

# FNR

## *Overview of the Luxembourg biomedical and health research ecosystem*

**FRANK GLOD**

**LUXCOR HEALTH EVENT | MONDAY 19 JUNE 2017**



Luxembourg National  
Research Fund

# Research in Luxembourg

*Luxembourg : a young research location*

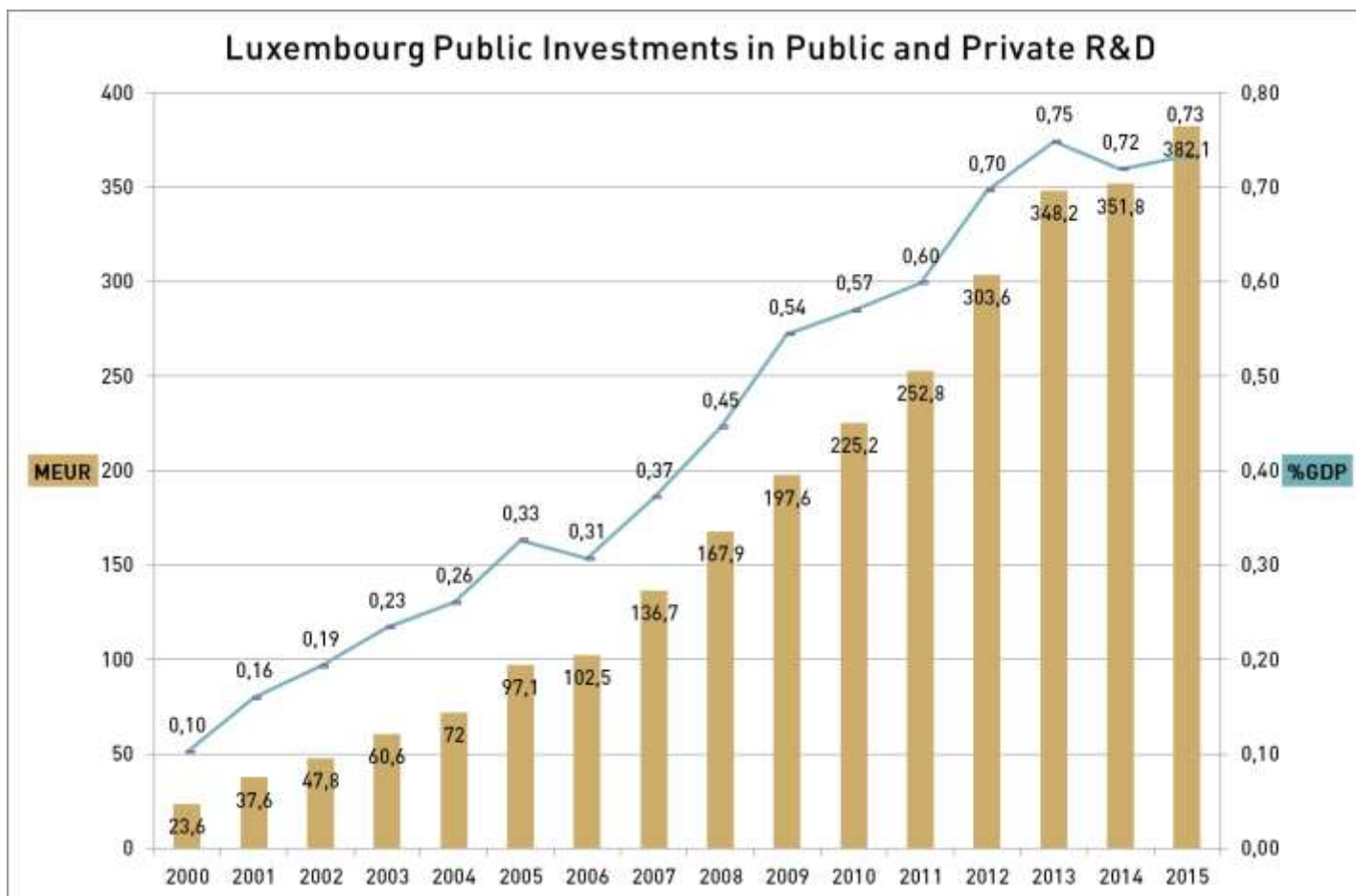
## Creating structures

- 1987 : First law on the public-sector research
- 1987 : First public Research Centres (LIH and LISER)
- 1999 : National Research Fund (FNR)
- 2003 : University of Luxembourg
- 2009 : Luxembourg Centre for Systems Biomedecine (LCSB)
- 2009 : Interdisciplinary Centre for Security Reliability and Trust (SnT)
- 2012 : Max-Planck Institute Luxembourg, dedicated to International and European Procedural Law
- 2015 : Creation of LIST (Luxembourg Institute of Science and Technology)
- 2015 : BELVAL Luxembourg Research and Innovation Campus

# Research in Luxembourg

*Luxembourg : a young research location*

Sustained efforts...



