PhD SCHOLARSHIP

Ref. Cardiofollow/2021/01

The PhD scholarship will support the project *CardioFollowAI - An intelligent system to improve patients' safety and remote surveillance in follow-up for cardiothoracic surgery*, funded by Fundação para a Ciência e Tecnologia (FCT). The candidate will work directly with healthcare providers, patients, and researchers to support the deliverable of project results, in interdisciplinary teams.

About the Project

The COVID-19 pandemic caused several surgeries to be delayed or performed under emergency circumstances due to activated hospital protocols to reduce nosocomial transmission of this severe air-transmitted virus. Cardiac surgery is a vital medical intervention for the treatment of cardiac disease, being highly susceptible to severe postoperative complications, and which recovery follow-up is crucial in the post-op period. However, due to cardiac patients' frail health, these patients are identified as a risk group in pandemic contexts, being inadvisable hospitals visits due to high risk of infection.

Telemonitoring allows the remote follow-up of large numbers of patients at home, which enables the reduction of hospital visits without affecting the quality of care delivery. Decision Support Systems (DSS) play a crucial role in this task, by leveraging the vast amount of generated medical data to aid doctors on diagnosis and prognosis of several conditions. However, in the scope of cardiothoracic surgery, the potential of telemonitoring systems and DSS to support patients' follow-up remains unexplored.

CardioFollow.AI joints the multi-domain expertise of researchers from Value for Health CoLAB (VOH.CoLAB), Fraunhofer AICOS, NOVA Medical School and Hospital de Santa Marta(HSM)-CHULC. The project is also supported by Vodafone Portugal. We tackle current limitations with the introduction of a telemonitoring service in Cardiothoracic Surgery Service of HSM-CHULC, to support clinicians in the follow-up of cardiothoracic surgery patients after hospital discharge. An Internet- of-Things system will remotely collect daily outcomes of monitored patients to complement and improve the current follow-up process, which consists of periodic phone calls and consultations over the first year after the procedure.

An Artificial Intelligence module will leverage electronic health records and one-year patient follow-up data collected by clinicians since 2011. Patients will take home a telemonitoring kit that will automatically record a set of clinical parameters (ex. weight, blood pressure, heart rate). Through an intelligent natural conversation module, patients will self-report symptoms and receive automatic

feedback from processed clinical notes. The multimodal data collected from patients' health pathways will identify risks of complications throughout the follow-up process, namely: (1) estimate, in the pre-surgery period, optimal follow-up resources; (2) identify patients who will benefit the most from telemonitoring; and (3) early detection of complications at home which leads to prompt medical intervention.

The implementation of a clinical study at HSM-CHULC will enable a continuous monitorization and optimization of AI modules enhanced by incremental learning strategies, always accounting for ethical and privacy principles regarding the responsible use of data. Models' accountability and transparency will be pursued using machine learning (ML) explainability tools to ensure transparency in prediction outputs. It is estimated the involvement of 300 patients. From the results, a value-based study will be conducted in CardioFollow.AI, to analyse the cost-effectiveness of digital follow-up in response to the pandemic crisis.

With CardioFollow.AI, we expect to empower health systems with mechanisms to deal with COVID-19 and future pandemics.

CardioFollow.AI integrates into a single platform inpatient and outpatient monitoring data collected from clinicians, a telemonitoring system for the continuous registry of outcomes, and AI-based modules to longitudinally predict risk and early detect complications. The benefits of telemonitoring may extend from the pandemic context to regular times, where the optimization of eHealth procedures is of extreme importance in National Health Systems. With CardioFollow.AI, we plan on elevating CHULC-HSM follow-up service as the gold standard for other national and worldwide cardiothoracic surgery departments and contribute with a value-based approach to lower nosocomial transmission of COVID-19 and future pandemics, while ensuring proper care for citizens in need.

Key Responsibilities

- Support research work of the CardioFollowAI project;
- Develop with the research and clinical teams, the design for the intelligent follow-up pathway in post-surgery, to be implemented in the clinical study;
- Support the clinical study implementation at Hospital de Santa Marta;
- Monitor the quality of outcomes collected from the patient reported data;
- Perform data analysis;
- Support research writing;
- Work collaboratively with the VOH.CoLAB team.

