




# Knowledge Transfer @ CERN

*Rita Ferreira*

*CERN Knowledge Transfer*

*Medical Applications*

*Portuguese Trainee at CERN and FCT*



PhD in Chemical and  
Biochemical Engineering @  
Universidade Nova de Lisboa

Trainee FCT (10.2016-09.2018)  
Fellow (02.2019)

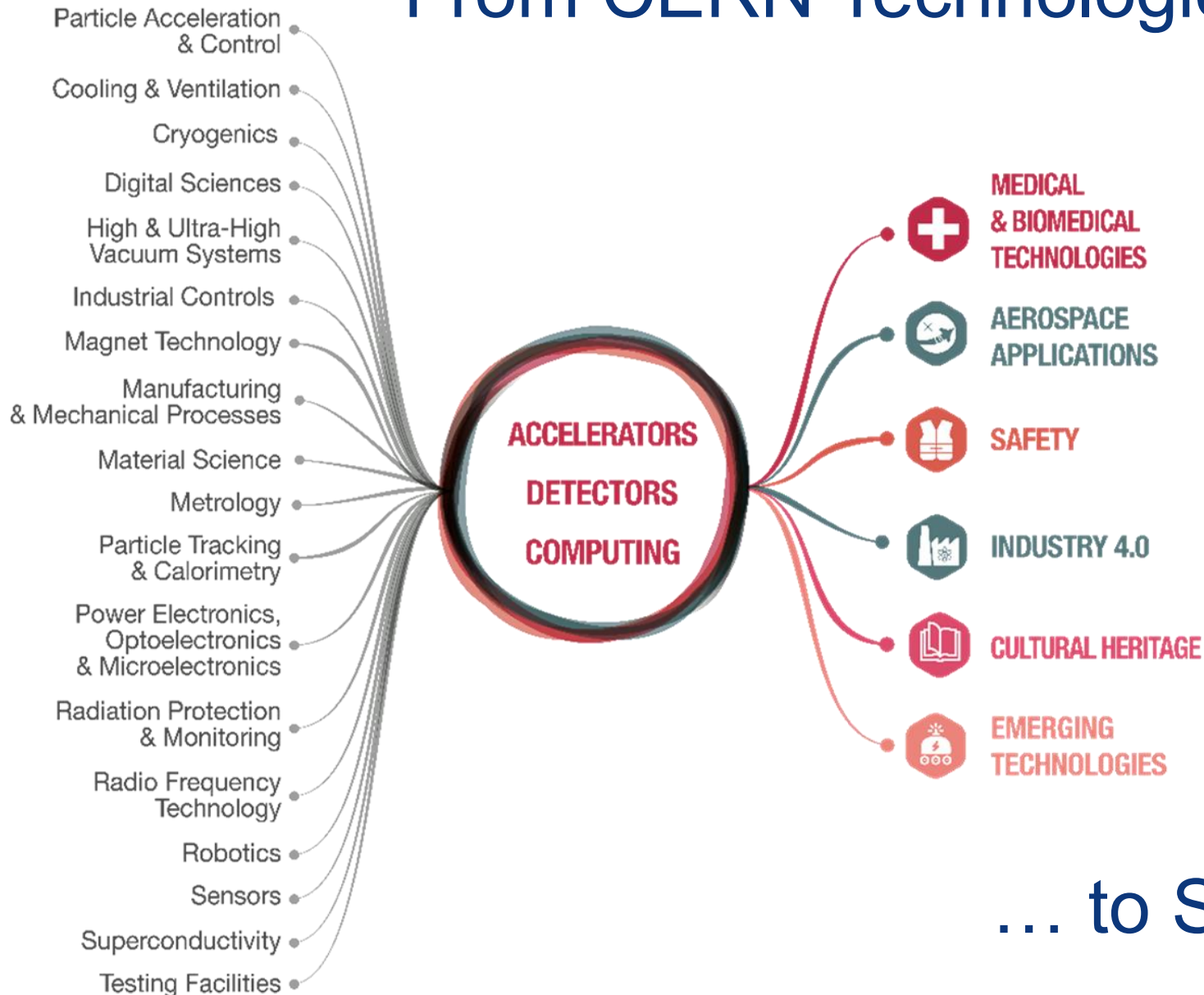


KT Everyday,  
everywhere!



