

MACHINE LEARNING and ARTIFICIAL INTELLIGENCE for EARLY DETECTION of STROKE and ATRIAL FIBRILLATION (MAESTRIA)

SUMMARY

The MAESTRIA project is an 18-partner Research and Innovation action coordinated by Sorbonne Université that answers the H2020 SC1-BHC-06-2020 call on digital diagnostics – developing tools for supporting clinical decisions by integrating various diagnostic data. MAESTRIA is an acronym that stands for Machine Learning and Artificial intelligence for Early detection of Stroke and Atrial Fibrillation. The acronym is used by the MAESTRIA consortium as a metaphor for expressing the mastery that leads to complete control of personalised and early diagnosis of atrial fibrillation and cardioembolic stroke, two major health problems.

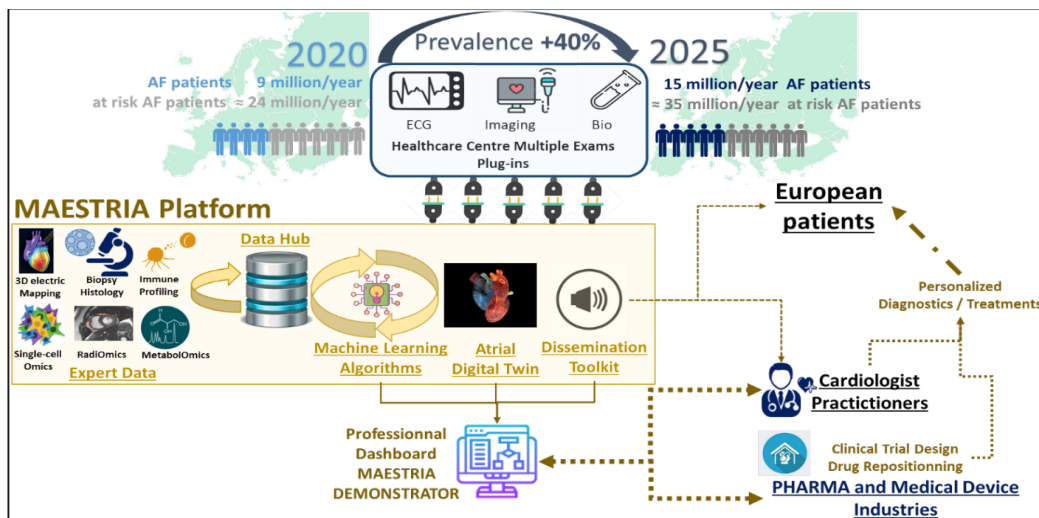


Figure n°1. MAESTRIA Platform: an AI-driven novel personalized approach for the management of AF and stroke

Objectives

The MAESTRIA project team focuses on developing novel approaches for timely detection of atrial myopathy to improve care management and identifying novel therapeutic targets for personalised medicine of AF and stroke. MAESTRIA addresses:

- **Highly personalised diagnosis** by combining research results on genomic, inflammation and metabolic disorders; all involved in the progression of atrial cardiomyopathy, incorporating AF and stroke in a novel, holistic and multidisciplinary **patient health pathway**. MAESTRIA has the potential of preventing excess deaths, stroke, and disability in 1.5-2% of the European population, and 12-15% of Europe’s octogenarians.
- **Integration of data available from various sources** by integrating mechanistic understanding of the cardiomyopathic substrate with cutting-edge imaging techniques, electrophysiological investigations and artificial intelligence approaches. Risk stratification in patients with AF will be refined, potential new therapeutic approaches to modify the natural history of AF and treatment rationalised.
- **Development and deployment of a clinically applicable digital diagnosis platform** by contributing to the development of a precision medicine tool set for the contemporary management of AF and stroke across Europe and beyond. MAESTRIA will build an open-access digital platform for clinicians and patients in Europe to inform them about risk based on the outcome of our investigations.

