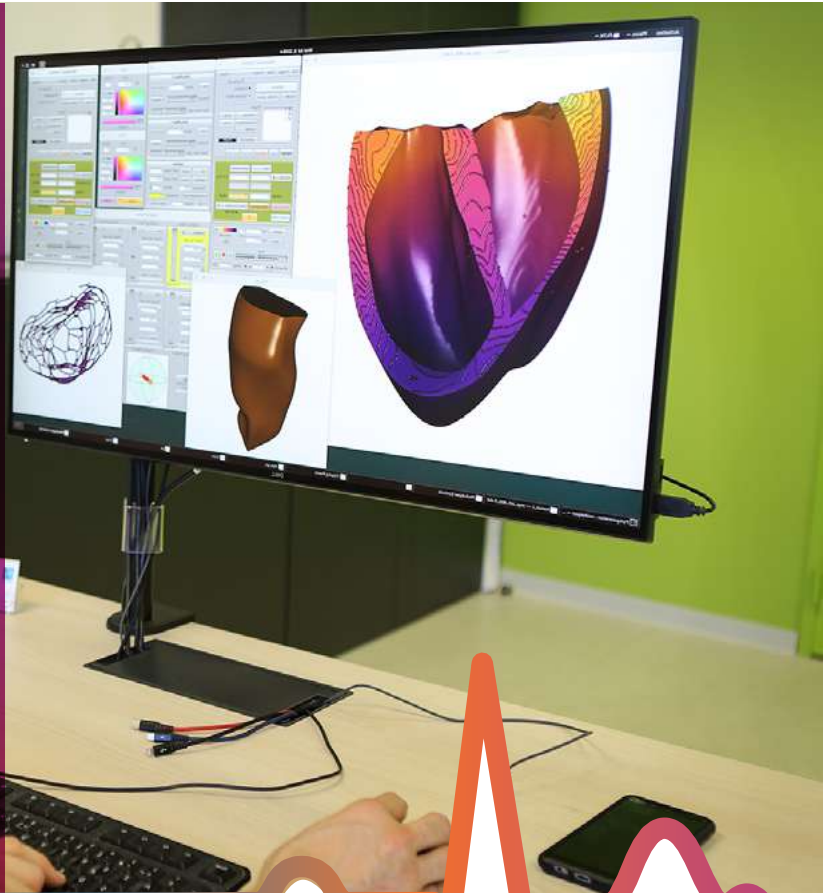




Electrophysiology  
and heart modeling institute

# THE LIRYC BEAT

NEWSLETTER N° 11 /// 2<sup>ND</sup> HALF 2020



EDITORIAL

## LIRYC ADAPTS!

In the very special and unprecedented context of 2020, we have been reminded that health is at the heart of our society and how medical research is essential.



By **Méléze Hocini**,  
Deputy  
Director

Liryc's teams adapted throughout the year with new working methods and collaborations, to support the collective fight against COVID-19, while pursuing their research, innovation and training activities to cure and prevent heart rhythm diseases. This health crisis should enable us to continue our research but also to reinvent ourselves coping with the challenges and issues of our Institute.

Throughout this newsletter, you will discover the ongoing research projects aiming at a better understanding of the potential impact of COVID-19 on cardiac function, the means implemented by the Institute to pursue its various missions, including patient care and training, as well as the latest news and projects of the teams.

I would like to highlight the remarkable commitment of our community, which has invested heavily in recent months to continue our fight against heart rhythm diseases. I'm also grateful for the support of our new scientific, academic and industrial partners, donors and our first ambassador, Jean Galfione, who inspires us with his strength and excellence.

We look forward to meeting again in person in 2021 to continue our action!

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# COVID-19: WHAT IS THE IMPACT ON CARDIAC FUNCTION AND HEART RHYTHM DISORDERS?

**While cardiovascular disease is one of the major co-morbidities associated with severe forms and deaths from COVID-19, Liryç's teams are currently conducting research projects aimed at measuring the risk of cardiac arrhythmias in patients with COVID-19.**



Myocardial lesions detectable by MRI can cause heart rhythm disorders by provoking abnormalities in the structure of the heart and electrical impulse conduction. They can cause either atrial fibrillation - the most common arrhythmia - or potentially fatal ventricular tachycardia or fibrillation.

