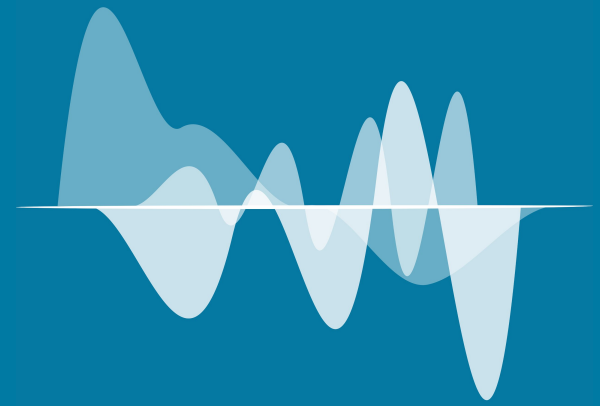


# Artificial Intelligence in Medicine



INFN - CSN5 proposal  
2019-2021

RN: A. Retico (INFN-PI)  
RL: A. Chincarini

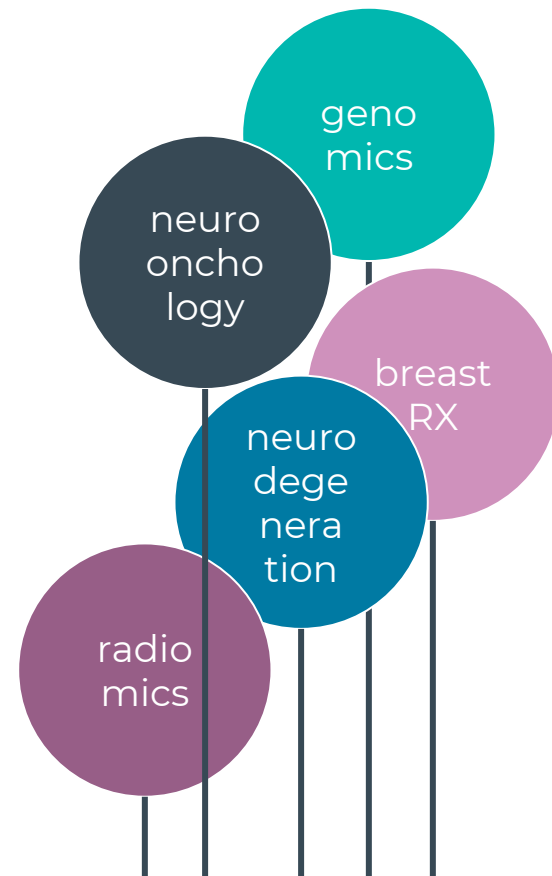
# AIM in short

- a **network of expertise** in applied data analysis
  - focus on medical data & radiomics
- INFN-wide collaboration
  - PI / GE / CA / BO / BA / ( FI / RM / NA )

Seeks to grow and develop existing and new curriculum in applied data science

Developments are CNTT-oriented

(e.g. DORIAN [A. Chincarini], R4I 2018)



# background

gather and builds on a tradition of applied physics @ INFN

1998-2001 **CALMA**

2002-2004 **GP-CALMA**

2005-2011 **MAGIC V**

2008-2012 **BEATS**

2011-2012 **SEVEN**

2013-2014 **TESLA**

2012-2014 **MIND**

2015-2017 **nextMR**

# sharing the expertise

AIM role is grounded into expertise sharing:

- workshops: 2/year (one internal, one open)
- slots into INFN software schools
- shared PhD training
- generation of consortia for regional / EU / health-related applications
- geared towards an INFN-Medicine infrastructure
  - following a CNTT proposal

