PARTNER
Particle Training Network for European Radiotherapy

Faustin Laurenţiu Roman

Age: 29
Nationality: Romanian

Education:
Engineering and Master Diploma in Physics @ University of Bucharest, RO
Junior Researcher @ IFIN-HH, RO: Nuclear Data Evaluations

Experience: IT consultant on server administration, security and networking for academic and private sector (Vodafone, Alpha Finance, Alpha Bank)

Status:
Marie Curie Early Stage Researcher @ CERN, April 2009
PhD student at University of Valencia, October 2009

Interest:
• computational physics
• distributed computing
• eHealth and cancer research

Recent Trainings:
• Technical: HealthGrids, Accelerators, Detectors, Imaging, Hadron therapy, Radiobiology
• Soft: French, Leadership, Medical Ethics, Presentation, Communication effectively, Media skills

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Daniel Abler

Age: 26
Nationality: German

Education:
Diploma in Physics at University Erlangen-Nuremberg, DE
Diploma thesis at CERN:
Characterisation of Anorganic Scintillating Crystal Fibres for HEP

Status:
Marie Curie Early Stage Researcher @ CERN, July 2009
PhD student at University of Oxford, October 2009

Recent Training:
• *PARTNER training events:*
grid computing, detectors and accelerators applied to medicine, hadron therapy, Radiobiology, leadership, Marie Curie conference
• *Oxford PhD courses:*
accelerator physics, medical ethics, radiobiology, presentation skills

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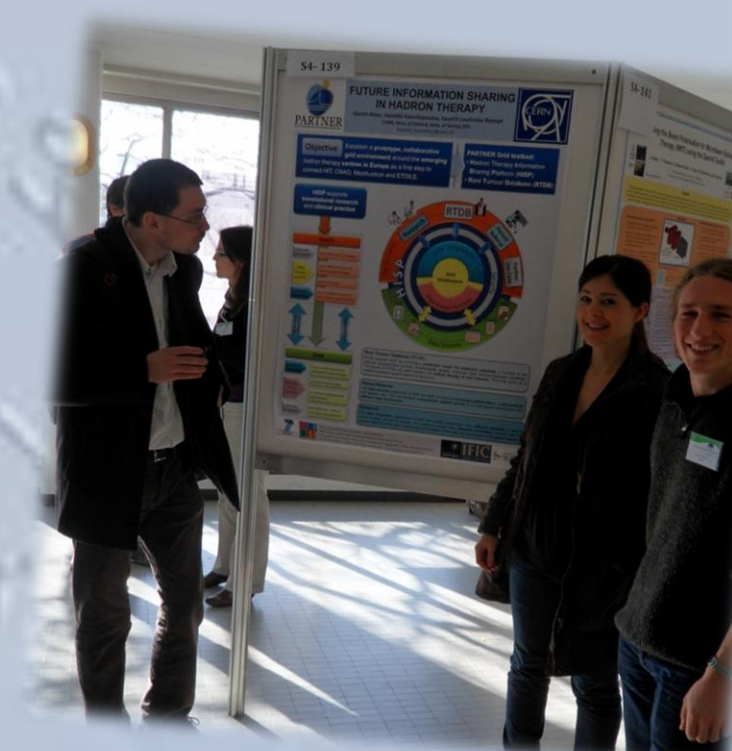
PARTNER Grid project: *Information Sharing System for Hadron Therapy*

Situation

No computing infrastructure connecting the emerging hadron therapy centres in Europe for:

• Cross-border patient referral
• Cancer Research

Prototype

Grid computing links distributed resources used in a multidisciplinary virtual organisation.
• **H**adron Therapy **I**nformation **S**haring **P**latform (**HISP**)
• **R**are **T**umour **D**ata**b**ase (**RTDB**)

