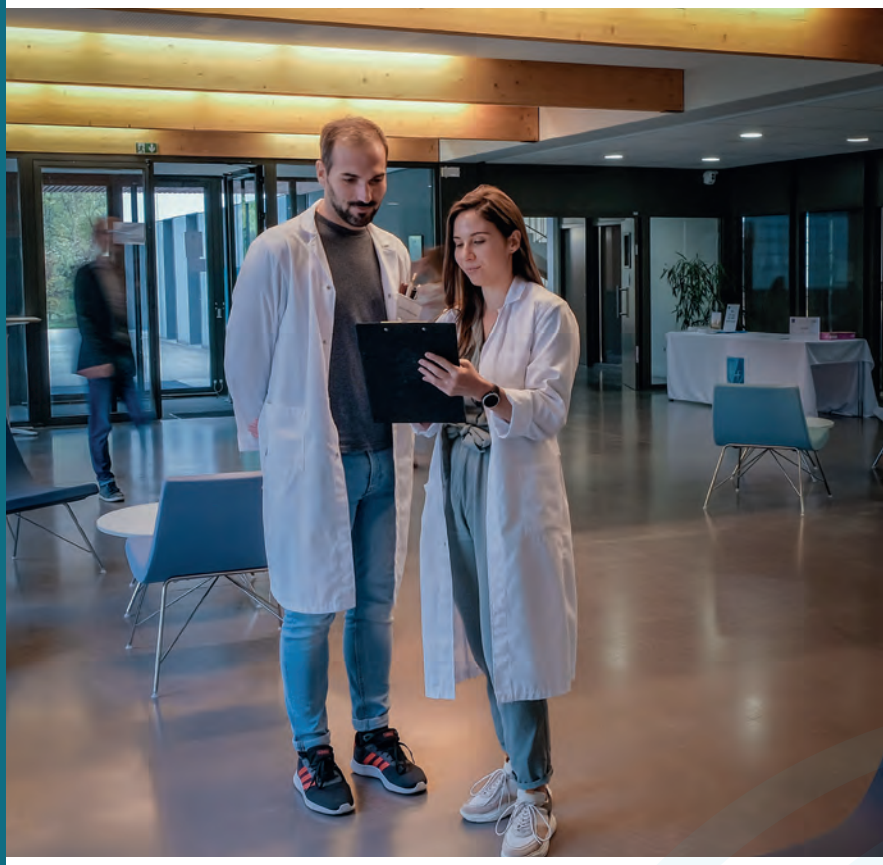
"THE LIRYC BEAT"

NEWSLETTER N° 15 /// SEPTEMBER 2023

liryc
Heart rhythm disease institute



EDITORIAL

"It is with honour and humility that I succeed Professor Olivier Bernus as Scientific Director of Liryc.

By **Richard Walton**, Scientific Director at Liryc

As a researcher within the institute for more than a decade, I've been able to observe and contribute to its growth and development. I believe that this enables me to have a clear vision of the needs of individuals, teams and departments.

In this context, and in view of the forthcoming National Research Agency evaluation of Liryc, I'd like the scientific trajectory to be fully in line with the general guidelines for the development of the institute, which place the patient at the heart of its concerns. We'll assess our ability to bring science from the lab to the patient's bedside, and for this, I'm convinced of the unique opportunity offered by the Liryc Institute to develop research at the crossroads of care and innovation. This is why I'll strongly support multidisciplinary, translational and technological projects that will enable us to improve our understanding of the cardiovascular system, from molecules and cells to the organ as a whole.

As you'll have understood, above all, I'd like Liryc to be an environment conducive to creativity, passion and innovation. This is how Liryc will offer excellent research and will meet the major challenges of cardiac electrophysiology, aiming for better patient care, from diagnosis to treatment.

I'd like to thank the institute for the confidence placed in me to exercise this new role and I'm delighted to contemplate the future that awaits us. ■

SIMCARDIOTEST: WHERE ARE WE?