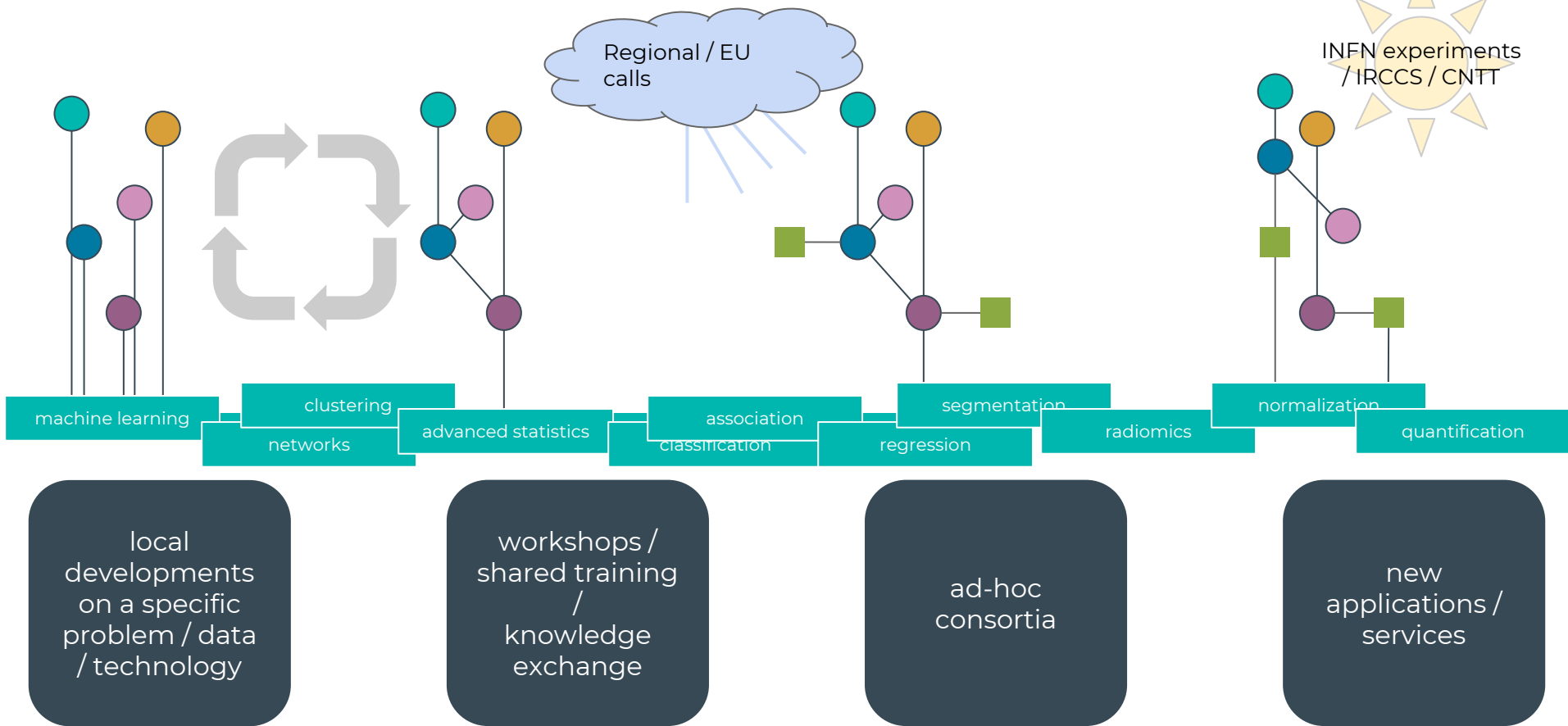


**JPND**  
research

EU Joint Programme – Neurodegenerative Disease Research



# AIM flowchart



# partners & dataset

## Clinical partners

- IRCCS S. Martino (GE)
- IRCCS Stella Maris (PI)
- IRCCS Gaslini (GE)
- IRCCS Centro S. G. di Dio (BS)
- IRCCS G.Paolo II (BA)
- IRCCS SDN (NA)
- AOUP (PI)
- Policlinico (BA)
- Osp. Pediatrico Meyer (FI)

## EU / consortia

- IMAGO7 (Fondazione di Ricerca)
- EADC (EU)
- ADNI (US)
- ABIDE (EU/US)
- ENIGMA (WW)



