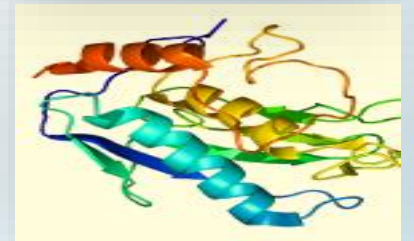
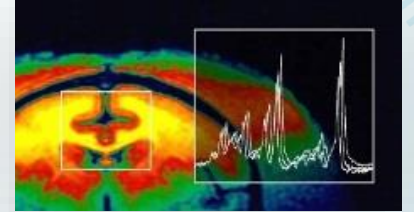
PATHOGENIC PROCESSES

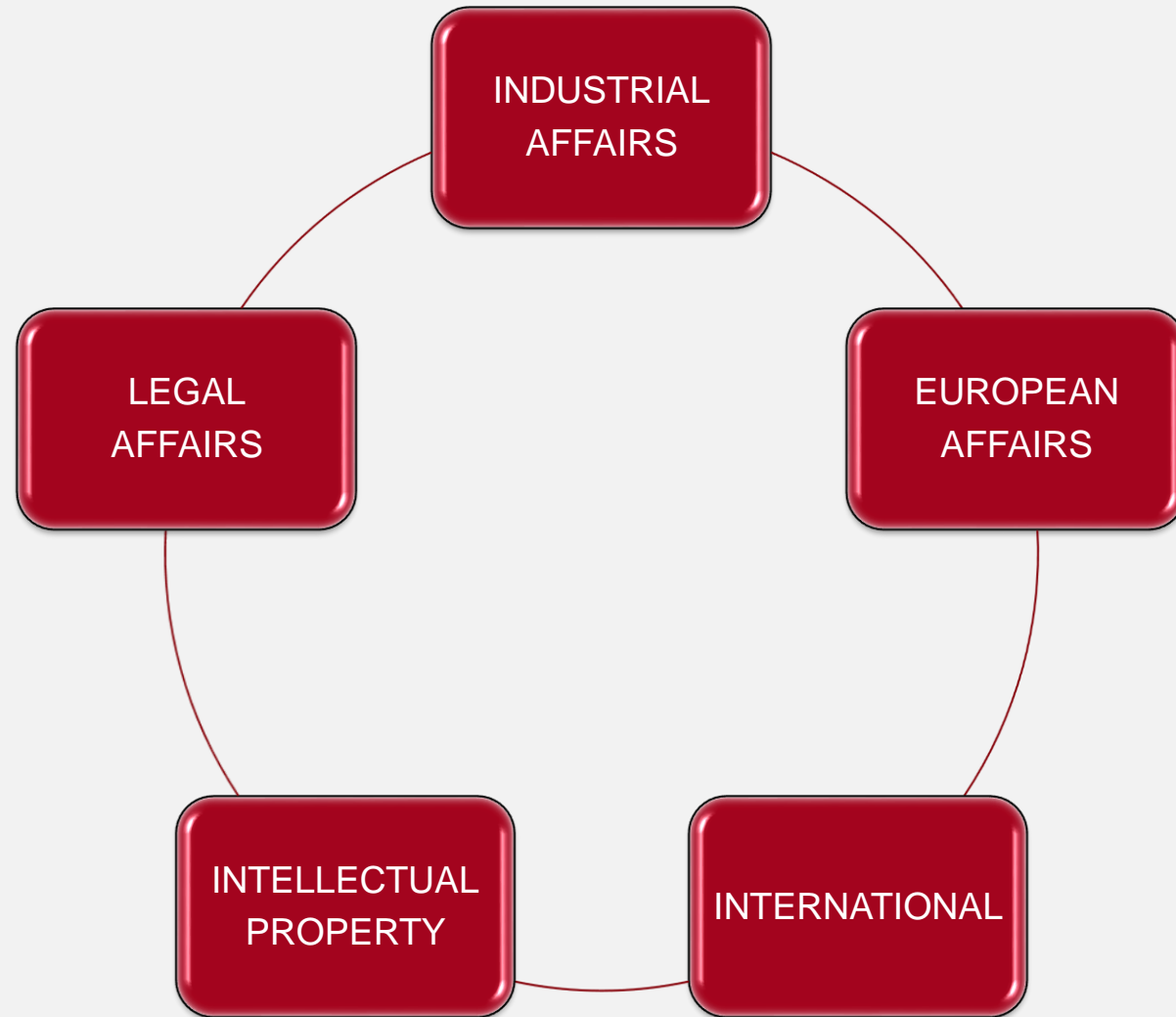


DIAGNOSTIC & THERAPEUTIC INNOVATION



TECHNOLOGICAL DEVELOPMENTS





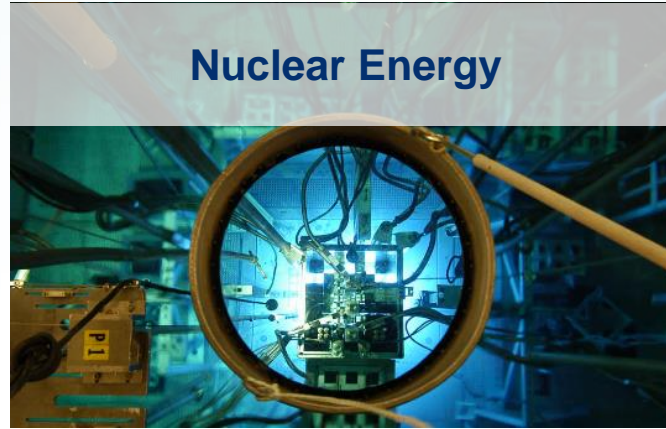
TRANSFER OF KNOWLEDGE & KNOW-HOW TO APPLIED CEA MISSIONS

Defense



- Nuclear Physics,
- Radiation Detection,
- Lasers,
- Cryotechnologies,
- MHD Simulations & HPC,
- Non Destructive Diagnostics,
- Atmosphere Measurements,
- Biological Threats ...

Nuclear Energy



- Nuclear Physics,
- Radiation Detection,
- Material & irradiation Studies,
- Radiochemistry,
- Environmental Remediation,
- Radiation Simulations,
- Radiobiology, ...