The **mission** of the CERN  
Knowledge Transfer group is to  
**maximise** the global positive  
**impact** of CERN on **society**

# From CERN Technologies ...



... to Society

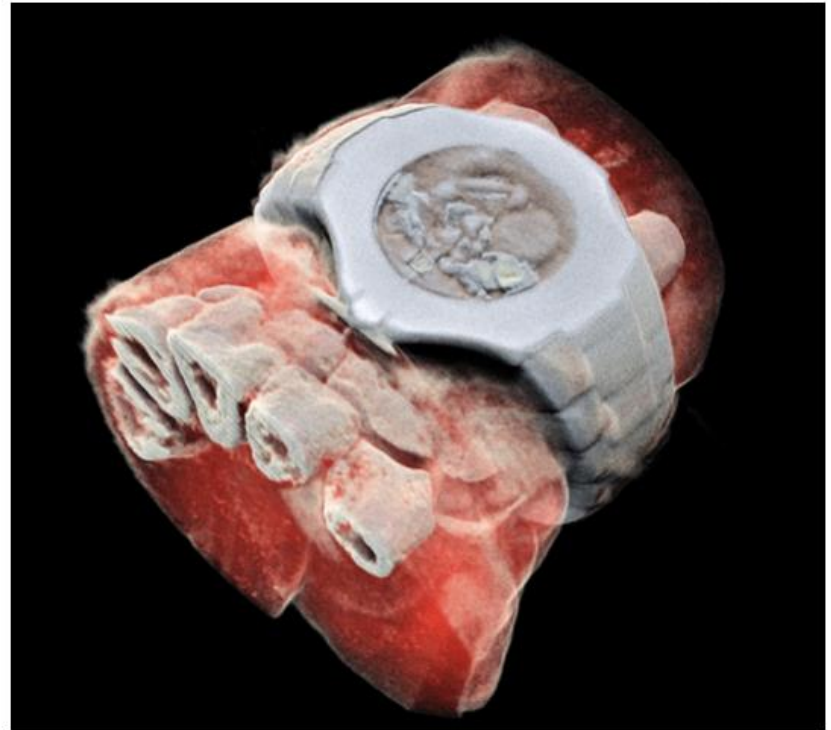




Machine learning for improved  
vaccine production  
CERN - Sanofi

3-D Color X-Rays Could  
Help Spot Deadly  
Disease Without Surgery

The  
New York  
Times





# Activities

## As FCT Trainee

### Technology Transfer Cases

Titanium Polishing  
MammoGrid  
Ceramic Spallation Targets  
High-gradient linac structure  
AC-Current Quench Protection System (CLIQ)  
PROBE: Booster for proton radiography  
MEDeGUN electron gun for EBIS injector

### New Technology Transfer Cases

Superconducting gantry design for hadron therapy (GaToroid)  
Combined MRI-SPECT using highly-polarized gamma-emitting nuclei (Gamma-MRI)

### MA Projects

Tigre  
Mass Separator Device MR-TOF  
Compact trimmable magnets for medical accelerators