The MAESTRIA project team aims to develop and validate the first integrative diagnostic digital platform for atrial cardiomyopathy diagnosis. This platform will be designed to provide support for improved diagnostic accuracy that increases effectiveness and efficiency of treatments, as well as prevention of the complications of atrial cardiomyopathy, such as atrial fibrillation and stroke.



Consortium as a whole

The MAESTRIA consortium consists of 18 partners: 12 academic institutions with a strong focus on clinical data integration and artificial intelligence research, 5 biotech companies (SMEs) and 1 large imaging company. The consortium benefits from the close integration of academic partners and industry partners with their joint involvement in all the work packages characterised by a collaborative bidirectional sharing of expertise and data. MAESTRIA is coordinated by Prof S. HATEM a clinician-scientist with substantial experience delivering successful multi-centre collaborative research projects (FP7 EUTRAF and H2020 CATCH-ME), former coordinator of a Leduc Foundation transatlantic network of Excellence on Atrial Fibrillation and executive director of SU-ICAN, a translational research excellence centre.

MAESTRIA combines scientific, clinical, and methodological excellence in the research on cardiac diseases, genomic, metabolism, cardiac imaging pathophysiology and data science.

- Impressive track record of successful mechanistic and genetic research into AF (Sorbonne Université (SU), Assistance Publique-Hôpitaux de Paris, Maastricht University (MU), Centro Nacional de Investigaciones Cardiovasculares Carlos III, Universitätsklinikum Essen, Chancellor, Masters and Scholars of the University of Oxford (UOXF), Massachusetts General Hospital)
- Experience in the evaluation of novel clinical concepts for AF therapy (University of Birmingham (UoB), Atrial Fibrillation NETWORK)
- Cutting-edge methods in clinical imaging (SU, UOXF, Centre de Recherche du CHU de Sherbrooke)
- Methodological experts in biostatistics, bioinformatics and data sciences (SU-SCAI, UoB, MU, Owkin, Idovent, Preventicus, YourRhythmics)
- Infrastructure capable of handling and combining large data sets in compliance with all relevant European regulations (IMT-Transfert)
- Capacity to develop prototypes and transfer to the market (Siemens Healthcare)

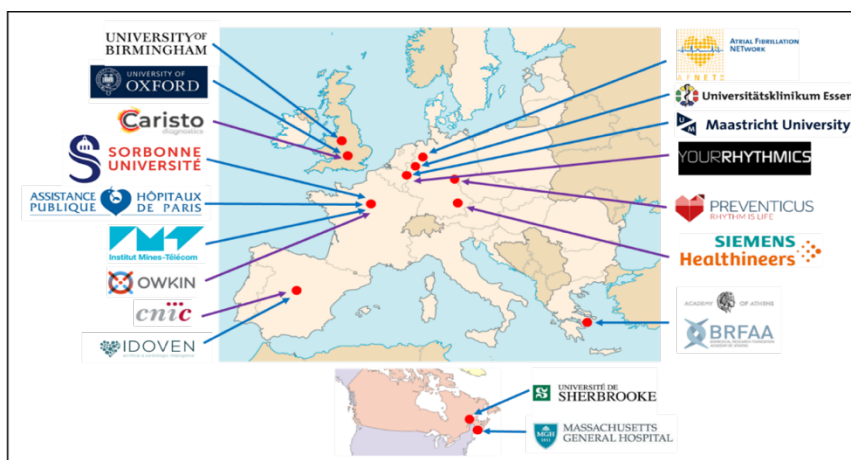


Figure n°2. Map of MAESTRIA consortium

MAESTRIA scaling-up:

- ✓ The platform will be designed as a dynamic tool during the five years of the project and beyond, able to integrate new knowledge coming from published studies and research programmes.
- ✓ The platform will validate new biomarkers from experimental assays to clinical study.
- ✓ MAESTRIA will foster the creation of an EU task force on cardiac parameters and data integration.

Requested budget

Total requested budget: 13,9M€

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