Cancer:
• primary cause of   death in age group 45-64 y (in Europe)
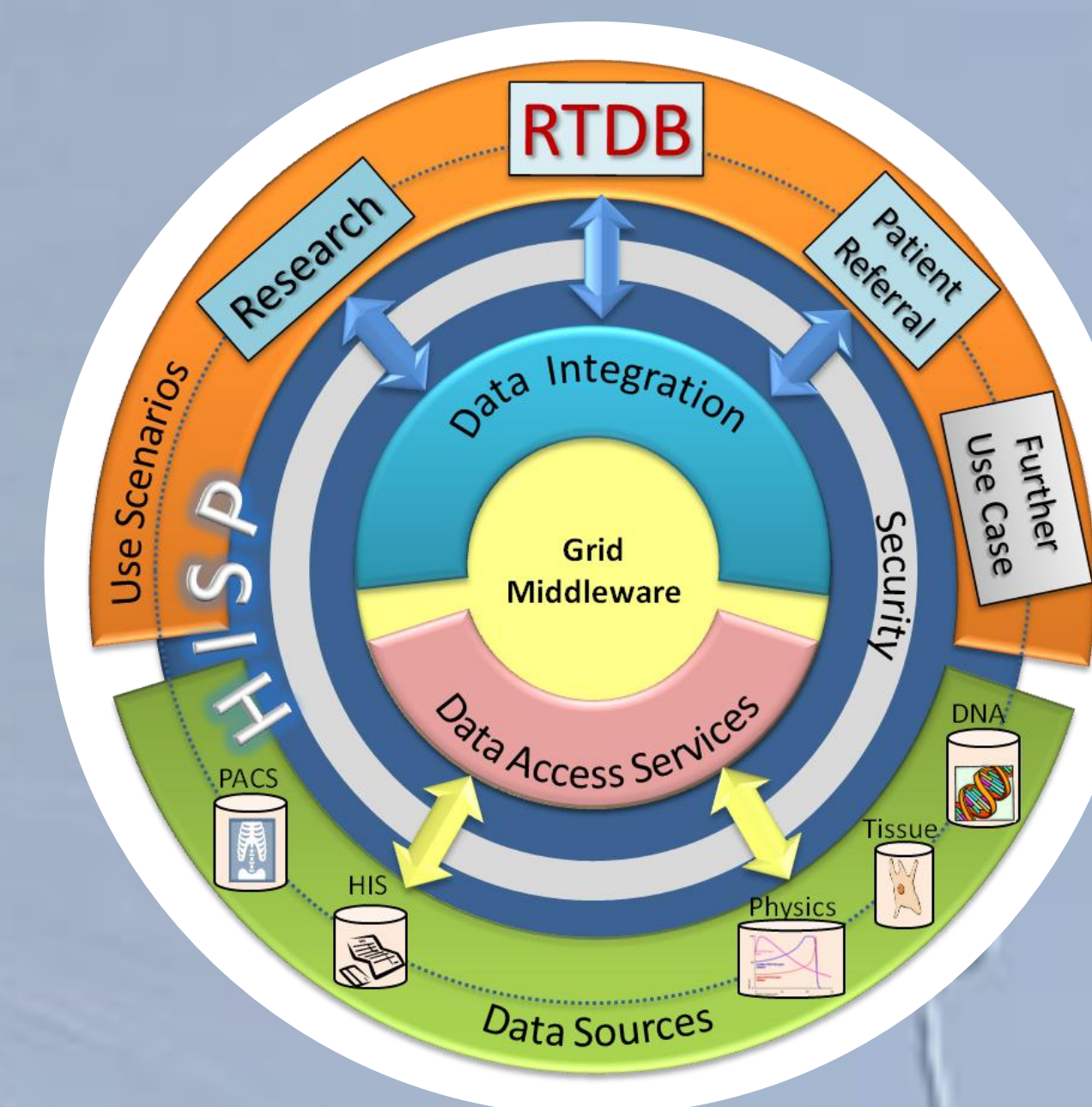• Hadron therapy:
~ 1500 patients/year/centre