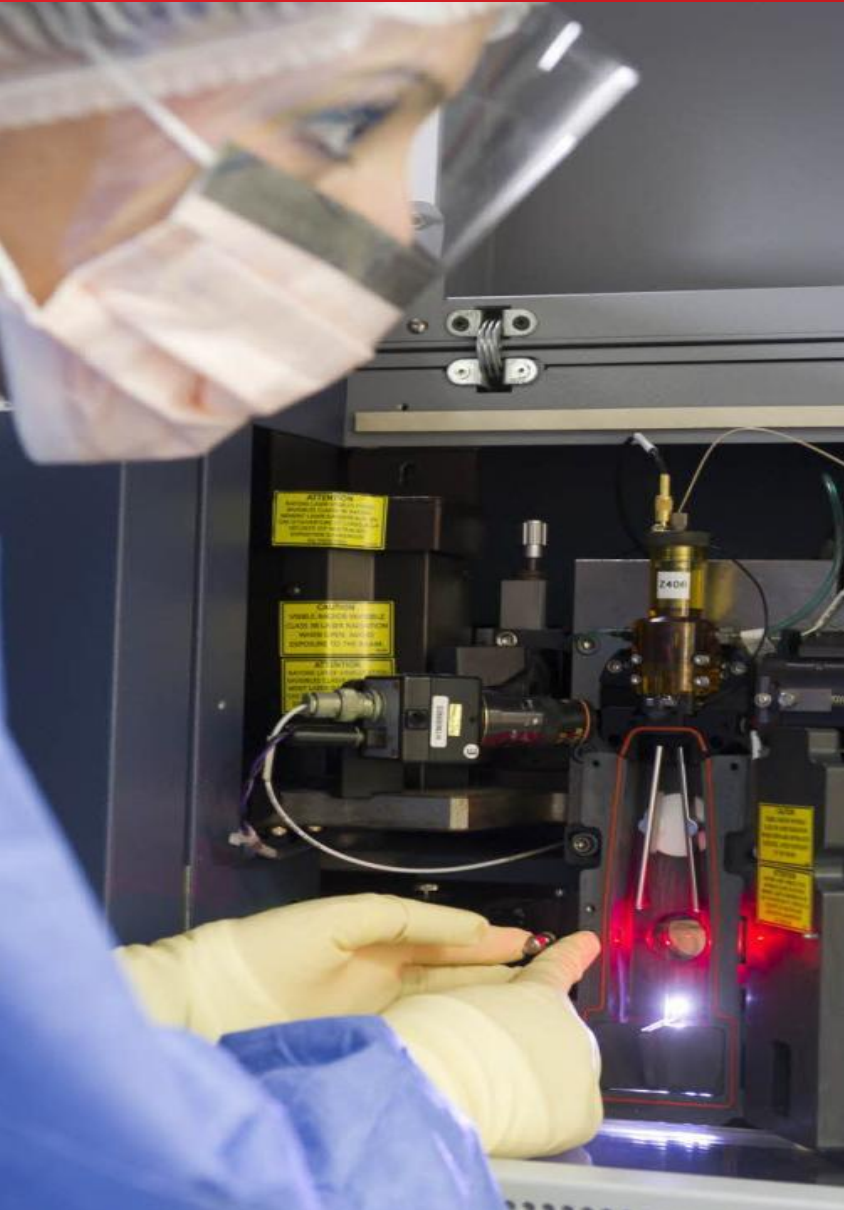
Industry



- Nanosciences,
- Electronics, Photonics, Spintronics,
- Material Sciences,
- Chemistry,
- Sensors,
- Cryotechnologies,
- Medical Devices,
- Technologies Inspired by Biology, biofuels and biochemistry, biocomputing,
- Non Destructive Monitoring...