Research topics

- Value-based Healthcare;
- Service design for digital transformation in Healthcare;
- Patient generated healthcare data;
- Digital health.

Qualifications Required

- Academic training at MSc level in Engineering OR Biomedical Sciences;
- Programming skills for data analysis (preference);
- Work with autonomy and in collaboration;
- Good teamwork skills and willing to participate in transdisciplinary work;
- Fluent level of English (spoken and written).

Candidates with a foreign degree or diploma must provide proof of recognition of the degree in accordance with Decree-Law No. 66/2018. Any candidate without recognition of the grade(s) will not be admitted to evaluation.

About the Value for Health CoLAB

VOH.CoLAB is a nonprofit collaborative laboratory, whose mission is to help people and organizations to measure the value in health. The founding partners, Universidade Nova de Lisboa, Fraunhofer Portugal, Vodafone and CUF, have centralized competencies and resources to create this CoLAB to accelerate fundamental restructuring of Healthcare delivery towards a paradigm shift to Value-based Healthcare and patient empowerment. Our experience in digital transformation and technology transfer in the health sector, our closer working collaboration with people, health organizations (private and public) and universities, enable us to characterize, model and optimize health care trajectories. For this purpose, VOH.CoLAB supports academia, healthcare providers and medtech developers in: (i) collecting clinical and patient reported outcomes, with a focus on digital data collection processes and telemonitoring, (ii) implementing clinical pilots to measure economic and social impact of innovation in Health and (iii) developing digital health literacy tools that can drive society to adopt healthier behavioral changes. By following people longitudinally, whether in a hospital environment, at home or in specialized residential care, VOH.CoLAB aims to validate innovative methodologies for measuring objectively health outcomes and costs toward new Value-based Health models.

What you can expect from Value for Health CoLAB

- Opportunity to work in a dynamic and innovative environment; to co-author the development of a collaborative laboratory;
- Opportunity to join a multidisciplinary team, with projects in different areas of digital healthcare innovation and value-based healthcare research;
- Gain experience in knowledge transfer and technology work, linked to the real context of healthcare providers, companies and society.

- Possibility to develop professional network connecting to the academic and business environment.

How to apply

To apply please send:

1. a letter of motivation (pdf file) why you would be a suitable candidate;
2. detailed curriculum vitae with copy of qualification certificates and copy of other relevant supporting documents (pdf file);
3. copy (or reference) of scientific articles in which the candidate is author and considers to be the most relevant of his/her professional career (not mandatory);
4. Recommendation letter (not mandatory);

The application should be sent to the following email address: grants@vohcolab.org until 28 August 2021.

The call is open between May 28 and August 28, 2021.

More information regarding the application evaluation:

Application Series

Applications will be ordered based on curriculum evaluation and, if deemed necessary by the jury, an interview will be conducted. In all cases, the suitability of the candidate's profile will be considered according to the duties / activities to be performed.
Applications that do not include all elements required in the application submission will be automatically excluded from the competition.

Jury Composition

Dr Ana Rita Londral
Professor Luís Lapão
Eng Salomé Azevedo
Professor Dr Pedro Coelho

Evaluation Criteria

- Curriculum Vitae and Motivation: Suitability for project activities and objectives (70%)
- Scientific experience aligned with VOH.CoLAB's scientific domains of knowledge (30%)

Notification of Results

The final result of the evaluation will be sent to all applicants via email. Value for Health CoLAB is free to fill the seat or not and may suspend or terminate the process at any time by informing all applicants.

Remuneration Statute

Scholarship for MSc level, according to Fundação para a Ciência e Tecnologia regulation for the Project DSAIPA/AI/0094/2020.

Workplace

The group work with the research team will be carried out at the facilities of Value for Health CoLAB, in NOVA Medical School, Rua do Instituto Bacteriologia, Nos. 5, 5-A and 5-B, 1150-190 Lisbon, or Incubadora UL, Av. Prof. Gama Pinto 3, 1649-003 Lisbon, or at other locations required for the execution of the activities, namely Hospital de Santa Marta where frequent visits will be needed during the implementation of the clinical study.

Data Protection

According to the GDPR - General Data Protection Regulation, the data collected will be processed exclusively for the purpose of processing the application.