



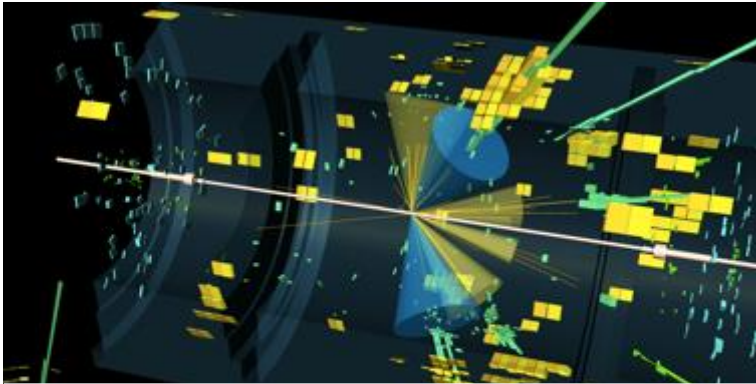
# Technology Transfer at CERN

Giovanni Anelli – Knowledge Transfer Group Leader

[giovanni.aneli@cern.ch](mailto:giovanni.aneli@cern.ch)

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# CERN's Mission



Science



Technology



Training



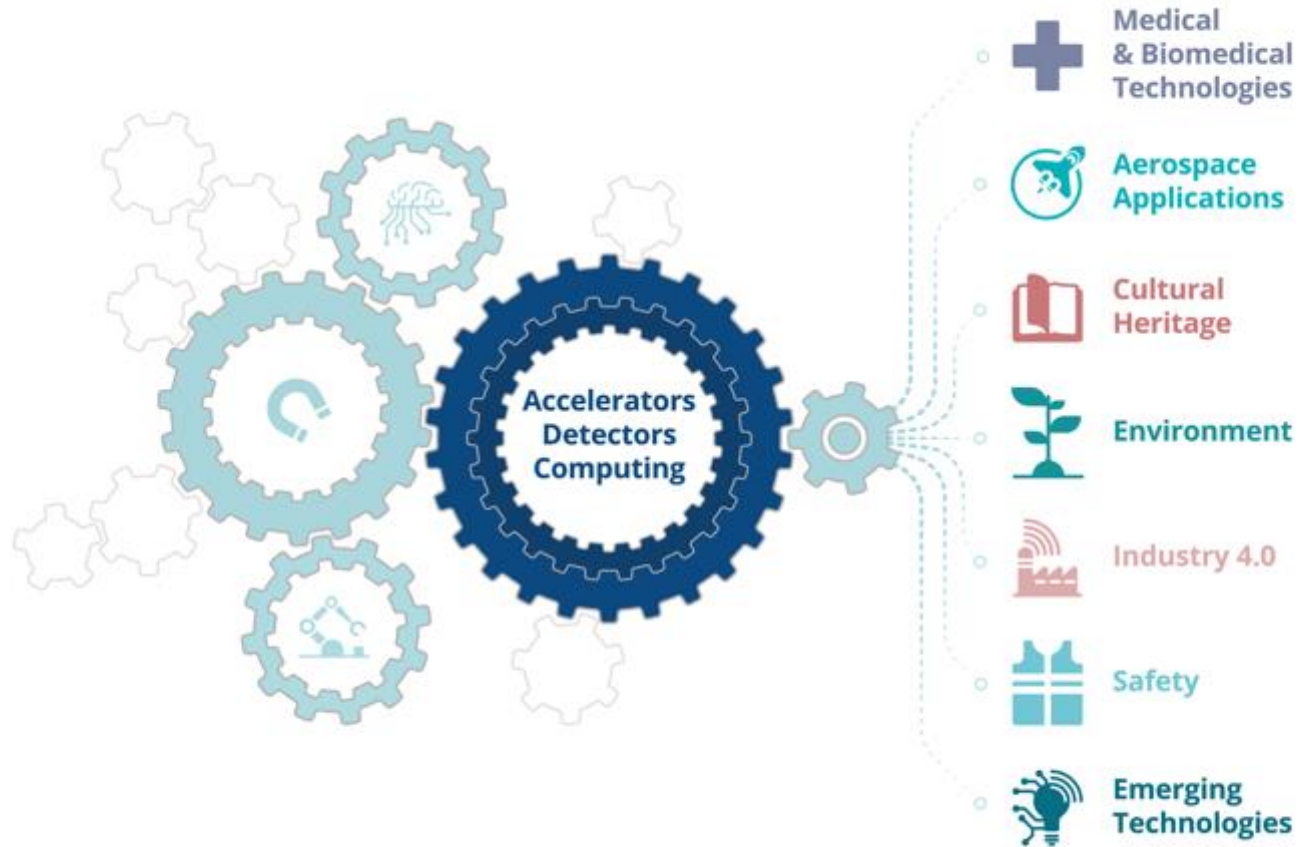
Collaboration

# KT's Mission

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- **Maximise** the technological and knowledge return to society, in particular through Member States industry
- **Promote** CERN as a centre of excellence for technology and innovation
- **Demonstrate** the importance and impact of fundamental research investments

# From CERN Technologies...



... to Society

# Knowledge Transfer Tools



# Collaboration with Bundesdruckerei (BDR) in Berlin



Collaboration: Consultancy Agreement

Partner: BDR is German state owned company responsible for printing Euros and making passports

Start date: May 2019

Relevant CERN Competence:

- > Physics equations
- > Materials science
- > Data management ROOT
- > Data encryption using wave functions

Status: Running for two years, decided to continue and expand fields of collaboration into data management and privacy protection mechanisms. Main purpose: generating new ideas and concepts.

Involved: 4-5 CERN experts

Use Case:

BDR is interested to develop entirely new approaches to data cryptography, ID security and privacy for application by, amongst other, government institutes, helping to protect the (digital) identity of civilians.

# Collaboration with ENERCON in Aurich



Collaboration: Partner Agreement

Partner: ENERCON is leading company in field of design, manufacturing and operation of wind turbines

Start date: July 2019

Relevant CERN Competence:

- > Superconductivity / powerlines
- > Power controls and management