Centres in Europe
• HIT 2009
• CNAO 2010
• MedAustron 2014
• ETOILE 2015

HIT (Heidelberg)
ETOILE (Lyon)
MedAustron (Wiener Neustadt)
CNAO (Pavia)
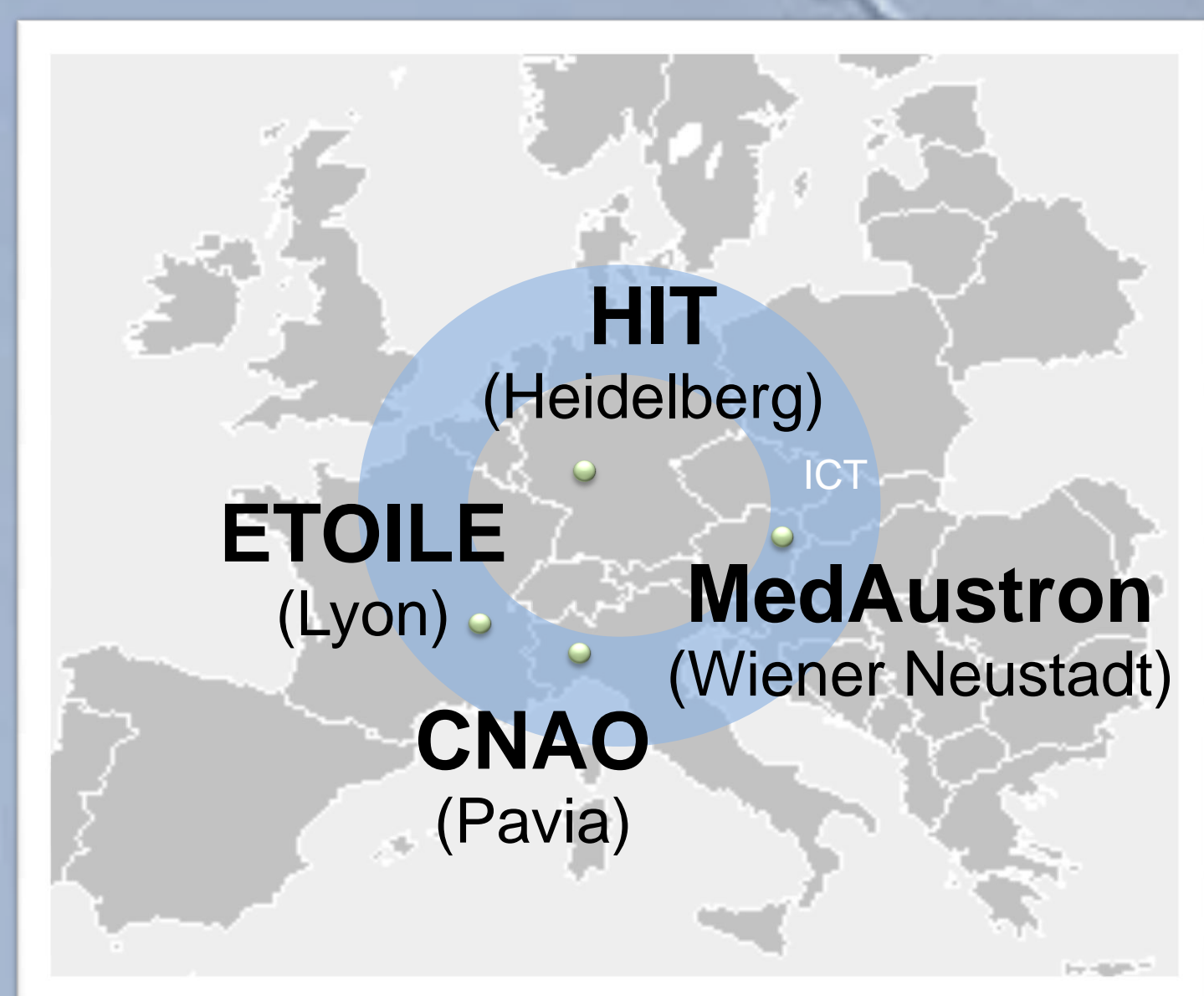
DISTRIBUTED
multidisciplinary   **research**
heterogeneity
grid   Sensitive data
COLLABORATION
EASY TO USE
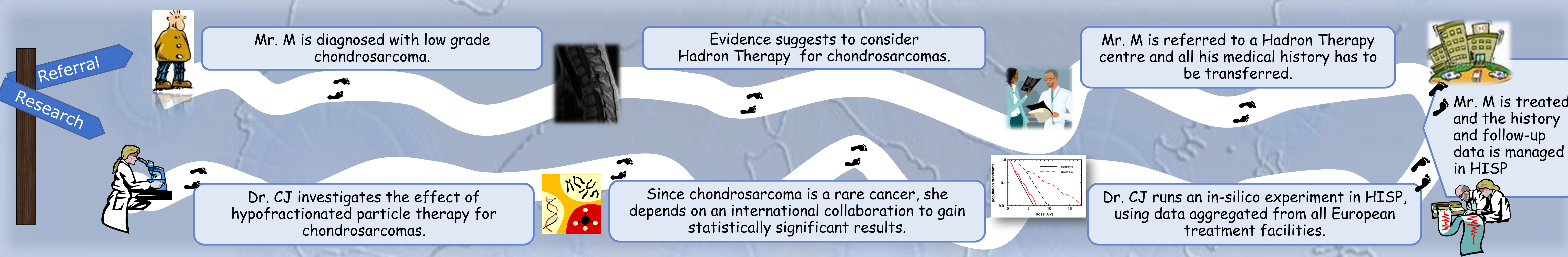ontology   *SECURE FRAMEWORK*
eHealth   semantics
medicine