Particle Acceleration & Control

Cooling & Ventilation

Cryogenics

Digital Sciences

High & Ultra-High Vacuum Systems

Industrial Controls

Magnet Technology

Manufacturing & Mechanical Processes

Material Science

Metrology

Particle Tracking & Calorimetry

Power Electronics, Optoelectronics & Microelectronics

Radiation Protection & Monitoring

Radio Frequency Technology

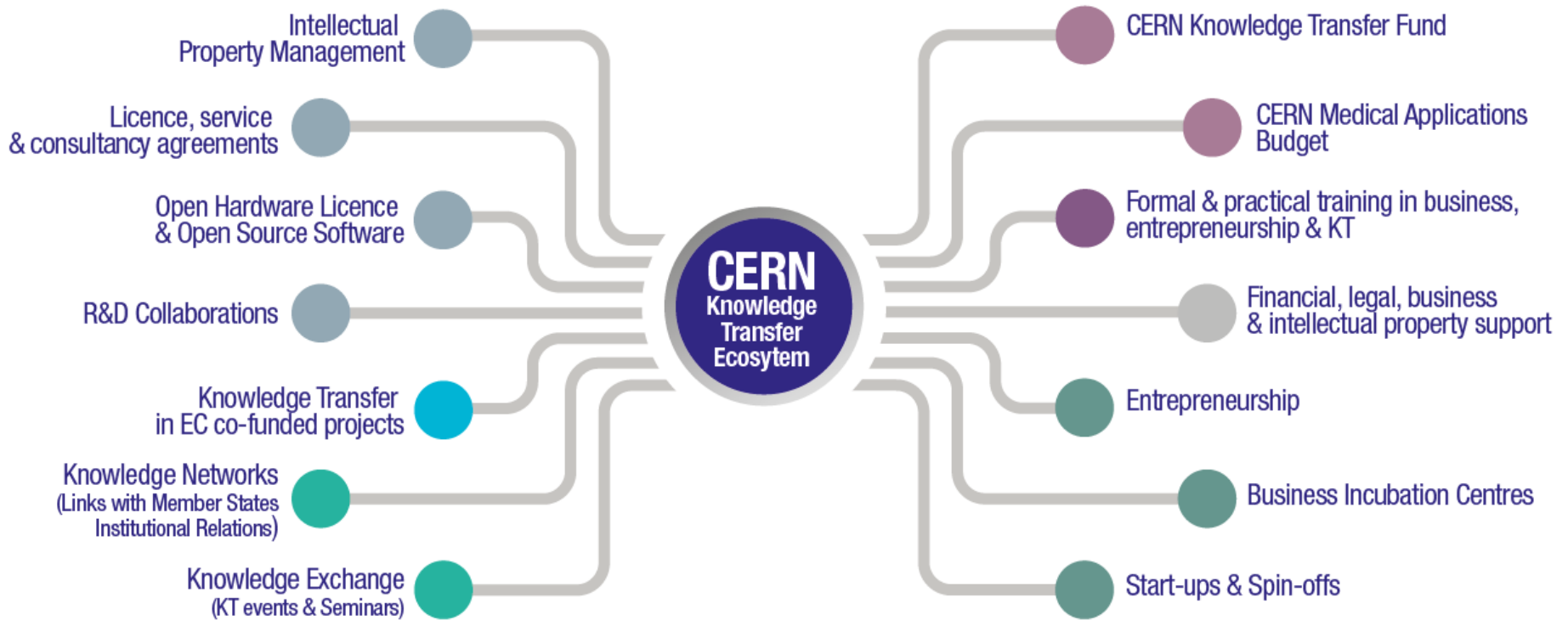