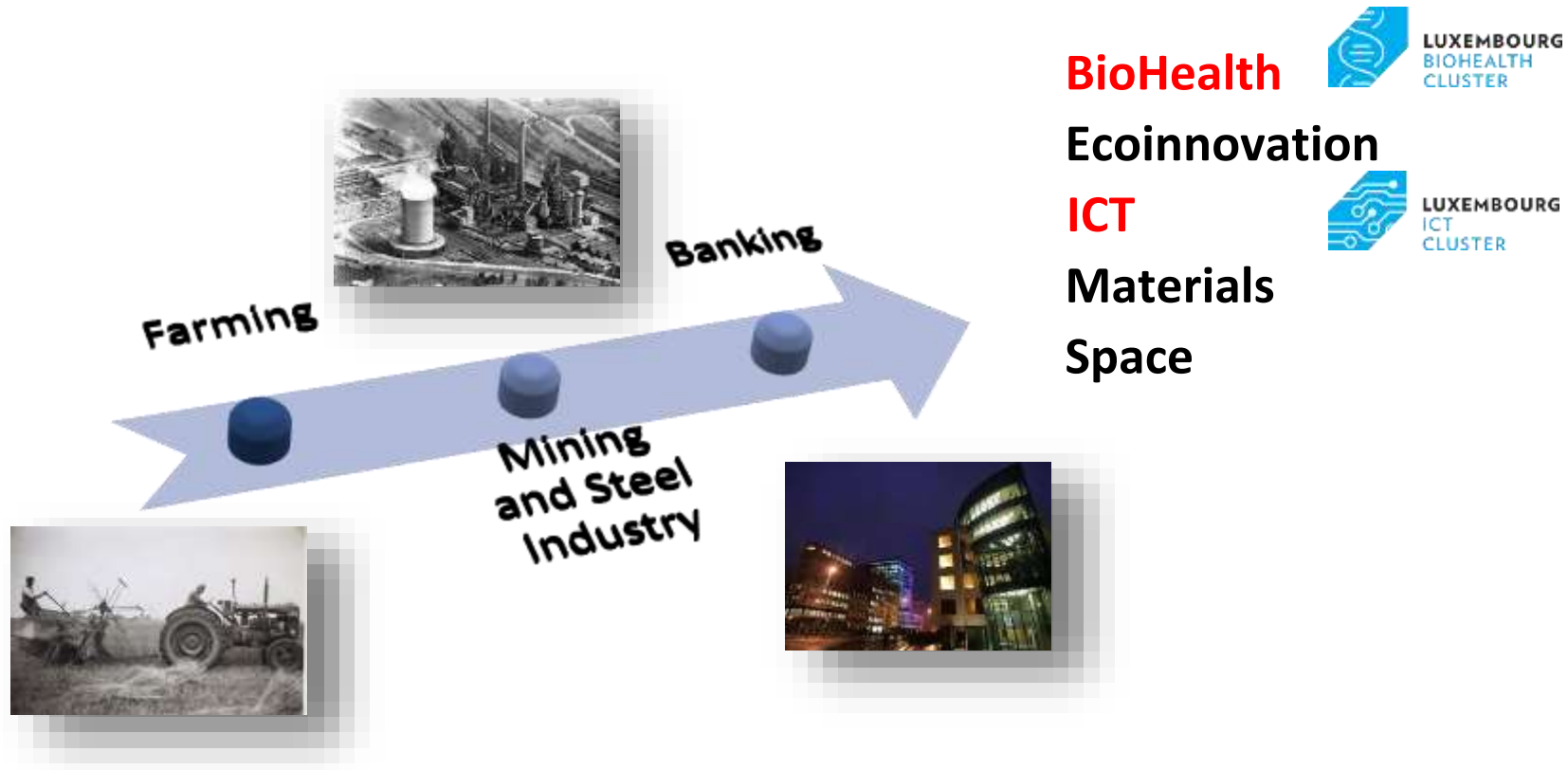
# Research in Luxembourg

## *Belval – Luxembourg's Research and Innovation Campus*

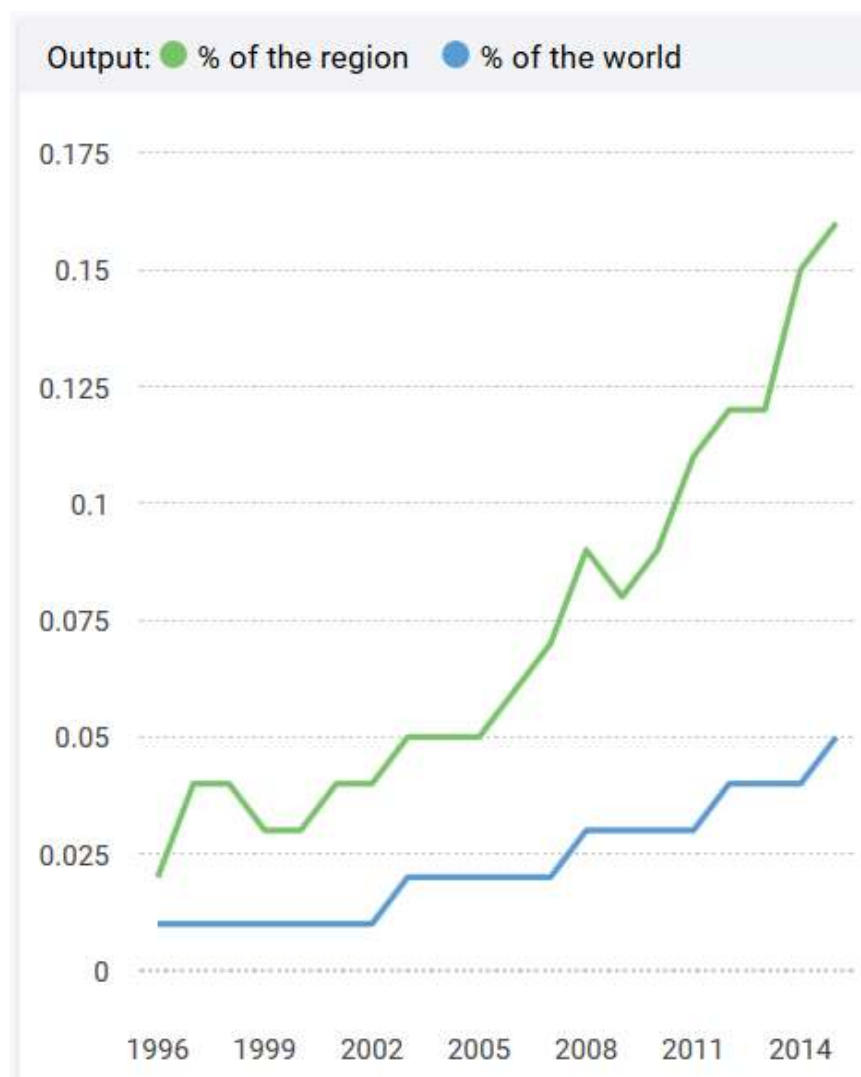
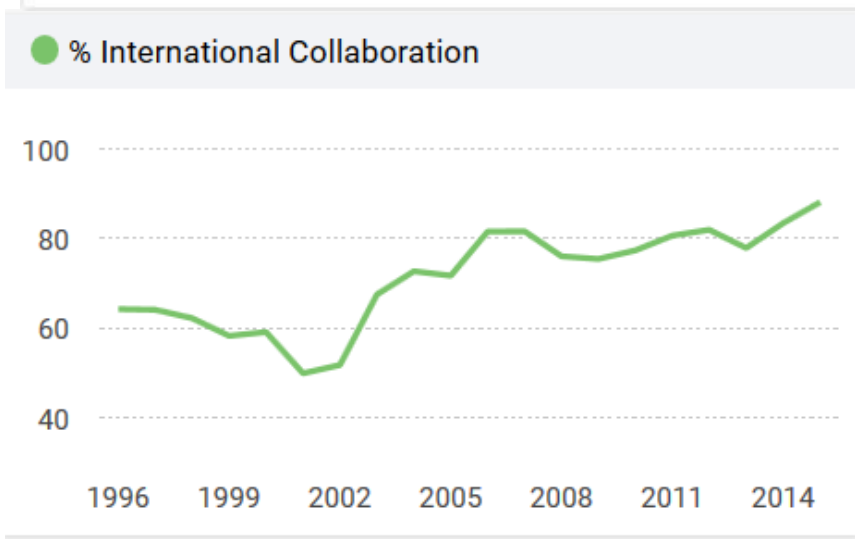
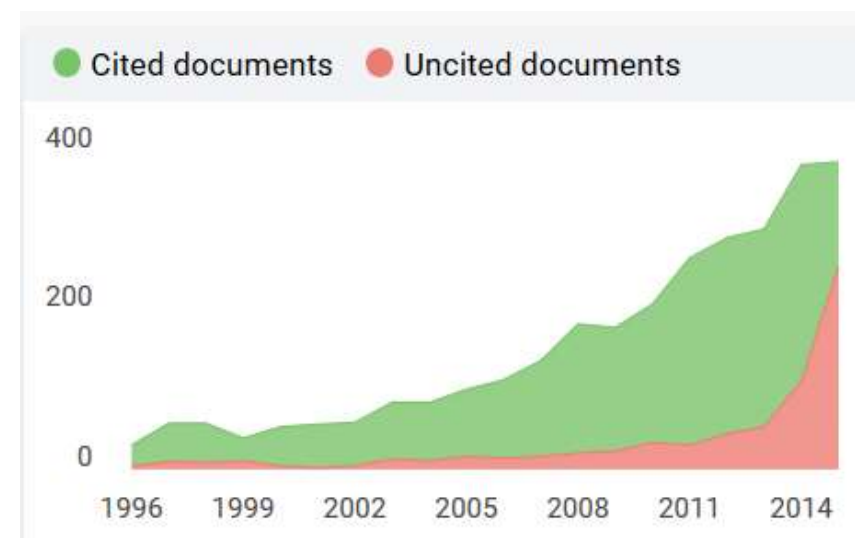
- 120 hectares site of Luxembourg's largest steel foundry
- 750 MEUR urban renewal project
- 20 new buildings
- All major research and innovation actors
- Around 7,000 students and 3,000 teaching staff and researchers