Several international studies now show that myocardial lesions, or scars, are common in hospitalized patients with COVID-19. While these cardiac scars caused by COVID-19 may have no short-term consequences, they could lead to future rhythm disturbances. It is thus a major challenge.

Liryç's doctors and researchers are therefore mobilized to investigate this risk and prevent it. In this respect, they are conducting several studies aimed at analyzing:

- the spectrum of cardiac disorders linked to COVID-19 in patients who have been hospitalized,

- the prevalence of heart lesions in the infected population monitored outside the hospital and the associated rhythmic risk,
- the impact of COVID-19 on the heart of elite athletes (study among rugby players).

The work, led by Prof. Hubert Cochet, will use innovative high-resolution MRI imaging methods developed at Liryç to detect potential silent scars associated with COVID-19 within the heart muscle.

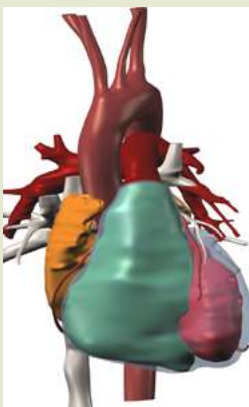
The project began in April and is expected to provide its first results in the spring of 2021.

*We are concerned about the rapid spread of the infection, and there is an urgent need to better appreciate the risk of heart failure and sudden cardiac death that these scars may cause in the general population in the coming decade.*

**Prof. Hubert Cochet,**  
Health Technologies Pole of the IHU LIRYC and radiologist at Bordeaux University Hospital

## → HIGHLIGHTS

### THE MICROCARD PROJECT: development of pioneering simulation software



The European project MICROCARD, coordinated by Mark Potse, is under contractualization, after a successful evaluation. A total of 5.8 million euros will be invested in the development of software capable of simulating an entire heart, cell by cell, on the most powerful future European computers.

The consortium brings together High Performance Computing specialists, mathematicians and biomedical engineers from six countries. There is also a scientific committee composed of renowned physiologists and cardiologists.

The developed code not only seeks scientific excellence, but also high energy efficiency; an increasingly important issue on machines whose power consumption is measured in megawatts.

Contracts are expected to be signed at the end of the year with a start of the project in spring of 2021.

This project has been selected for funding under the European Horizon 2020 program.



## → HIGHLIGHTS

**A low-cost, modular, portable electrocardiogram for large-scale deployment**



Inspired by the urgency of the COVID-19 crisis, the innovation team, led by Prof. Rémi Dubois and Dr. Sylvain Ploux with research engineers Angel Moreno Entrenas and Sylvain Caubet, is developing a low-cost, modular, portable electrocardiogram measurement device.

The current prototype records between 2 and 5 leads transmitted to a smartphone via Bluetooth. Its software is developed by the Bordeaux agency Hilo. The data collected will then be sent directly to a server for analysis and storage.

The first use is planned for January 2021, as part of the telecardiology monitoring of patients with the Careline company, a partner of Liry. The project is financially supported by the Nouvelle-Aquitaine Region.

## → A LOOK BACK AT

**Liry enters into the capital of its spin-off inHEART**

On July 2<sup>nd</sup>, 2020, Liry took shares in the capital of its spin-off inHEART, reaffirming its support for the innovative technologies developed.



# BEYOND THE LIMITS OF CARDIAC DIAGNOSTIC WITH ARTIFICIAL INTELLIGENCE

**Long QT Syndrome (LQT) is an inherited heart disease characterized by abnormal ventricular repolarization (QT interval prolongation on the electrocardiogram), putting patients at significant risk of syncope or sudden cardiac death.**

**It concerns 1 in 2500 to 5000 births in France.**

The diagnosis of this pathology is essentially based on two elements: the measurement of the corrected QT on the 12-lead ECG, at different rhythms, and genetic analysis. However, the scientific literature shows that these tools are imperfect.

The partnership between Liry and the start-up company Cardiologs is in line with this observation. It aims at optimizing diagnosis through artificial intelligence. While Liry will provide access to its clinical databases, Cardiologs will use them to train a network of neurons to recognize an ECG from a patient carrying the genetic QT anomaly, and ultimately also to identify the mutation responsible for the pathology from the ECG.

The performance of this neural

network will be compared to the LQT measurement, the reference test being the genetic analysis.

This partnership, concluded for an initial period of two years, represents an opportunity to develop a unique and innovative diagnostic tool to better support the work of the cardiologist.