Simcardiotest is a collaborative project that brings together eight organizations in six European countries, funded by the European Commission (H2020). The challenge is to build an online platform for conducting in silico clinical and pre-clinical trials, based on the production of a digital model of the heart to evaluate three use cases. Initiated two years ago, the project will end in 2024. By then, the major challenge for the research teams is to succeed in generating a large panel of digital hearts to simulate as many situations as possible, and then to exploit the significant amount of data generated. It's on this very theme that the INNOVAHEART day was focused, which was organized on March 22, 2023. ■

EUROPEAN FUNDING TO PUSH BACK THE BOUNDARIES OF CARDIAC MRI SCANS

Interview with Prof. Aurélien Bustin, Researcher at Liryc and in the Cardiovascular Imaging Department of University Hospital of Bordeaux, Junior Professor at the University of Bordeaux and Visiting Researcher at the Lausanne Vaudois University Hospital Centre, Winner of a European Research Council Starting Grant 2022 (Horizon Europe) worth €1.5 million for his "SMHEART" cardiac imaging project.

What does your research consist of?
My research sits at the frontier of cardiology, medical imaging and data science to help improve patient care. The approach is inspired by my international academic and professional experience that gave me a multidisciplinary and translational view of cardiac imaging. My work has led me to look at both the advanced acquisition of cardiac images, but also at image reconstruction, so as to push back the boundaries of magnetic resonance imaging (MRI).

What scientific challenge does the "SMHEART" research project respond to?
To understand and treat cardiovascular disorders, MRI remains the only way of providing a complete assessment of the function and structure of the heart, without exposing the patient or the operator to potentially dangerous radiation. However, radiographers are overwhelmed with hundreds of complex MRI sequences, while clinicians spend considerable time extracting the relevant diagnostic elements. From a scientific point of view, the lack of interaction between specialists hinders a detailed and complete study of cardiac pathology. At the same time, when considering the patient journey, I was struck by the difficulty of the examination. As such, there's an urgent need for discovery and innovation in this field.

What's the goal of the SMHEART project?
The goal is to unleash the full potential of MRI by introducing a fast, one-click, fully automated and comprehensive imaging pipeline, applicable to diagnosis, prognosis and therapy selection in cardiology. This approach will enable the rapid collection of a single 3D multiparameter volume of the whole heart during free breathing, therefore more comfortable for the patient, with automated extraction of the anatomy, function and characteristics of the heart tissues, thanks to artificial intelligence. This is not only the condition for a wider adoption of MRI in cardiology and the opportunity for better diagnosis, but it also offers the opportunity to improve knowledge of cardiovascular disorders, thanks to a multiparametric approach. ■

CADENCE PRIZE

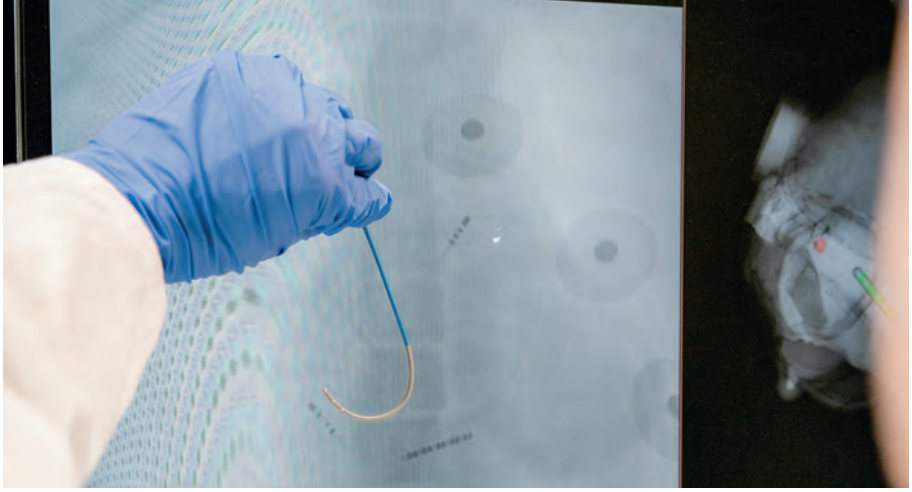
On the occasion of the Prix Cadence ceremony and thanks to fundraising, Liryc rewarded the members of its teams invested in the CadeNCE program for their remarkable work.