# Development of the Luxembourgish Economy



## Scientific output (SCImago data for Field of Medicine)



# Biomedical research from a Luxembourgish perspective



# Research Actors

## Biomedical and Health research



**Systems  
Biomedicine  
Parkinson's**



**UNIVERSITÉ DU  
LUXEMBOURG**



**Tumor Biology**



**Psychophysiology  
Health research**



**LUXEMBOURG  
INSTITUTE  
OF HEALTH**  
RESEARCH DEDICATED TO LIFE

**Infection & Immunity  
Oncology  
Population Health**



**Proteomics**



**LUXEMBOURG INSTITUTE OF  
SOCIO-ECONOMIC RESEARCH**

**Social  
Influences**

**LUXEMBOURG  
INSTITUTE  
OF SCIENCE  
AND TECHNOLOGY**



**Environment  
Materials  
Health IT**



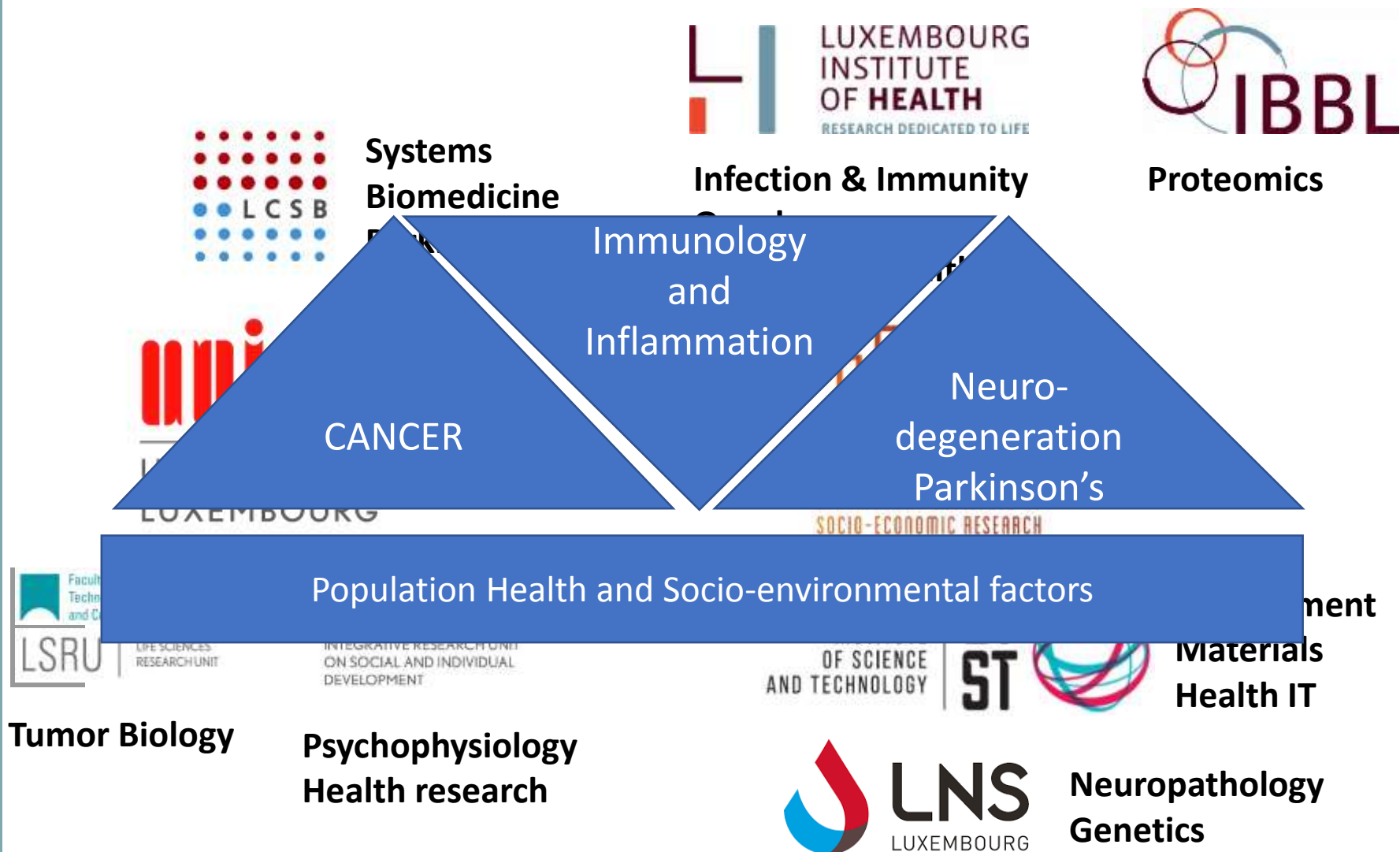
**LNS**  
LUXEMBOURG

**Neuropathology  
Genetics**

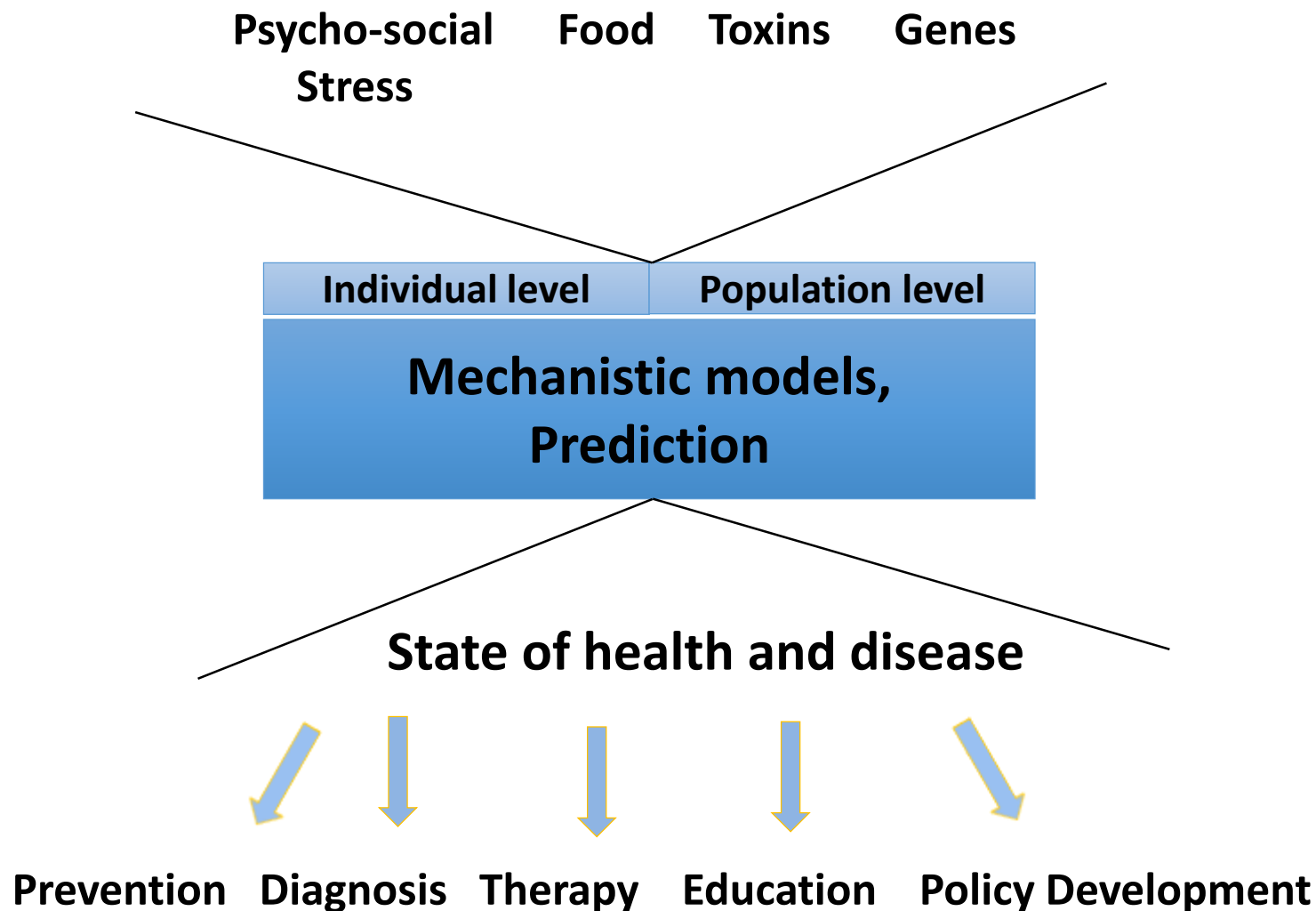


# Research Actors

*Biomedical and Health research*



# Biomedicine Quo vadis? From Data to Knowledge



# Personalized Medicine Consortium (PMC)

~ 150M investment by Lux Gouvernement



IBBL



LCSB



Parkinson's

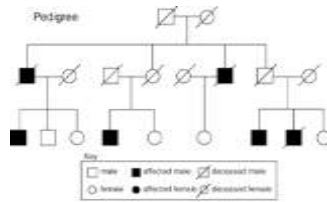


Lung Cancer Project (PPM)

- Institute for Systems Biology (Seattle)
- Translational Genomics Research Institute (Arizona)
- Partnership in Personalised Medicine – Consortium of several U.S. centres



