

# Artificial Intelligence in Medicine



INFN – CSN5 2019-2021 – PISA

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# Chi siamo



Personale di ricerca,  
assegnisti, borsisti,  
specializzandi,  
dottorandi INFN e UNIFI

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Personale INFN, Centro  
di Calcolo

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Laureandi UNIFI

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Maris e IMAGO7

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Bosco Paolo
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Buonincontri Guido
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Costagli Mauro
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Tosetti Michela
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FONDAZIONE  
DI RICERCA ONLUS  
**IMAGO7**

**FONDAZIONE PISA**



IRCCS FONDAZIONE  
**STELLA MARIS**



**Servizio  
Sanitario  
della  
Toscana**

## Su cosa possiamo “contare” @ Centro di Calcolo INFN-PI

CPUs: 2x10 cores Intel Xeon E5-2640v4 @2.40 GHz

RAM: 64 GB

GPUs: 4x nVidia Tesla K80, con 2x GPUs Tesla GK210, 24 GB RAM e 2496 CUDA ciascuna  
nVidia Tesla V100



# Cosa stiamo facendo/faremo



## AIM 1: Data harmonization

AIM1.T1 - Multi-site data harmonization in MRI (PI, BA, BO) [Task expected duration: 3 years, starting month: 1]

M1.1 (31-12-2019) Identification and coding of Generative Adversarial Network for MRI data harmonization

AIM1.T2 - Multi-site data harmonization in mammography (PI, CA) [Task expected duration: 2 years; starting month: 1]

M1.2 (31-12-2019) Implementation of first prototype of the harmonization algorithm for mammograms

## AIM 3: Predictive models

AIM3.T1 - Predictive models for Radiation Therapy treatments (FI, GE, PI) [Task expected duration: 3 years; starting month: 1]

M3.1 (31-12-2019) Creation of database for predictive models for Radiation Therapy treatments

AIM3.T2 - Predictive models for mammography and CESM (PI, CA, BA) [Task expected duration: 3 years; starting month: 1]

M3.2a (30-06-2019) Development of a CNN for automatic classification of breast density in the 4 BIRADS classes

## Mammographic data from RADIOMA data sample:

- ~ 8000 clinical mammograms acquired by 4 different RX devices with Gold Standard (4 BIRADS density classes) by an expert AOUP radiologist.
- To be extended to 10000 screening mammograms supplemented by genetic and epidemiological informations and DBT (Digital Breast Tomosynthesis) images.