“ This partnership represents an opportunity for Cardiologs to combine its expertise in artificial intelligence solutions for electrocardiogram analysis with the one of a scientific and medical team specializing in cardiac electrical dysfunctions in order to advance, together, the diagnostic management of Long QT Syndrome. ”

**Yann Fleureau, CEO**  
and co-founder of  
Cardiologs





# THE BEAT AF STUDY: A REAL HOPE FOR A REVOLUTIONARY TREATMENT FOR ATRIAL FIBRILLATION



**If one were to imagine the ideal atrial fibrillation ablation procedure, it would be easy to perform, in one hour or less, with a success rate of more than 90% at one year follow-up, with no risk of life-threatening or disabling complications.**

**Is it utopian? We are actually very close to such an ambitious goal.**

The BEAT AF<sup>[1]</sup> consortium brings together 9 leading European clinical centers, coordinated by Liryc, to help reduce the enormous burden of atrial fibrillation, which affects more than 10 million people in Europe. The overall objective of this randomized study is to demonstrate, within the framework of a 5-year project, that isolation of the pulmonary veins by Pulsed Electric Field (PEF) ablation is more effective than radio-frequency, the reference treatment to date.

As a reminder, PEF uses high-voltage electric microshocks to create nanoscale pores in cell membranes, without collateral damage to non-cardiac tissues.

The project will seek to demonstrate that PEF is faster, more effective and safer than radio-frequency. For this purpose,

two distinct randomized clinical trials will be conducted to provide evidence of the superiority of PEF for paroxysmal atrial fibrillation and its potential efficacy for persistent atrial fibrillation.

These first two clinical trials will pave the way for further large-scale effectiveness trial to confirm and extend the results of BEAT AF, and finally establish PEF as the reference energy in international guidelines. This project has been selected for funding under the European Horizon 2020 program. Over the last 30 years, no new technology has reached this level of hope in this field.



<sup>[1]</sup> *ground-BrEAKing electroporation-based inTervention for Atrial Fibrillation treatment.*

## → CONGRATULATIONS!



**1<sup>st</sup> place for electrophysiology teams of Bordeaux!**

The electrophysiology and cardiac stimulation department is once again at the top spot on the 2020 ranking of the newspaper Le Point. This ranking rewards the excellent care of patients with heart rhythm disorders by the teams of the University Hospital and the Liryc Institute. It takes into account the evaluation of 348 hospitals in France.

For its part, it is the 6<sup>th</sup> time since 1998 that the Bordeaux University Hospital occupies the 1<sup>st</sup> place, all disciplines combined.

## → FOCUS ON

### COVID-19: telemonitoring to ensure continuity of care



As early as March, the telecardiology team ensured remote monitoring of patients by maintaining a presence at the hospital. The department has set up remote monitoring for more than 200 patients with heart

failure and chronic disease using the Careline system, bringing the number of patients monitored remotely to more than 6,400.

During the lockdown period, patients with an appointment scheduled in consultation also benefited from a teleconsultation thanks to the mobilization of the physicians, the telecardiology team and the department's secretaries.



→ A LOOK BACK AT

# Boston Scientific

On Wednesday, September 30<sup>th</sup> & Thursday, October 1<sup>st</sup>, 2020, Boston Scientific organized the first virtual edition of the Alliance Program in partnership with Liryc. Once again this year, a dozen international experts presented new techniques for the treatment of atrial fibrillation and ventricular tachycardia.

For this international scientific event, Liryc organized live broadcasts of the ablation procedures from Bordeaux University Hospital.

The degree of participation was beyond expectations, bringing together more than 360 healthcare professionals from 36 nations over two days.



## EDUCATION @LIRYC: DIGITAL TOUCH

**During the health crisis, Liryc has decided to continue its training mission for healthcare professionals and students by offering new types of events. Continuing professional development is one of the pillars of the institute to guarantee the mastery of new care techniques. The organization of remote scientific events has allowed to maintain the link and discussions between researchers, engineers, students and world experts.**

During this exceptional period, Liryc offered conferences of international experts, including live practical work carried out by Prof. Cabrera in Spain. Prof. Chen, Casadei, Coronel and Dr. Lumens, all world class experts, also discussed the fundamentals of cardiac electrophysiology.