# LCSB From systems biology to systems medicine



**Family  
Studies**



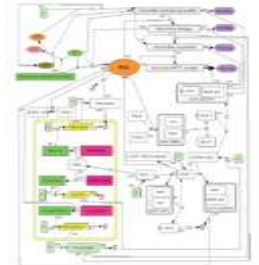
**Patients**



**Longitudinal  
Cohorts**



***Pathway and Network Analysis  
Computational Models  
Machine Learning***



**Yeast**



**Zebrafish**



**Mouse**



**Organ on  
a chip**



**Microbiome**



**Human**

# LCSB: At the interface of IT and medicine



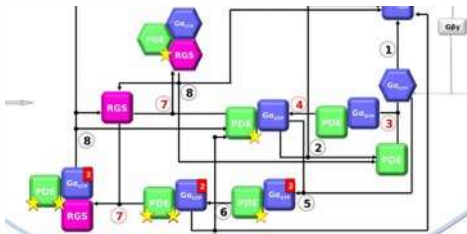
## Bio- and Medical Informatics



## Integration of Clinical and Non-Clinical Data



## Computational Disease Modelling

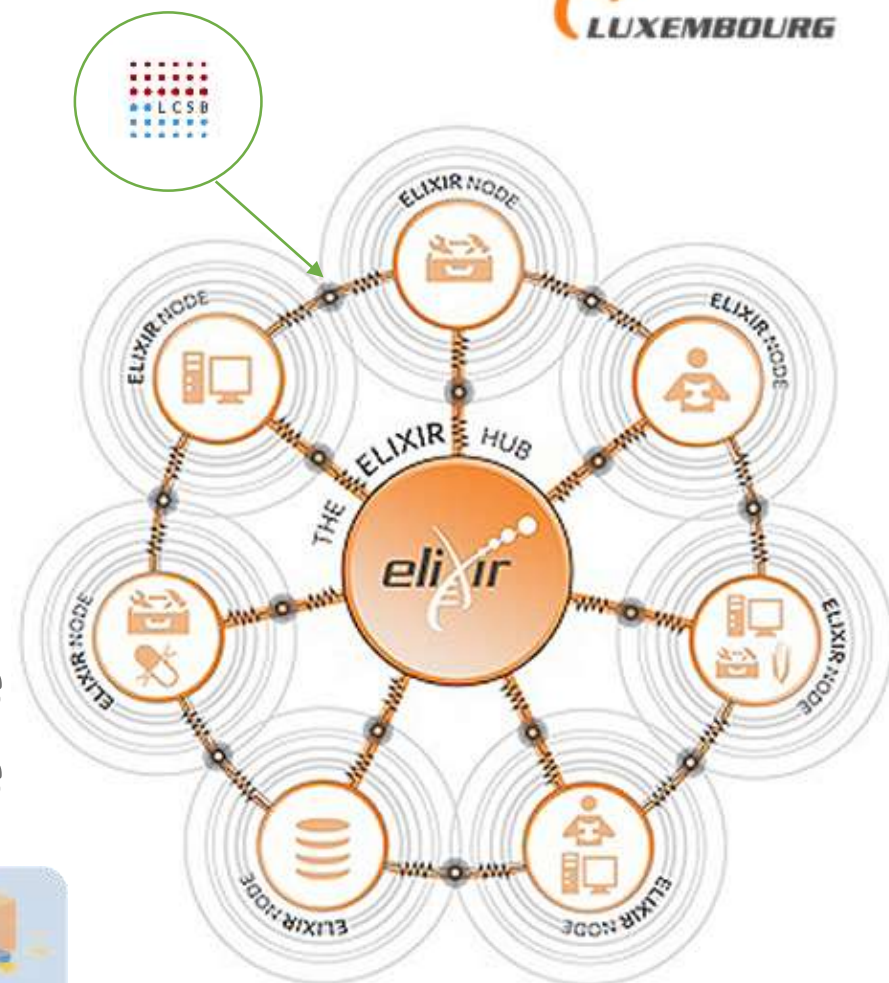


## International Data Hub

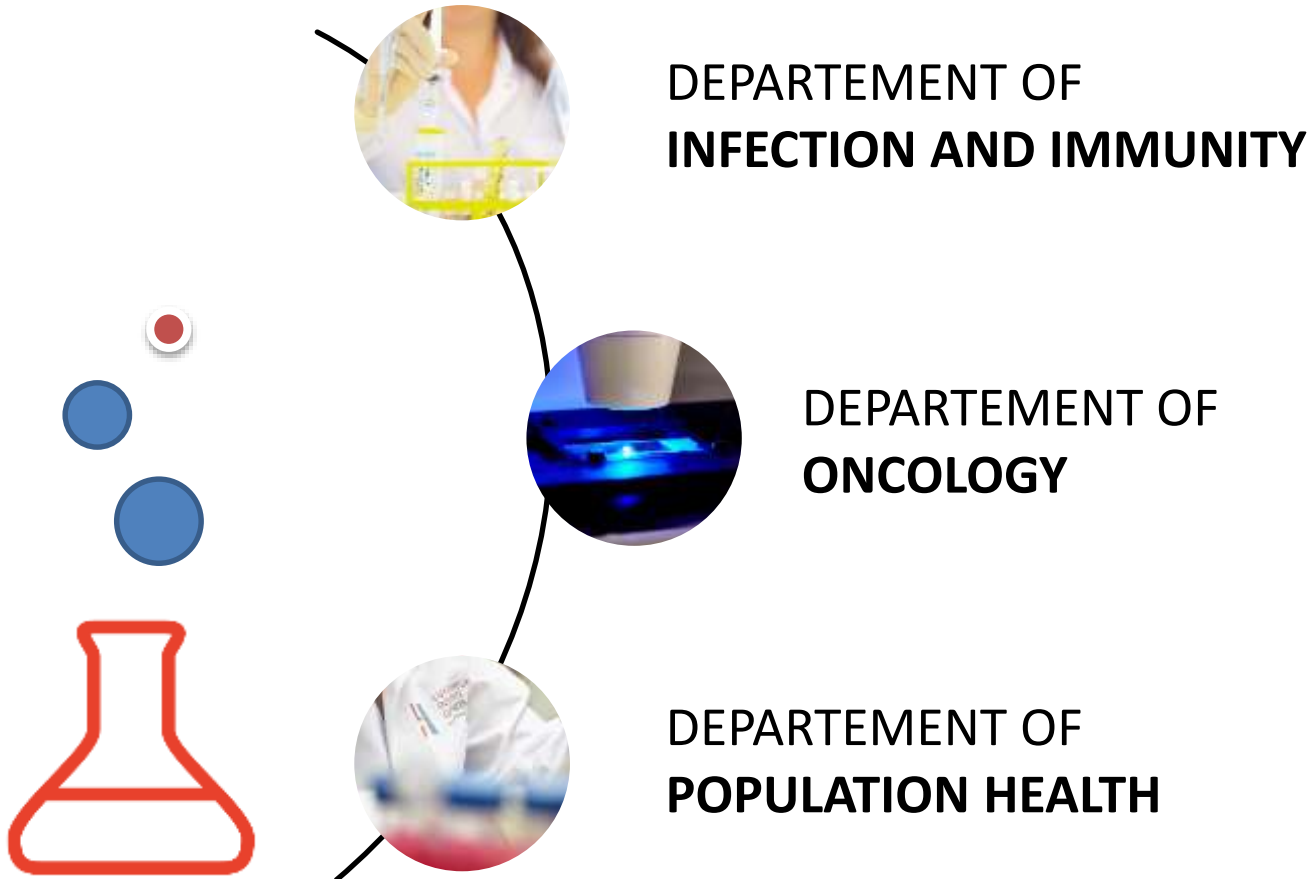


- Repository of biological data
- Decentralised Hub & Nodes structure for hosting data
- Assessed among the 3 strategically most important European infrastructures

**Luxembourg became node for translational medicine data**







## LIH current strategy



Translational and **personalized medicine in Luxembourg,**

**Clinical research** in close collaboration with other national partners (hospitals, university, IBBL...) and become recognized in this domain **at an EU level,**



To implement a **state-of-the-art public health research** firmly implemented **in the EU context** and **serving the needs of the country,**



To **develop research-oriented training & higher education activities** in close collaboration with the University of Luxembourg



# Clinical and Epidemiological Investigation Center

Observational  
Healthy volunteers  
Exploratory



STRASSEN – r. Thomas Edison



