Artificial **I**ntelligence in **M**edicine
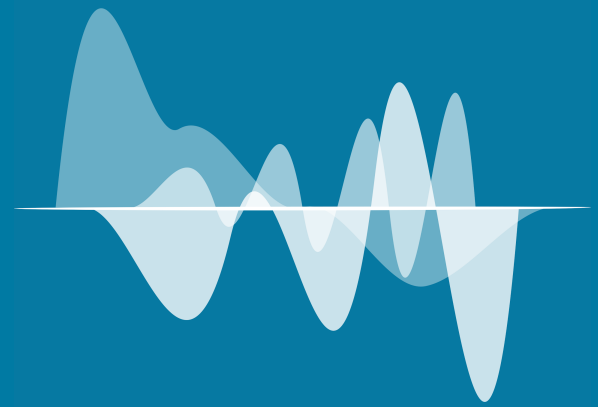
CT

AIM: Description of the CT group (UniPA)

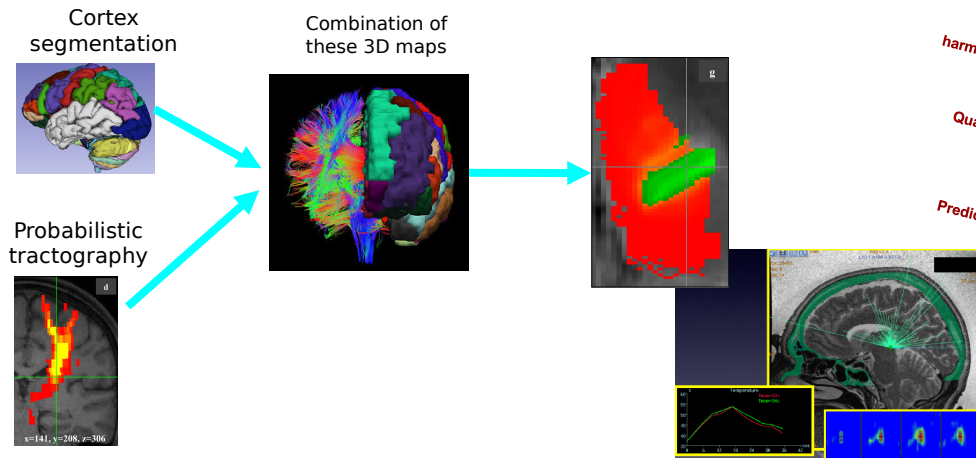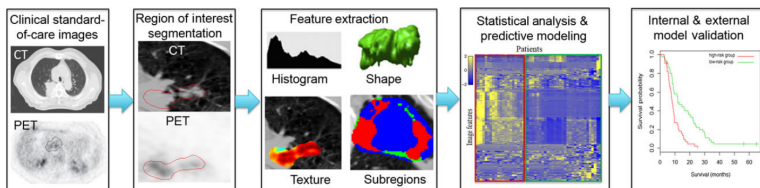|	
Prof. A. Bartolotta Prof. E. Tomarchio Prof. M. C. D'Oca Dott. G. Collura (PhD student) Mrs. O. Milazzo (Msc Physics - UniBicocca) Mr. R Borgese (Msc Physics - UniPa)	MRI sequence optimization and data analysis, Machine Learning, SW development
Prof. M. Midiri (Director of Radiological Section AOUP) Dr. C. Gagliardo (Neuroradiologist) Dr. F. Valentino (Neurologist) Dr. V. Valenti (Radiation therapy Specialty Student)	Clinical evaluation, diagnosis, patient selection, treatments, followups

AIM: Project Implementation

AIM 3: Predictive models

<u>AIM3.T3</u> - Predictive models for transcranial-MR-guided Focused Ultrasound Surgery (tcMRgFUS) (CT, BO)

Cortex segmentation

Probabilistic tractography

Combination of these 3D maps

		I year		II year		III year	
AIM+	T+.1	*		*		*	
	T+.2		*		*		*
AIM1	T1.1		*	*			*
	T1.2			*		*	
AIM2	T2.1			*		*	
	T2.2			*		*	*
AIM3	T3.1			*		*	*
	T3.2	*		*		*	
	T3.3			*		*	*
	T3.4			*		*	

Networking and Continuous Training

Data harmonization

Quantification

Predictive Models

<u>AIM3.T1</u> - Predictive models for Radiation Therapy treatments (FI, GE, PI, CT)

<u>AIM1.T1</u> - Multi-site data harmonization in MRI (PI, BA, BO, CT?)

Interest: Comparison of MRI data acquired with different scanners and/or different sequences.

Milestones

	I year	II year	III year
AIM+	M+.1 (30-06-2019) Organization of the first MACRO workshop	M+.1 (30-06-2020) Organization of the second MACRO workshop	M+.1 (30-06-2021) Organization of the third MACRO workshop
	M+.2 (31-12-2019) Organization of the first APP workshop	M+.2 (31-12-2020) Organization of the second APP workshop	M+.2 (31-12-2021) Organization of the third APP workshop
AIM1	M1.1 (31-12-2019) Identification and coding of Generative Adversarial Network for MRI data harmonization	M1.1 (30-06-2020) Acquisition of suitable MRI data sample for testing (e.g. ABIDE, ADNI, ...), identification of test metrics and validation.	M1.1 (31-12-2021) Comparison with standard techniques and publication
	M1.2 (31-12-2019) Implementation of first prototype of the harmonization algorithm for mammograms	M1.2 (31-12-2020) Database consolidation and validation of the harmonization algorithm and publication of the results	--
AIM2	M2.1 (31-12-2019) Paper submitted, describing an innovative method of amyloid- PET quantification	M2.1 (31-12-2020) Method validation on EU multicentric dataset and all fluorinated tracers	--
	M2.2 (31-12-2019) Characterisation of PET dataset and its association to clinical variables	M2.2 (31-12-2020) Implementation and validation of methods to combine quantitative PET measures and omics data	M2.2 (30-06-2021) Publication of the results

Milestones

	I year	II year	III year
AIM3	M3.1 (31-12-2019) Creation of database for predictive models for Radiation Therapy treatments	M3.1 (31-12-2020) Software development for the selection of the most important features and first test on data	M3.1 (31-12-2021) Data analysis and study of results obtained in predicting: overall survival, radiation treatment response, distant metastases, recurrences, and radiation-related toxicity
	M3.2a (30-06-2019) Development of a CNN for automatic classification of breast density according to the 4 BIRADS classes	M3.2a (30-06-20) Validation of the CNN on the available database	M3.2a (30-06-2021) Development and validation of a CNN for automatic classification of breast density according to the 4 BIRADS classes on the harmonized database
	M3.2b (31-12-2019) Database creation and development of analysis software for predictive models for Contrast Enhanced Spectral Mammography	M3.2 (31-12-2020) Further patient data acquisition and application of the analysis software on the data acquired on the first year and validation of an automatic classification method	M3.2 (31-12-2021) Application of the analysis software on all data acquired and publication of the results
	M3.3 (31-12-2019) Database creation and development of analysis software for predictive models for transcranial-MR-guided Focused Ultrasound Surgery	M3.3 (31-12-2020) Further patient data acquisition and application of the analysis software on the data acquired on the first year	M3.3 (31-12-2021) Application of the analysis software on all data acquired and publication of the results
	M3.4 (31-12-2019) Development of a pipeline for the integration of multiple omics data in relation to drug target identification	M3.4 (31-12-2020) Application of the pipeline to real patient case studies for personalized targeting	--