On the academic side, Prof. Bordachar proposed daily lectures of one hour on the basics of ECG, i.e. 40 hours of training with an average of 120 external students each day.

Based on this experience, Liryc is developing its internal training offer, with a series of scientific events since the start of the academic year.

The pedagogical team planned several

sessions, either face-to-face or in remote learning, with among others:

- the Liryc Journal Club, which encourages critical discussion of major scientific articles;
- the Meet & Greet sessions, which allows new collaborators of the institute to present their research work;
- the Liryc Expert Seminar, which mobilizes international experts in a multidisciplinary training program;
- courses on the basics of ECG.

All of these educational contents will eventually enrich a future digital training platform on electrophysiology.

### Telemonitoring University Diploma: 100% successful

After a first edition completing the training of 16 participants, Liryc welcomed the second promotion of the University Diploma for remote

monitoring of implantable cardiac devices.

The first week of face-to-face training took place from October 5<sup>th</sup> to 9<sup>th</sup> and brought together more than 20 healthcare professionals wishing to

learn the practical and theoretical bases of telemonitoring.

Led by Prof. Bordachar, this training also includes practical workshops as well as in-depth courses in distance learning.



## → HIGHLIGHTS



**Navigator and Olympic athletics champion Jean Galfione joins LiryC's commitment to fight heart rhythm diseases, sharing common values of selflessness, excellence and passion at work. LiryC is honored to count on Jean Galfione, to support the institute in its mission for the treatment and prevention of heart rhythm diseases.**

**“ I wanted to join the adventure of these people who are fighting to bring solutions to heart rhythm diseases. It's also important that people realize that it should not be seen as fate, as solutions already exist, but that we still need to invest to reduce this affliction. ”**  
Jean Galfione

# LIRYC'S GOVERNANCE IS WELCOMING A NEW MEMBER!

**On May 12<sup>th</sup>, the members of the Administrative Board decided to broaden its scope in LiryC's governance, taking into account the expectations of the various key players.**

The patient is at the center of the institute's concerns. It therefore seemed essential and logical that the decisions taken for the institute could be officially advised by an external personality representing the patients. Thus, Christophe Biais, a patient from the cardiac electrophysiology department of Bordeaux University Hospital and a lawyer specializing in labor and social affairs, agreed to join the Board. As of the next Board meeting, he will hold one of the eight voting rights among the founding members of LiryC and its Chairman.

## → TESTIMONY



**“ I know what a patient is going through and I have a pragmatic and clear vision. My idea is to highlight the benefits of**

**LiryC's research for patients. Thanks to my job, I am able to hear arguments and analyze proposals. I have a lot of positive expectations and my goal is to help move things forward. ”**

**Christophe Biais**, patient and member of the Administrative Board



## LIRYC REPRESENTATIVES

LiryC's representatives program allows doctors and researchers to promote their work and expertise to the general public. It is also a new way for them to get involved in the fight against heart rhythm diseases.



## → STORIES OF DONORS



### An American philanthropic couple supports LiryC

Mark and Laura Bailey have a happy ending story: after 20 years of persistent arrhythmias and 7 ablations in the United States, Mark went to Bordeaux to consult with the LiryC teams and finally find a normal life again.

Thankful for the institute and the expertise he has benefited from, the couple became major donors to LiryC.

### The Rubis Group joins the LiryC adventure

As a French company in the energy sector, the Rubis Group is committed to support health and education in all the countries where it operates. As part of its policy of societal actions and in the context of the COVID-19 crisis, the Group wished to support LiryC by contributing to the financing of research and training projects.

*« Considering what the world is going through, it made sense for Rubis to also commit itself to public health issues. The choice of LiryC quickly became obvious, given the expertise of the teams and their involvement in major public health issues. »* Lorraine Gobin, Managing Director Rubis mécénat





## CONGRATULATIONS!

- **Hubert Cochet** is the winner of a European funding ERC Proof of Concept (POC), for its MAP-IN-HEART project.
- **Marine Martinez** and **Jairo Rodriguez Padilla** received a grant from the Fondation Lefoulon Delalande.
- **Nicolas Derval** received funding from the health ministry (PHRC) for its Marshall-PLAN study.
- **Marine Martinez, Maxime Yon, Angel Moreno, Girish Ramlugum, Jerome Naulin, Zakaria Jalal and Guido Caluori** were winners of the IHU 2020 internal call.