Trials with IMP  
Phase II & III  
Registries



LUXEMBOURG – CHL



CTU for Belgium & Luxembourg  
Coordination of EU trials



VISION-DMD



# Integrated BioBank of Luxembourg



An accredited & certified  
biobanking infrastructure

Offering a full range of bioservices  
to academia, industry and EU consortia



## CERTIFICATIONS

ISO 9001:2008  
NF S96-900:2011



ACCREDITATION  
ISO 17025:2005



**8** accredited testing &  
characterisation methods



Biobanking



Sample  
processing



Sample analysis &  
Quality control



Biomarker  
validation



Biospecimen  
proficiency testing



University  
biobanking certificate



# Integrated BioBank of Luxembourg



- **Preferred partner in EU projects:**

- MINDACT study (Microarray In Node negative Disease may Avoid ChemoTherapy)
- BIOMARKAPD project of the EU Joint Programme for Neurodegenerative Disease (JPND) Research
- STORE (for Sustaining access to Tissue and data frOm Radiobiological Experiments), FP7 Programme
- IMI Cancer ID and IMI Litmus
- H2020 SPIDIA4P



- **EATRIS host institution for Luxembourg**

- **70+ active projects (40+ fee for service contracts)**

- **Key projects in LU:**

- National centre for Excellence in Research on Parkinson's Disease (NCER-PD) (with LCSB, LIH, CHL)
- Plan National Cancer (with LNS, LU Hospitals)



- **Key projects outside of LU:**

- EORTC (European Organisation for Research and Treatment of Cancer):
  - Scientific partner and biobank infrastructure
- BIG (Breast International Group, BIG)
  - Aurora study