- > Data analytics / machine learning
- > Material science

Status: Started with broad exploration of various potential areas that could support innovation ambition. Concluded to start in digital domain, to support in collection and analytics of data from multiple turbines.

Involved: 2-3 CERN experts

Use Case:

Wind turbines are equipped with many sensors and controls. Hence, a wind turbine farm requires live data storage and analysis capability in order to help efficient operation and early detect potential issues.

# Medipix 2 Collaboration



Collaboration: Collaboration agreement

Partners: 17 partners, 2 in Germany  
University of Freiburg and University of  
Erlangen Nürnberg

Start date: July 2004

Relevant CERN Competence:

- > Microelectronics
- > Dosimetry

Status: 3 ASICs have been designed in this  
collaboration: Medipix2, Timepix and  
Timepix2.

5 non-exclusive licences granted. 1 in  
Germany

Involved: 3-4 CERN experts

Use Case:

Medipix and Timepix chips have been  
heavily used in material analysis, dosimetry  
in space, education and have led into a new  
development Timepix 2 targeted for space  
applications.



# Collaboration with X-Ray Imaging Europe



Collaboration: Licence agreement

Partners: X-Ray Imaging Europe is mainly active in semiconductor detectors and electronics for X- and Gamma-rays.

Start date: August 2010

Relevant CERN Competence:

- > Microelectronics
- > Dosimetry

Status: License agreement for production and sale of Medipix2 and Timepix assemblies

Involved: 3-4 CERN experts

Use Case:

XIE is mainly focused on CdTe sensors and is one of the main supplier of CdTe assemblies for Medipix users worldwide

# Medipix 3 Collaboration



Collaboration: Collaboration agreement

Partners: 23 partners, 7 in Germany  
DESY, University of Freiburg, ISS, University of Erlangen-Nürnberg, University of Bonn, TUM, KIT.