Robotics

Sensors

Superconductivity

Testing Facilities

# KT Ecosystem

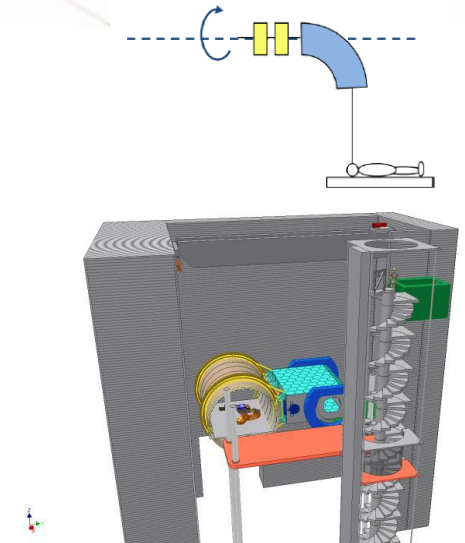
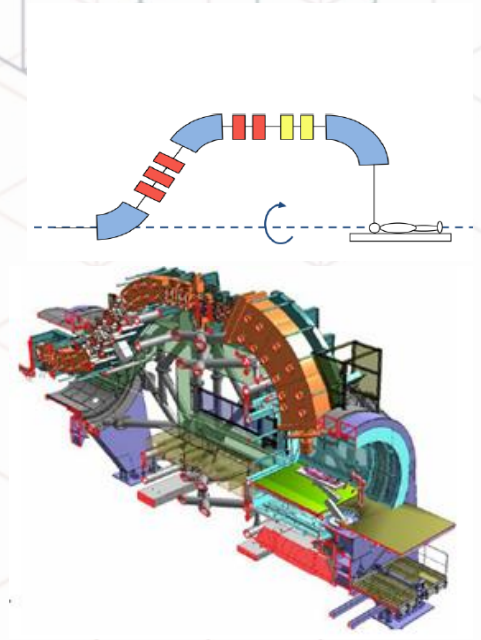
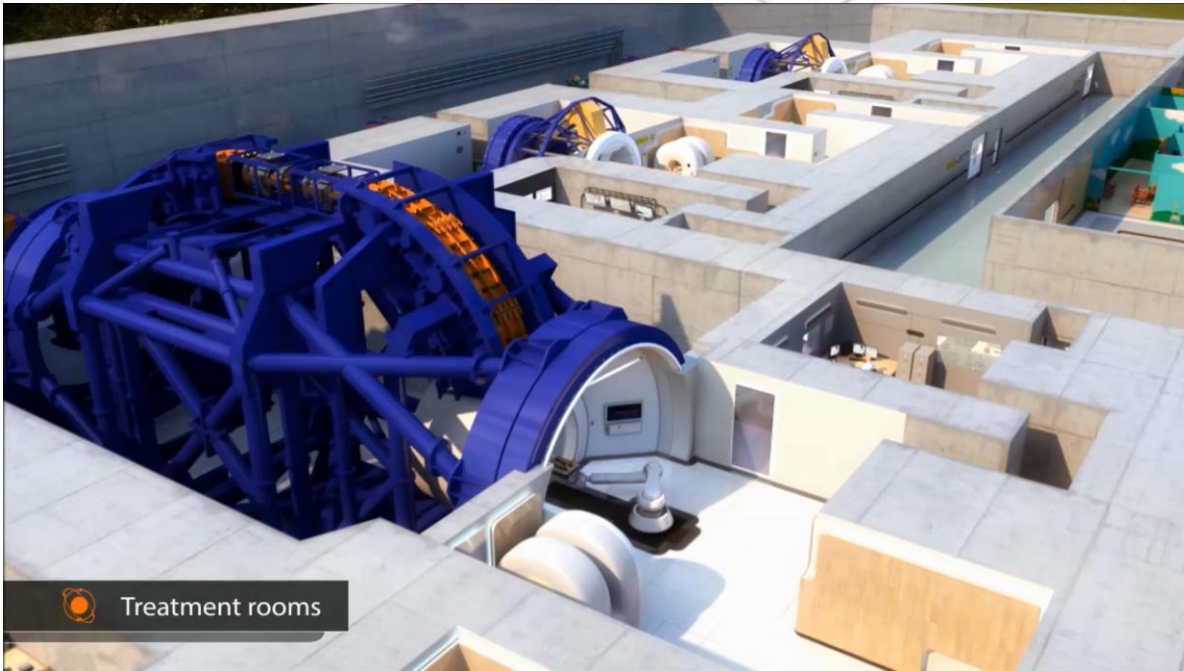


# Activities

As FCT Trainee

## Gantries for hadron therapy

Transport the protons from horizontal plane into a vertical rotation plane.



# GaToroid



# Activities As FCT Trainee

Toroidal Gantry (GaToroid)