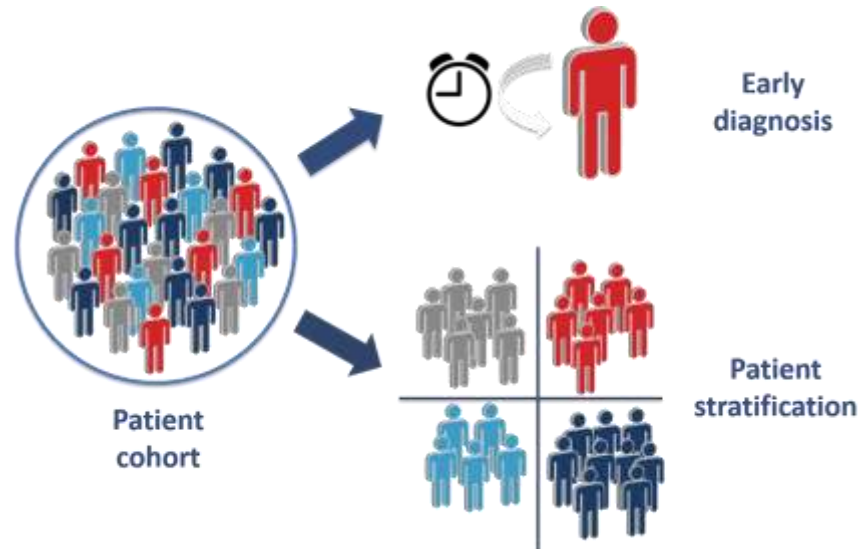




# FNR's National Centre of Excellence in Research (NCER)

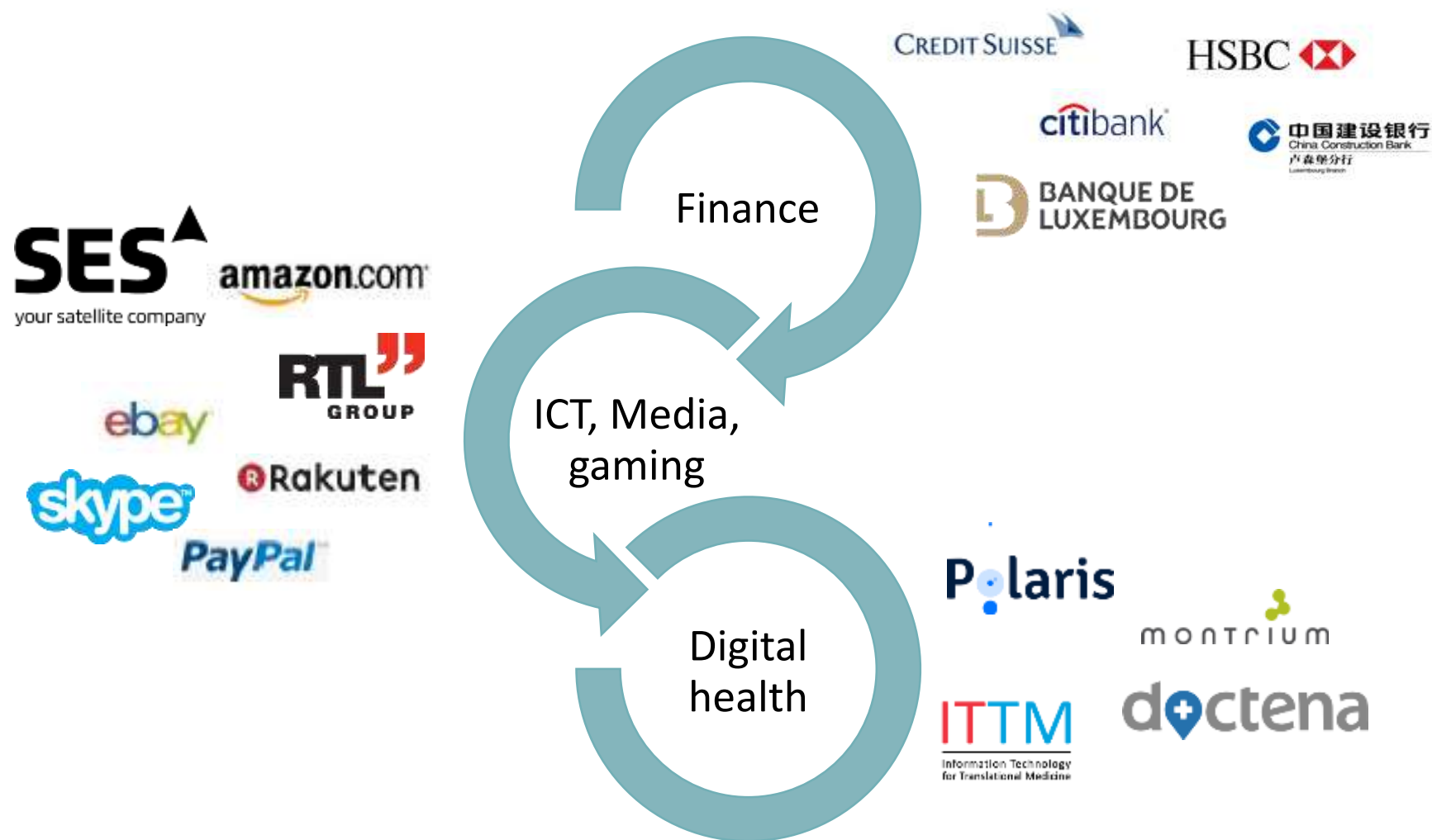
Joint Research Program on Earlier Diagnosis of Parkinson's Disease

20M€ invest over 8 years



# From banking and media to digital health

*Making use of current infrastructures and competences*



# The Luxembourg Life Sciences ecosystem

## *The Luxembourg Life Sciences environment*

### 70 Cluster members

- 46 companies
- 14 service providers
- 6 public research organisations
- 4 strategic partners



**LUXEMBOURG  
BIOHEALTH  
CLUSTER**



# Medicine of tomorrow

- Data-driven
- Personalised
- Patient-centered
- Preventive



➡ **Need for systemic change in the healthcare system**

## Luxembourg – Healthcare System

- 1 Payor
- 4 major hospitals for acute care and 5 smaller hospitals for specialized care
- ~ 98 public Pharmacies
- ~ 2200 Practitioners (incl. Dentists)
- Laboratories:
  - 3 private Laboratory groups
  - 1 national Laboratory (LNS)
  - Each hospital has a laboratory
- 2 major providers for the home care domain (cover 97%)
- Up to 60 institutions for long term care







# eHealth Agency in Luxembourg

## Exchange and sharing of medical data

Goals for the national eHealth services platform in Luxembourg :





- facilitate a seamless communication between healthcare professionals  
**=> Continuity of care**
- enhance a better coordinated healthcare and a more comprehensive and efficient health system.  
**=> Integrated care**