Launched in March 2015 with the University Hospital of Bordeaux, this unique program on the heart made possible thanks to organ donations for research, makes it possible to explore the electrical properties of the heart in vitro and ex vivo, using state-of-the-art technologies in basic and clinical electrophysiology. Coupled with the expertise of CAdeNCE members, this multidisciplinary and translational approach offers advances in the understanding of the molecular mechanisms of atrial fibrillation, of the Purkinje network in human ventricular arrhythmias, and in electrical remodelling in hereditary disorders, such as arrhythmogenic right ventricular cardiomyopathy. Ultimately, the programme aims to anticipate and to implement a protocol to meet biological and clinical needs that are adapted to the various cardiac arrhythmias.

A CLOSER LOOK AT THE RHYTHM PROJECT

Led by Liryc and the University of Washington, alongside four other international partners, the RHYTHM project came to an end last September. As part of this project, Liryc teams focused their research on the mechanisms of sudden death and ventricular fibrillation, with the aim of better understanding them and developing new non-invasive diagnostic tools, as well as personalized therapies. In particular, they worked on the development of an electrocardiography system, which made it possible to detect small anomalies in patients whose sudden death remained unexplained after initial examinations. Our collaborating partners from the universities of Washington and Chicago focused on the development of innovative bio-electronic devices, with biodegradable implantable acquisition and stimulation systems, offering better biocompatibility and increased efficiency. The University of Auckland has developed a new approach to microscopic imaging, while Johns Hopkins University in Baltimore has been working to develop digital twins to guide therapy, and the University Medical Centre of Amsterdam has developed a method for predicting the risk of arrhythmia by cardiac stimulation. ■

Visit bit.ly/3OhZ2P2



A NEW CARDIAC BIO-ENGINEERING PLATFORM TO MEET CROSS-FUNCTIONAL CHALLENGES

Liryc recently completed the development of the facility that now houses its new cardiac bio-engineering platform. In total, they include 500 sq. m. at the interface of research and patient care, which aim to internalize the prototyping stage of medical innovations developed by the institute's teams and its academic or industrial partners.

"Thought by Liryc, made by Liryc"

Since it was created, Liryc has had an experimental platform dedicated to basic research, as well as a clinical research centre welcoming patients from University Hospital of Bordeaux. Together, they enable the biomedical innovations developed at Liryc to be approved, alone or in collaboration with manufacturers.

Within the institute, researchers design new concepts of innovative medical equipment, such as catheters. Until now, the absence of local manufacturers made it necessary to entrust their prototyping to major manufacturers, most often abroad, before confirming their approval to the institute.

The Nouvelle Aquitaine region and Liryc have thereby designed and financed this ambitious project, bringing together a bio-engineering center, a training suite and workspace for internal and external teams involved in innovation projects.

The ambition of this platform is to provide a test bench for prototype design of innovative validation. As such, the institute will have on-site access to all the skills needed to bring a project imagined by its researchers to preclinical approval. The clinical design stage will remain outsourced and supported by industrial partners, mainly due to the associated cost and the regulatory constraints required.

This unique platform aims to position Liryc as a key player in innovating, stimulating the creativity of teams and attracting manufacturers in the development of ambitious partnerships, giving rise to innovative projects promoting better patient care. ■