Patentability Study

Patent Draft

Priority application filed 21st May 2018

PCT filed 21st May 2019

Technology Dissemination

Technology brief

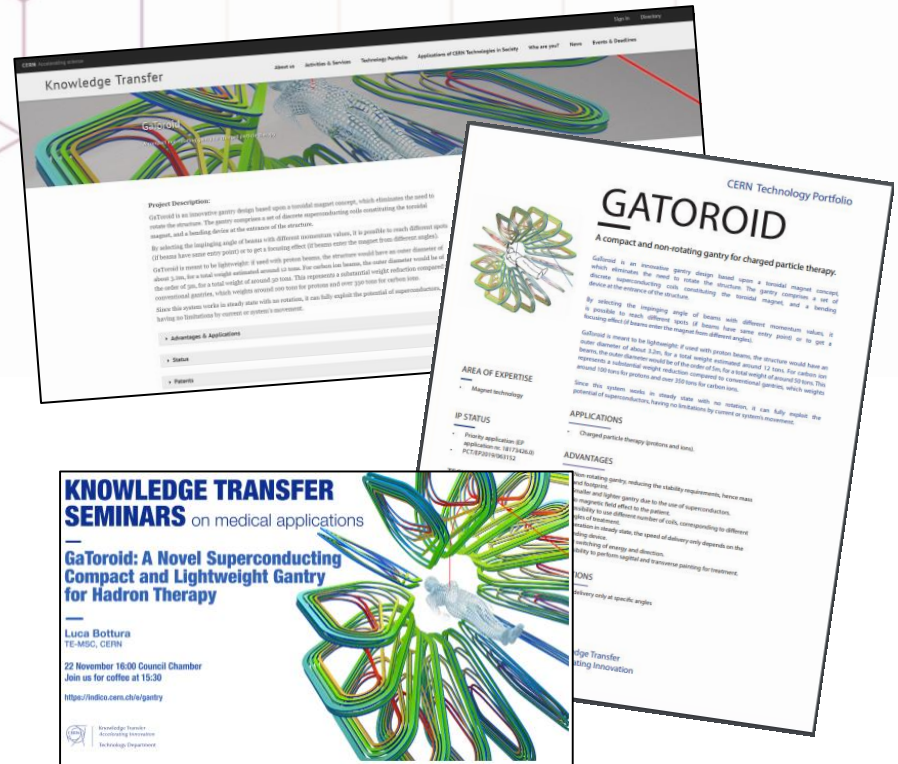
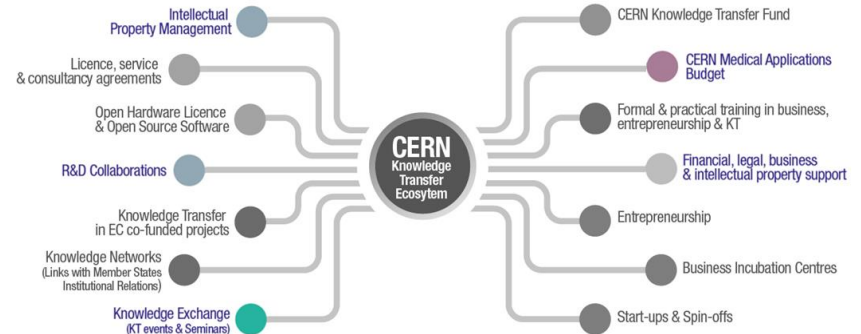
Website Information

Communication and publicity

Market Assessment

Due diligence

CERN Internal dissemination with KT Seminar and ECRMA



This Project has been funded by the CERN Budget for Knowledge Transfer to Medical Applications



# Activities

## As FCT Trainee

### Main organizer of Medtech:Hack

- Fundraised in 3 months 16k CHF
- 16 CERN technical experts
- 25 Teams registered from 14 countries
- 5 Teams selected
- Finalize collaboration with:
  - 2 Health Organizations
  - 1 Hospital
  - 2 Medtech companies
  - 3 Associations

### CERN Medtech:Hack

An innovation competition where teams solve topical problems in the medical field pitched by healthcare organisations and industry partners.



Website: <https://indico.cern.ch/e/medtechhack18>

Video: <https://home.cern/cern-people/updates/2018/04/hacking-solutions-medtech-challenges>

Photos: <https://cds.cern.ch/record/2316915>



# Activities

## As FCT Trainee

### Training

General and Professional French course  
Supercomm – Switzerland (2016 and  
2018)

Fundamentals of technology transfer training  
course

ASTP Knowledge Transfer Europe –  
Netherlands (2017)

Communication : Science or art?  
SwissNova – Switzerland (2017)

Finding happiness in patent databases  
CERN – Switzerland (2017)

Introduction to knowledge transfer tools  
CERN – Switzerland (2016)

CERN Guide and *Conferencier*  
Training on Communication for CERN Guides

### Conferences and presentations

ISMIRM-ESMRMB 2018  
Paris  
Conference on MRI technology

IEEE NSS-MIC 2017  
Atlanta  
Nuclear Science Symposium and Medical  
Imaging Conference – Technology Transfer  
Program Workshop

French-CERN-Ukrainian Workshop on Medical  
Physics and Imaging 2017  
Ukraine

Medtech Europe 2016  
Bruxels  
The 4th Industrial Revolution – the medtech  
era?



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**FCT**  
Fundação para a Ciência e a Tecnologia  
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

# Thank you!