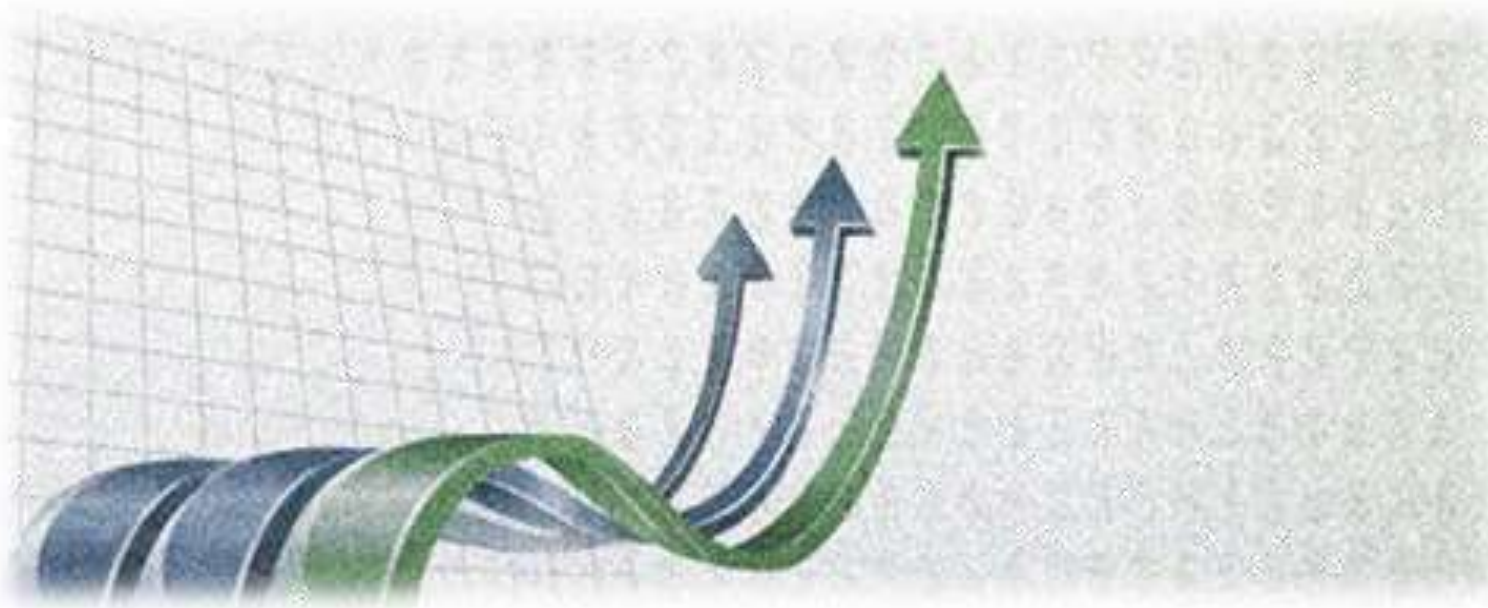


Define a national strategy (SDSI) promoting interoperability between healthcare information management systems.

- Develop and implement a common interoperability platform to support such data sharing and exchange

# Agence eSanté – Platform and DSP goal

-  Support for enhanced diagnostic and patient treatment
-  High level of quality and security
-  Usage of more structured data
-  Reduction of costs



# CLINNOVA

*Teaming proposal within H2020 widening*

**The Gap:** Clinical research in Luxembourg

**The Aim:** Bridging between research and healthcare

**Saving Time:** Through teaming up with strong partners

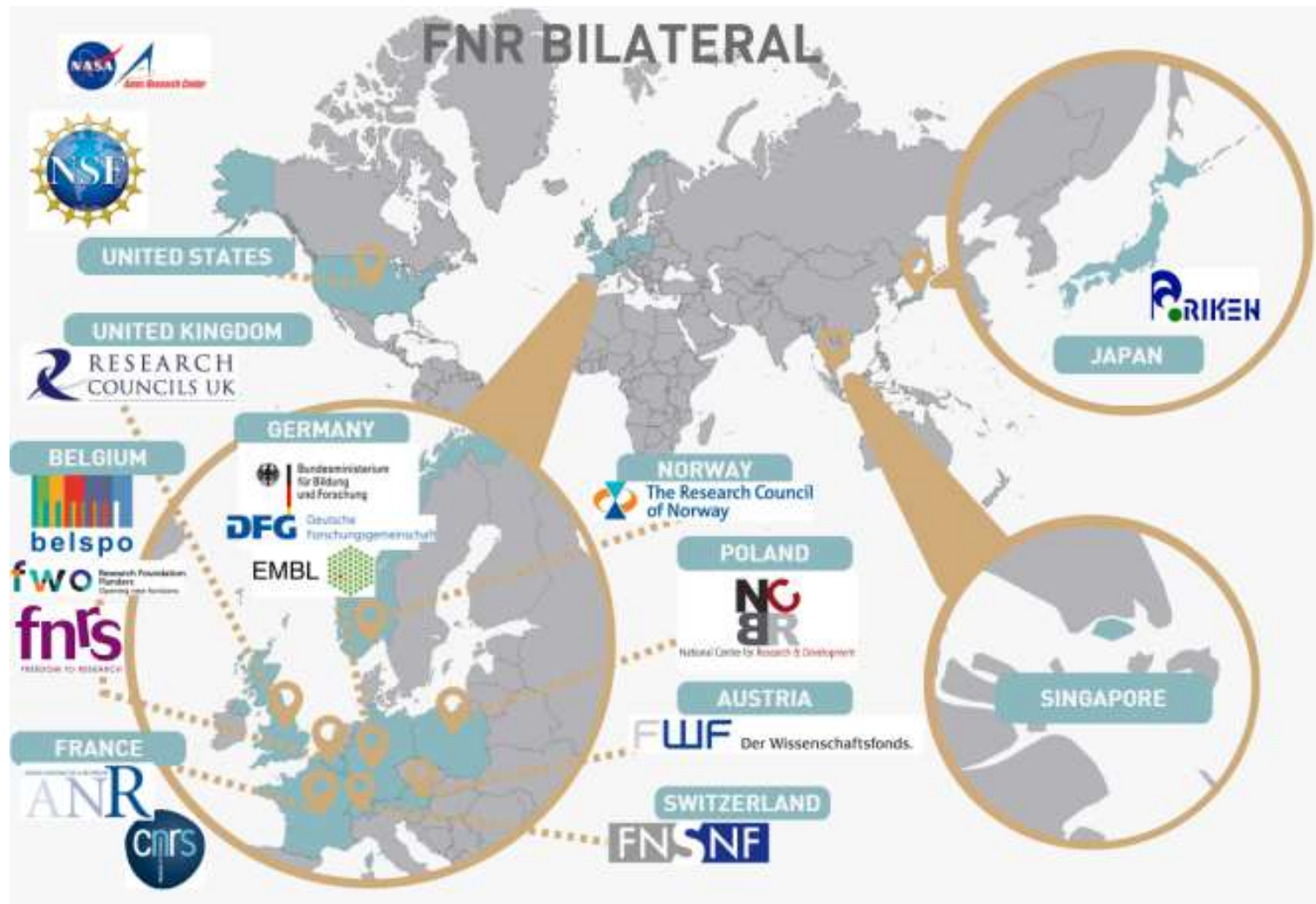


- Strong IT component: digital medicine, eHealth records, big data analytics
- Infrastructure for clinical research: research ward, clinical imaging, phase 1 CTC, etc....
- Firmly establish clinician-researchers in Luxembourg

Complete the value-added chain for biomedicine in Luxembourg  
→ the continuum from basic research to patient application

# FNR's international cooperation

<http://fnr.lu/fnr-international-cooperation/>



## INTER: Multi-lateral international Collaborations



Thank you for your attention