Servizio  
Sanitario  
della  
Toscana



Provincia Lombardo-Veneta  
Ordine Ospedaliero di S. Giovanni di Dio - Fatebenefratelli  
CENTRO S. GIOVANNI DI DIO - FATEBENEFRAELLI  
ISTITUTO DI RICOVERO E CURA A CARATTERE SCIENTIFICO  
25125 BRESCIA - Via Pilastroni, 4  
Telefono 030 35011 - Telefax 030 348255



Welcome to the  
**EADC** web site  
European Alzheimer's Disease Consortium



IRCCS FONDAZIONE  
**STELLA MARIS**

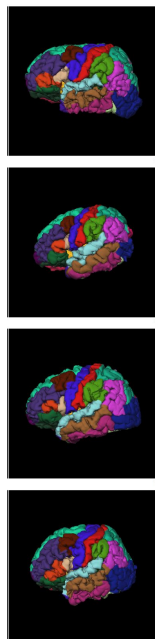
*Gaslini*



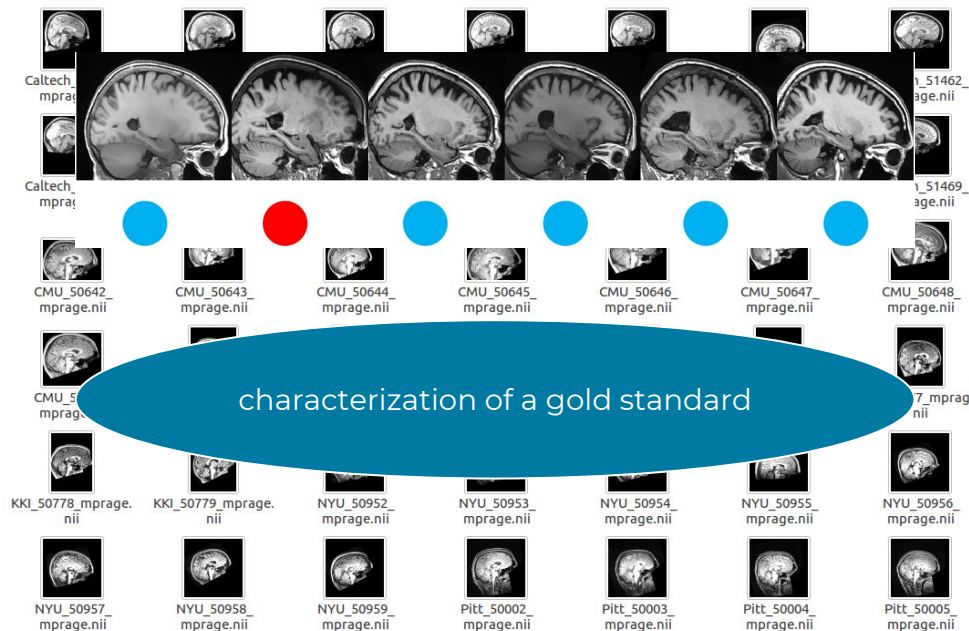
# AIM 1: multi-site data standardization

data gathered by different sites and/or acquisition systems carries local “fingerprint”, often to the detriment of the much more subtle information of interest.

this problem is akin to the management of **systematic errors**



typical application cases: MRI, RX, PET, NPSY tests

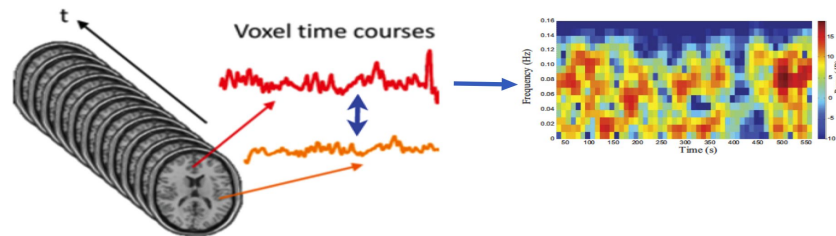


# AIM 2: response modeling

the efficacy and discriminative power of a measure depends on the applied models and the features that are extracted from the data, often through the integration of external knowledge