THREE QUESTIONS TO SÉBASTIEN ESTORT, PLATFORM ENGINEER

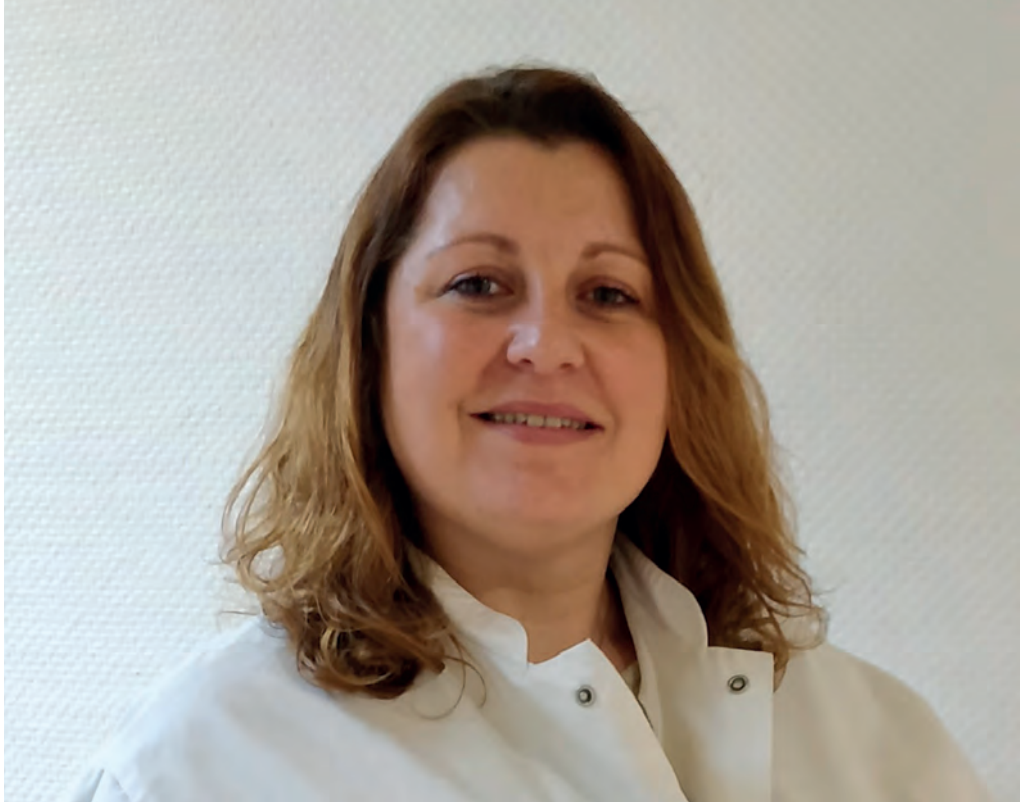
Sébastien, can you introduce yourself? I work as a cardiac bio-engineering platform engineer at Liryc. I hold an engineering degree in mechanical design from the Technological University of Compiègne and a University Technical Diploma in Mechanical and Production Engineering from the University of Bordeaux.

What's your role with the platform? As a platform engineer, my mission is to understand the expectations of researchers, so as to design new catheter models that meet clinical needs. To do this, I define their needs with them, before thinking about the manufacturing process and proposing a design that will then have to be manufactured and assessed.

In your own words, what's the purpose of the platform? The primary goal of the platform is to accelerate the innovation process by internalizing the catheter prototyping stage and its approval on test benches. It should lead to the design of new models of catheters, with reduced lead times and costs. Ultimately, it's a question of positioning Liryc as an interdisciplinary skills centre, covering a wide spectrum: from the first concepts to preclinical trials.

FOURTH CMARY PATIENTS' DAY: HOW CAN HEREDITARY RHYTHM DISORDERS AND SPORT BE RECONCILED?

The fourth patient's day of the CMARY centre – Reference centre for hereditary rhythmic disorders and the prevention of sudden death – took place on Saturday March 18, 2023, at the Liryc Institute. Patients, their families, paramedics and doctors were able to discuss together the topic of hereditary rhythmic disorders and sport. On the program were several conferences, a testimonial from the association "Au coeur des jumeaux" (At the heart of twins), numerous workshops, as well as educational and awareness-raising stands. ■



INTERVIEW WITH STÉPHANIE BAILLIEU-ROSENG, CLINICAL STUDIES CO-ORDINATOR

What position do you hold within Liryc?
I hold the position of Clinical Studies Co-ordinator for the areas of cardiology and rhythmology, at the Cardiology/Hypertension department of Saint-André Hospital and Geriatrics department of Xavier Arnozan Hospital.

