Tesi su proposta

CARDIVALVE – Home Evaluation of Cardiac Valves Closure Timing of Heart Failure Patients

Co-Tutors: Prof. Marco Knaflitz, Prof. Valentina Agostini & Noemí Giordano, **POLITO** and
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Place of development: Hospital de Clínicas, Universidad de la República, Uruguay

Timing: 1 month preparation in Torino & 5 months at NIB, prior to defense in POLITO July 2020

By introducing efficient algorithms to process simultaneous ECG and PCG to determine the four cardiac valves closing timing sequence, the novel method by Giordano and Knaflitz constitute an important "back to basics" clinical approach, and specifically for Heart Failure (HF) patients. The number of chronic condition patients is increasing in our societies giving rise to the problem of their follow up, difficult to enact with traditional methods based solely on health personnel and XX century communications.To address this difficulty, systems like SIMC are been put in place to gather chronic patient information at home in an interactive way driven by clinical guidelines turned into an active "expert robot". But only simple information such as nutritional facts, weight, exercise are taken into account by SIMIC. The inclusion of sophisticated cardiac functionality is only a manual placing of microphone and electrodes away, which can be achieved by using ReMotus (c) device manufactured by **ItMed**. To use ReMotus and related software at home, it must be adapted for use by patients themselves or accompanying persons. Presently, ReMotus has been tested only on young healthy adults, and the present research aims at performing its first use in HF patients as part of research in HF follow up in Uruguay.

The "laurea magistrale" thesis starts with the study of the state of the art at POLITO and at NIB, with special reference to the PhD dissertation by Dr. Noemi Giordano and to Heart Failure follow up coded in the SIMIC App. The analysis of the problem of sampling valve timing at home to be included in follow-up data of SIMIC leads to the specification of a system, CARDIVALVE, to calculate valve closing timing in real time from ReMotus signals (ECG + PCG) and in bed them in a standard clinical report, following CDA format. Programming, documentation and testing follow, prior to writing a paper and prepare the written thesis for dissertation at POLITO.

ItMed is invited to cooperate by making two sets of ReMotus available for this research, with possible inclusion of suggestions for new versions of the device. **ItMed** is also asked to help finance the thesis internship of POLITO students at NIB.