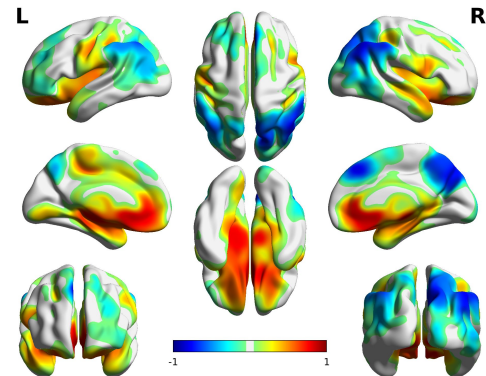
This problem is akin to the **detection of a small signal** in an uncharacterized noise

typical application cases; genetic researches, treatment response, radiomics



functional networks

rare disease fingerprinting



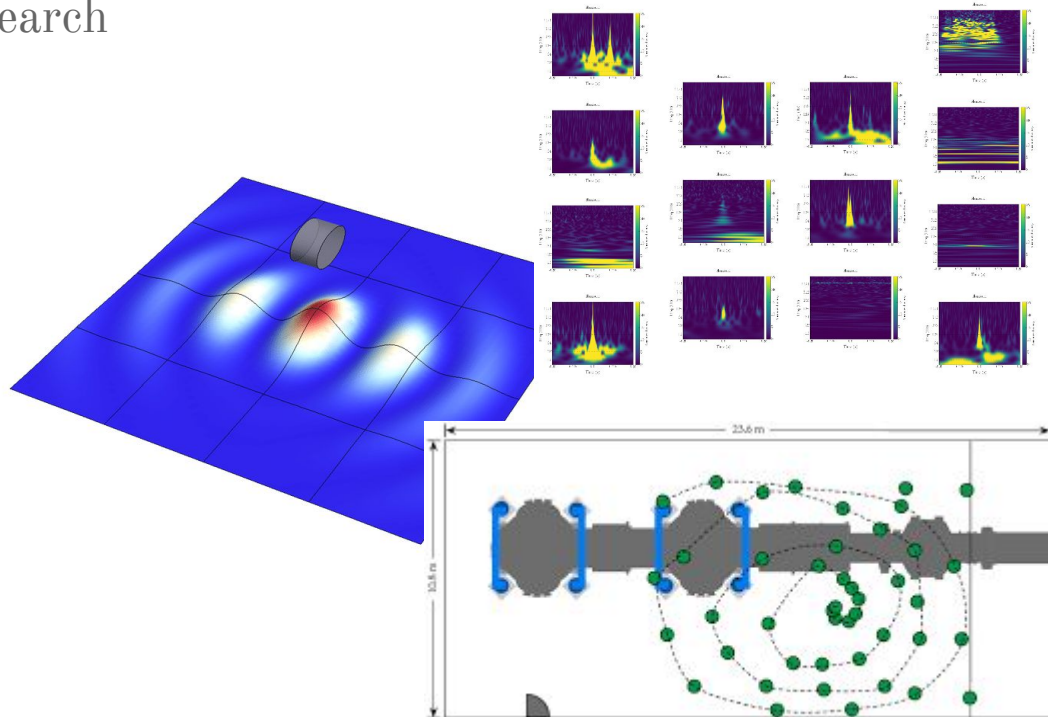


# feedback on INFN-core researches

developing resources, expert advice, infrastructures and practical help to assist with the management and data discovery in research

current applications in VIRGO:

- glitch detection & classification
- Newtonian Noise Cancellation
- E.M. followup



# people & facilities

<b>Nome</b>	<b>Ruolo</b>	<b>FTE</b>
A.Chincarini	Ricercatore	0.4
E. Peira	Dottorando	1.0

Servizio Calcolo: 2 m.u.

related external funds (t.b.approved):  
PRIN, Health Min. RF, TOPMED,  
HBP, BIOUPPER, CNTT R4I

thank you

The AIM logo is rendered in a bold, white, sans-serif font. The letters 'A', 'I', and 'M' are connected at the base. The logo is positioned in the bottom right corner of the blue banner, partially overlapping a stylized white waveform graphic that resembles an audio signal or a data plot.