PARTNER@CERN
2009 – 2012

Deliverables:
• survey of existing projects
• legal/ethical aspects
• prototype services
• demo platform

Beyond PARTNER
• ULICE
• ?

Referral
Research

Mr. M is diagnosed with low grade chondrosarcoma.

Evidence suggests to consider Hadron Therapy for chondrosarcomas.

Mr. M is referred to a Hadron Therapy centre and all his medical history has to be transferred.

Mr. M is treated and the history and follow-up data is managed in HISP

Dr. CJ investigates the effect of hypofractionated particle therapy for chondrosarcomas.

Since chondrosarcoma is a rare cancer, she depends on an international collaboration to gain statistically significant results.

Dr. CJ runs an in-silico experiment in HISP, using data aggregated from all European treatment facilities.

Description of work (WP22):
Data aggregation, grid services, security

Grid computing is about **sharing information** across multiple centres in a secure way. The core concept is the **Virtual Organization** (VO): a **collaborative environment** where researchers share resources and knowledge to solve a particular problem, e.g. VO.PARTNER.EU will share medical data for the hadron therapy community. The grid components give access to **storage** and **computational resources**, HISP services making possible to **federate distributed databases** and run queries and time-consuming algorithms in a fast and secure way. These services are offered to researchers in an **easy to use** web portal that will allow the negotiation of research proposals and designing experimental workflows.

Further challenging aspects are the legal and ethical issues surrounding the patient information. We analyzed the European and national legal frameworks and the ethical rules to exchange medical data and proposed a framework to **protect patient information and rights**.

https://espace.cern.ch/partnersite/workspace/faust/

Description of work (WP23):
Semantic Interoperability framework

Medical data comes from **different data sources**, **across disciplines** and institutes: Doctors, lab reports, imaging and treatment devices, all contribute to the entries in a patient record. However, not all the patient information is coded in a standardised way and existing reporting **standards may be interpreted differently** by users and doctors from different institutes.

A prerequisite for **data integration** is to know the meaning, the **semantics**, of data in the context in which it had originally been taken.

Tools will be developed to :
• Ensure **semantic interoperability** of data sources;
• Support **"intelligent" queries**, helping users to find the data they are looking for.

These tools will be designed for the **hadron therapy community** and implemented and tested in HISP.

https://espace.cern.ch/partnersite/workspace/abler/

TRAINING FOR EUROPE
13-17 September 2010

www.cern.ch/partner

MARIE CURIE ACTIONS
PEOPLE