## PORTRAIT OF A CLINICAL RESEARCH ASSOCIATE: CARINE LOPEZ

### Meeting with Carine Lopez, clinical research associate at the Bordeaux University Hospital - Liryc.

#### **Carine, what is your position at the Bordeaux University Hospital?**

I am a Clinical Research Associate at the Centre de Référence des Maladies Rythmiques Héritaires (Reference Center for Hereditary Rhythmic Diseases), which takes care of patients with hereditary rhythmic diseases and patients at risk of sudden cardiac death.

#### **When did you join the institute?**

I joined the Department of Cardiology-Electrophysiology and Cardiac Stimulation of Prof. Haissaguerre at the Hospital in November 2015, a department attached to the Liryc Institute.

#### **What does it mean to be a clinical research associate at the Bordeaux - Liryc University Hospital?**

It means helping and supporting the researchers of the institute in the progress of their work, by cooperating with them, setting up clinical research

projects on patients but also providing them with logistical solutions for their research in the hospital. My mission is at the interface between research and patient care.

#### **What is your greatest pride?**

My greatest pride is to be part of a team that is never satisfied with its knowledge but always looking to move forward.

#### **To conclude, do you prefer research or patient care?**

Research! After graduating from the Faculty of Science, I started working in fundamental research laboratories before discovering clinical research. I was thus able to appreciate all the work that is done by researchers, to be aware of the investment that it represents for them and to know what it means to be able to move on to the clinical study stage which is the culmination of several years of work.



# A LOOK BACK AT THE KEY EVENTS

## → JUNE 11<sup>TH</sup> 2020

Visit of Bérangère Couillard, Deputy of Gironde 7<sup>th</sup> district, in the context of the adoption of the law to fight against sudden cardiac death.



## → AUGUST 12<sup>TH</sup> 2020

In the context of the collaboration with Acutus Medical, which has just gone public on Nasdaq, Liryc's teams appeared on the giant screens in Time Square to make the scientific partnership official.



## → SEPTEMBRE 9<sup>TH</sup> 2020

The ANCRE association renewed its support to Liryc for a period of 3 years, to fight against heart rhythm diseases and more specifically to support research programs on ventricular fibrillation.



**WE CAN SUPPORT LIRYC TOGETHER TO PREVENT AND CURE HEART RHYTHM DISEASES**

Make a donation on : [www.ihu-liryc.fr](http://www.ihu-liryc.fr)

or by bank check. IHU Liryc - FBU  
Campus Xavier Arnozan  
Avenue du Haut Lévêque  
33600 Pessac

## → SEPTEMBER 18<sup>TH</sup> 2020

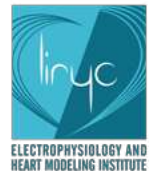
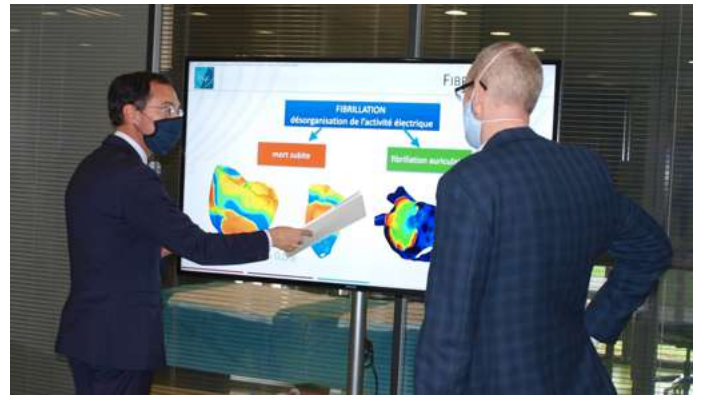
Liryc celebrated the first anniversary of the signing of the multi-year philanthropy agreement with Boston Scientific.

## → OCTOBER 5<sup>TH</sup> 2020

The spin-off of Liryc CERTIS Therapeutics was awarded the 1<sup>st</sup> prize for innovation in medical imaging by the Société Française de Radiologie et d'imagerie médicale (SFR) and Medicen Paris Region.

## → OCTOBER 15<sup>TH</sup> 2020

The Secretary General for Investment, Guillaume Boudy, accompanied by a government delegation came to visit Liryc and meet its teams.



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**THE LIRYC BEAT**

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