TRANSFER TOWARD INDUSTRY

33 START-UPS SINCE 2000



CyTOO
cell architects

High-throughput cell screening

Theranexus
Therapeutic Boosters

Optimizing the effectiveness of psychotropics

AJELIS

Filters for selective capture of metals

vaxeal

Therapeutic vaccines

ACUBENS

Radiodosimetry

ARYBALLE
Technologies

Olfactive and gustative sensors

THERMADIAG

Thermal image analysis software

CrivaSense
TECHNOLOGIES

GMR sensors

eVaderis

Energy-saving circuits

PX'Pharma
cGMP production

Production of antibodies

bertin
pharma

Pharmaceutical development

Fermentalg
ocean green energy

Microalgae, Metabolic engineering

Immuni
TECHNOLOGIES

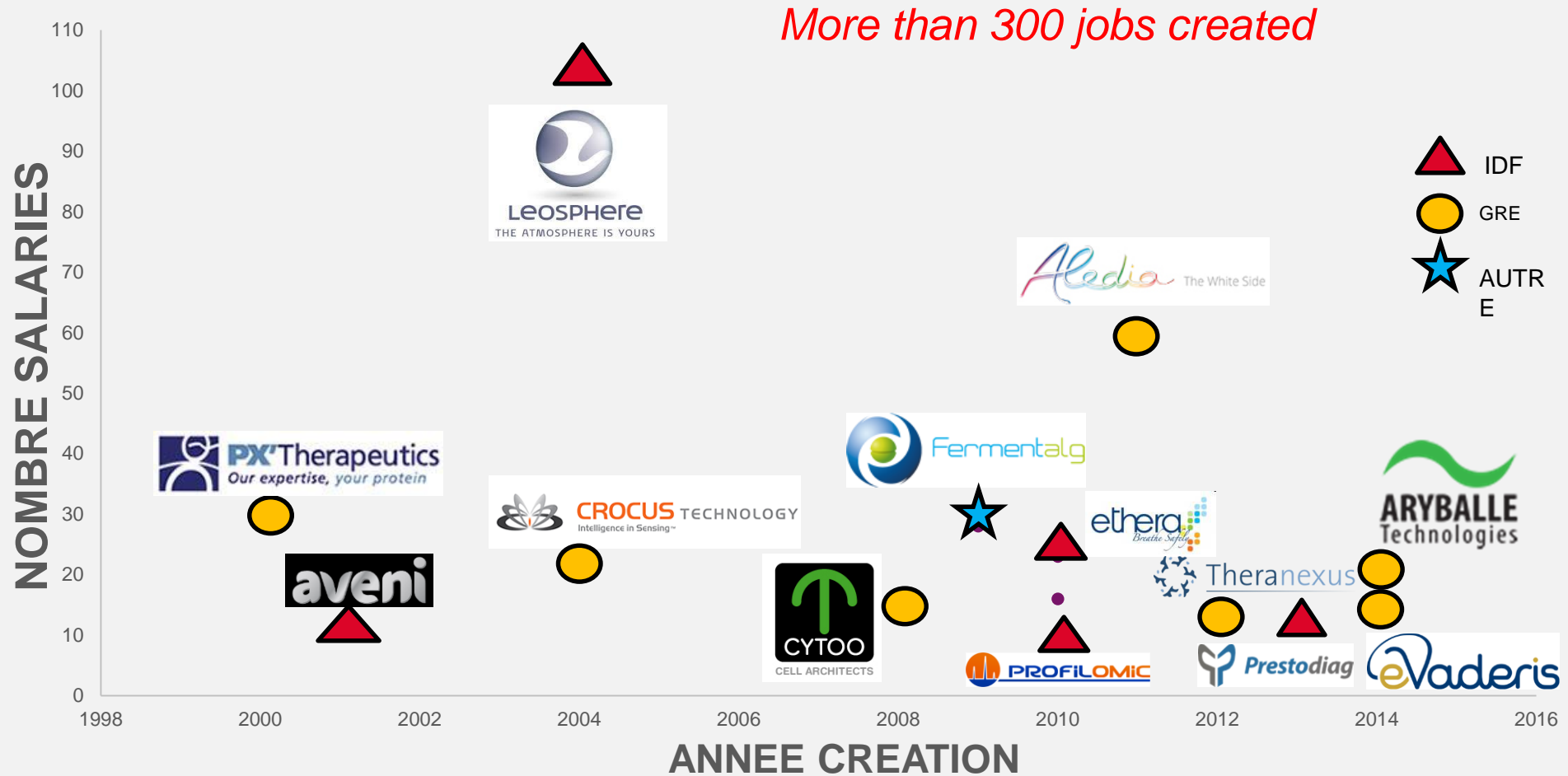
Personalized medicine

AND CONTRACTS WITH MAJOR COMPANIES

<i>KNOW-HOW</i> <i>MARKETS</i> <i>Value Chain</i>	DIGITAL	INSTRUMENTS	MATERIAL	CHEMISTRY	BIOINGENIERY
SECURITY			4	10	7
ENERGY		8	47	36	15
HEALTH	12	47	11	21	86
ENVIRONMENT		6	21	30	11
TIC		15	84	6	1
SCIENCES		89	13	23	17

* 2017 features

DIRECT EMPLOYMENT CREATED SINCE 2000 BY DRF SPIN-OFFS IN ACTIVITIES



INNOVATIONS DRF : DRF IMPULSE

Initiated in 2016 with success : agile process, emerging projects with both life sciences and Physics components