Start date: December 2012

Relevant CERN Competence:

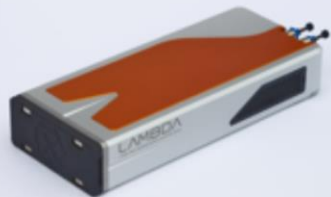
- > Microelectronics
- > Dosimetry

Status: 2 ASICs have been designed in this collaboration: Medipix3 and Timepix3 (Uni Bonn contributed to the design)  
7 licences granted on Medipix3. 1 in Germany  
3 licences granted on Timepix3

Involved: 3-4 CERN experts

Use Case:  
Medipix3 and Timepix3 chips have been heavily used in material analysis, medical imaging, synchrotron applications and electron microscopy.

# Collaboration with X-Spectrum



Collaboration: Licence agreement

Partners: X-Spectrum GmbH is dedicated to the scientific advancement through research utilizing synchrotron radiation.

Start date: October 2014

Relevant CERN Competence:

- > Microelectronics
- > Dosimetry

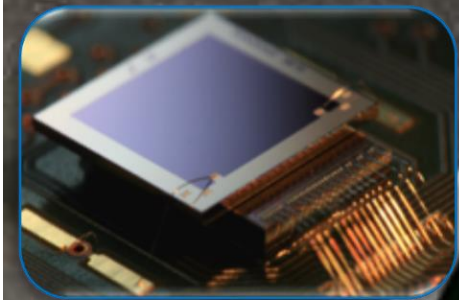
Status: License agreement for production and sale of Medipix3 assemblies

Involved: 3-4 CERN experts

Use Case:

X-Spectrum, develops and provides a fast, high-resolution X-ray camera for high-end research projects at advanced X-ray sources. In 2020, the Lambda system has been used in DESY-PETRA III to investigate new ways of administering drugs such as possible coronavirus treatments.

# Collaboration with DI Dosimetric Instruments



Collaboration: Licence agreement

Partners: Dosimetric Instruments is a CERN Spin-Off focused on the development, production and sales of dosimetry instruments.

Start date: September 2020

Relevant CERN Competence:

- > Microelectronics
- > Dosimetry

Status: License and supply of DOSEPIX chips

Involved: 1 CERN expert

Use Case:

The main applications targeted are dosimetry of ionising radiations for medical facilities, industries utilizing radiographic testing, and research facilities.



# How to collaborate with CERN

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Start a company based on CERN technology or know-how



Service & Consultancy



Licensing



R&D Collaborations

Find out more at [kt.cern/collaborate](https://kt.cern/collaborate)

# Main contact points: KT Forum delegates



› **Friedrich  
Haug**

Delegate to KT Forum

✉ [friedrich.haug@cern.ch](mailto:friedrich.haug@cern.ch)



› **Karl  
Ziemons**

Delegate to KT Forum on  
Medical Applications

German Ministry of  
Education and  
Research BMBF

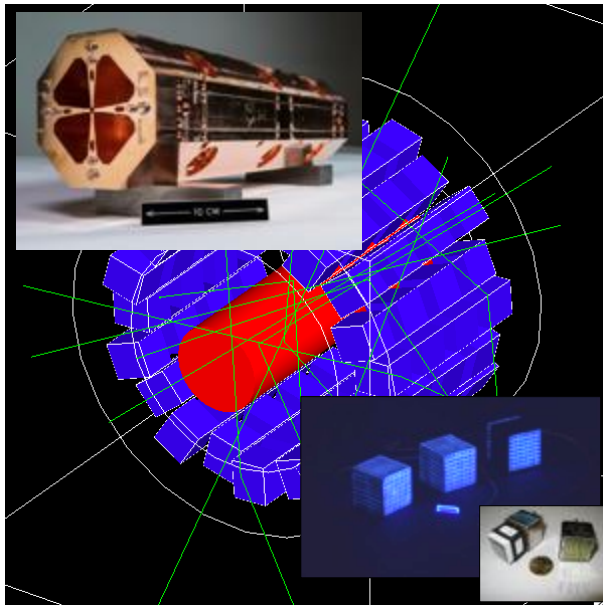
✉ [k.ziemons@fh-aachen.de](mailto:k.ziemons@fh-aachen.de)