▶ **DRF Impulse : 632 k€, 14 projects**

2017: reinforcement with 4 types of projects

▶ **DRF impulse Interdisciplinary : 668 k€, 14 projects**

▶ **DRF Impulsion Target Actions : 585 k€, 8 projects**

▶ **DRF Impulsion Invention : 515 k€, 9 projects**

▶ **DRF Impulsion 2016 Follow-up: 349 k€, 11 projects**

Each project is accompanied to define the best valorisation strategy.

Energy

- **Stockage** : LightAcc-Cat
- **Conversion** : ALCASUN, RMN BioCar

Environment

- **GES** : CarbonSeq, Epiclim
- **Remédiation** : GUAPA
- **Omics** : Geomics, Neogen

Sciences/Instrumentation

- Fluoblink, NanoBiom, CompaTREG, D3DT, EXYT, SUPER-RESOL, TMRHealth, FIB-BIO, RPE-Nano

Health

- **Biomarqueurs** : Pangée, ITGM-SS, PROTEOGENODIAG, SRAVS, Glycogel
- **Imagerie et radioimagerie** : SHIM-11,7, RadioCatCO2, Avanti-HC, IRIP, MagnetBrain, TIMO, BrainAMP, COSMIC
- **Nouveaux Médicaments** : MQ-D-MUN, BioCarb1, Radis-Bio
- **Diagnostic in vitro** : Hybridimer, RACC
- **Thérapies innovantes** : BioImpression 3D, Contract
- **Radiothérapie** : SATBOT

TIC

- **Quantronique** : SOUPAPE, JPAF, SUMMA, SUPER-G
- **Numérique** : SCIC, TilesViz

**THANK YOU
FOR YOUR
ATTENTION**