☎ +49 2 41 6009 53960

von den **CERN Technologien** in  
Beschleuniger, Detektoren und  
wissenschaftliches Rechnen

hin

zu **(Bio-) Medizinischen  
Anwendungen** in Diagnostik und  
Therapie



**Technologie & Wissens- Transfer**

**Kommunikation** zwischen Industrievertretern und dem Technologie-Transfer Büro @ CERN;

**Organisation** von Veranstaltungen unter Beteiligung von Industrievertretern;

z.B. SCINT conference @ Chamonix, France 2017  
IEEE NSS&MIC conference @ Strasbourg, France 2016

**Unterstützung** bei der Gründung neuer Industriepartnerschaften, Start-up Unternehmen und weiterer Netzwerke;

**Präsentation** neuer Technologien und Produkte aus dem europäischen Forschungszentrum CERN auf (bio-) medizinischen Veranstaltungen und Konferenzen;

z.B. als Mitglied der DGMP (Deutsche Gesellschaft für Medizinische Physik),  
und DGN (Deutsche Gesellschaft für Nuklearmedizin)



## Kontakt Daten:

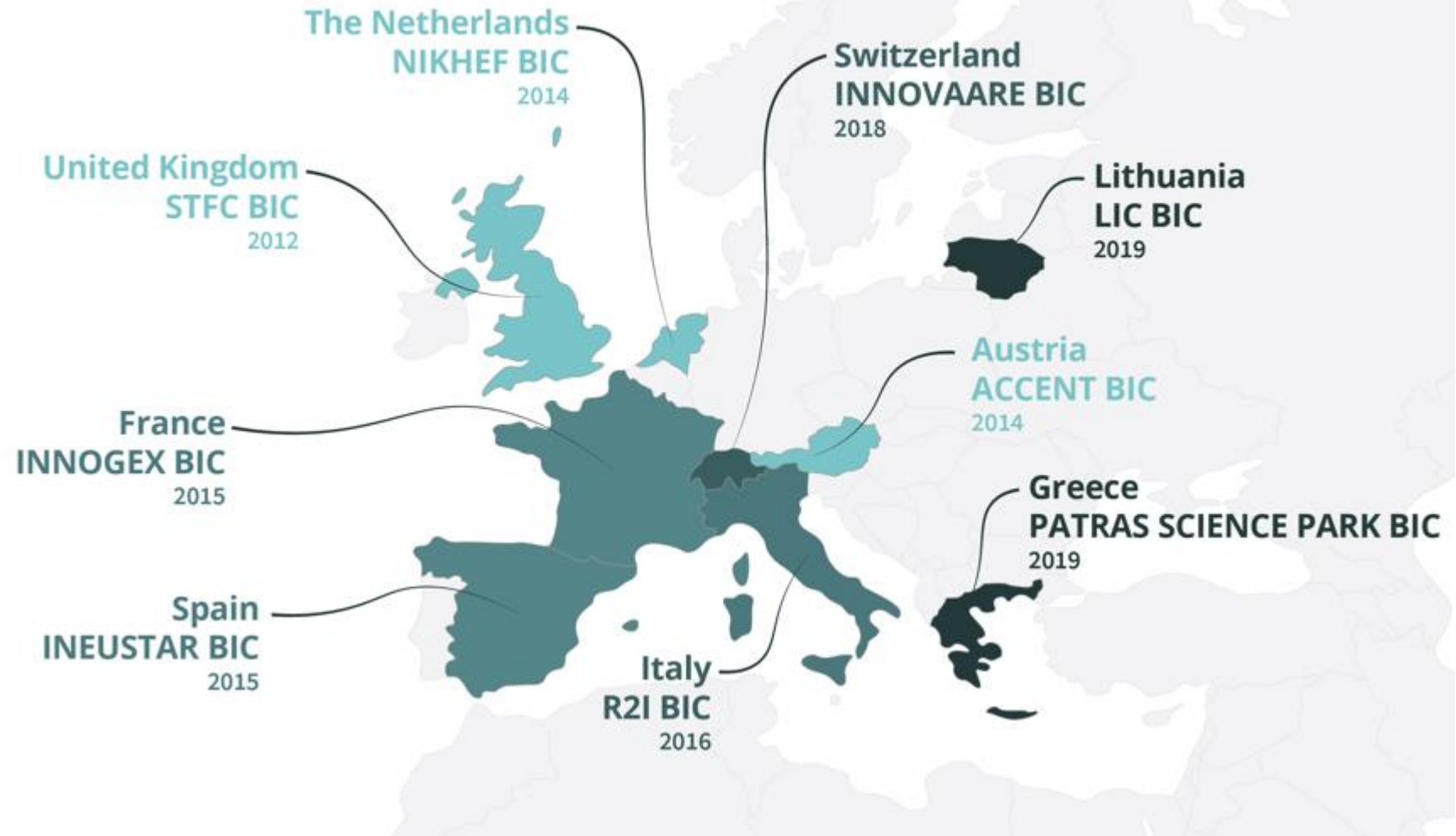
### Prof. Dr. Karl Ziemons

FH Aachen University of Applied Sciences  
Fakultät für Medizintechnik und Technomathematik

Heinrich-Mußmann.Str. 1  
52428 Jülich  
T +49. 241. 6009 53960  
F +49. 241. 6009 53962  
K.Ziemons@fh-aachen.de  
www.fh-aachen.de



# Business Incubation Centres



Thank you!

# Spare slides



# Collaboration with Erlangen Centre for Astroparticle Physics (ECAP)



Collaboration: R&D Licence and supply agreement

Partners: ECAP studies astrophysics and medical physics and get the most of the 2.

Start date: September 2020

Relevant CERN Competence:

- > Microelectronics
- > Dosimetry

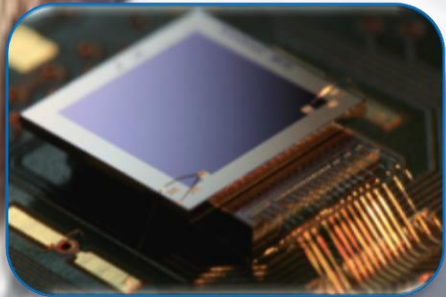
Status: License and supply of DOSEPIX chips

Involved: 1 CERN expert

Use Case:

Dosepix wafers will be used by ECAP for non-commercial and academic R&D purpose only, specifically for dosimetry of ionising radiation and x-ray imaging, such as molecular imaging.

# Collaboration with IBA (Germany)



Collaboration: Licence agreement

Partners: IBA Dosimetry offers a full range of integrated and innovative solutions for QA, calibration procedures, as well as services and trainings that maximize efficiency and patient safety in Radiation Therapy and Medical Imaging.

Start date: October 2019

Relevant CERN Competence:

- > Microelectronics
- > Dosimetry

Status: License for CERN IP background related to Dosepix Chips

Involved: 1 CERN expert

Use Case:

Non-exclusive, sub-licensable license on the CERN IP background and Dosepix ASIC, in the field of quality control monitoring systems for X-ray diagnostic equipment in medical applications.

# Collaboration with Helmholtz-Zentrum Dresden-Rossendorf



Collaboration: R&D Licence agreement

Partners: HZDR conducts research in the materials, health and energy sectors in Dresden and at three other locations in Germany and France.

Start date: October 2019

Relevant CERN Competence:

> Microelectronics

Status: R&D licence

Involved: 1 CERN expert

Use Case:

Non-commercial and academic R&D purpose only, specifically for a small scintillator-hodoscope to improve the detector test facility at ELBE