When did you join Liryc?
After training as a Clinical Research Associate (CRA) in Bordeaux, I started in a private sector business in Toulouse, as a Clinical Research Associate supporting investigation in an organ transplant service. I then joined the University Hospital of Bordeaux in 2011, more specifically the MEMENTO cohort team at the ISPED institute for public health, epidemiology and development as a Co-ordinating Clinical Research Associate. After a new experience in ophthalmology project co-ordination, I joined Liryc in 2020 as a Clinical Research Engineer in the Cardiology/Rhythmology department, alongside Maider Piquet. Since November 2022, I've held my current position as Clinical Studies Co-ordinator at Liryc.

Can you tell us a little more about your job?
I have many and varied assignments. Above all, I co-ordinate the clinical research activity of the department and supervise the research staff (management and human resources assignments). The main task for our team is to support researchers and clinicians with their research. At my level, I help them to respond to calls for projects, so as to be able to obtain sources of funding and set up their project, and then I follow up with them. I'm also the interface between researchers/clinicians and the Clinical Research and Innovation Department.

What's the thing you're most proud of?
I'm very proud of how my career has gone forward and to be where I am today. Through my experiences, I have gained skills and responsibilities.

I'm particularly proud to work alongside the greatest in their field and to be part of an institute that aims for excellence and expertise, in research and innovation, for the benefit of patients.

Finally, I'm proud to challenge a team of involved and competent people, all motivated to contribute to improving the prevention of diagnosis and the management of cardiac rhythm disorders.

Anything else to add?
Enthusiasm, tenacity and optimism are essential work qualities for efficient collaborative work, leading to the successful completion of major projects. ■

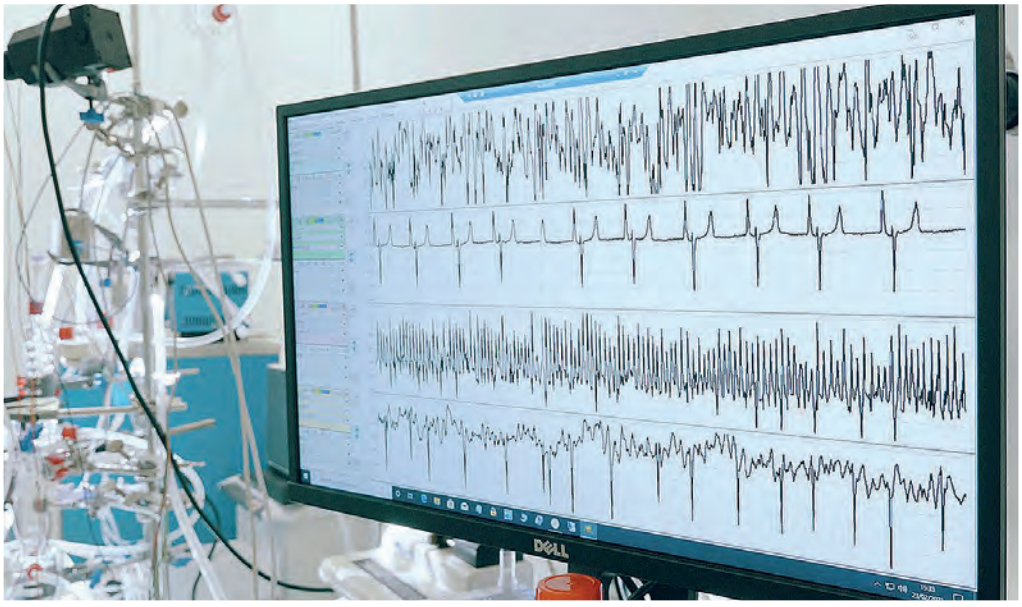
AT THE HEART OF THE NEW BIO-ENGINEERING PLATFORM, A SIMULATION TRAINING ROOM

Since 2019, the SIMRIC simulator, developed by Liryc researchers and engineers, has been a learning device offering beginners or experienced clinicians the opportunity to safely simulate catheter ablation procedures. In parallel with training, the simulator enables research applications and is made available to manufacturers to help them to evaluate the prototypes of new catheters being developed.

At the heart of the new bio-engineering platform (see page 3), a dedicated space is intended to host simulation training sessions for medical students and cardiology professionals. Equipped with five SIMRIC simulators to enable the simultaneous training of a group of cardiologists, it will also aim to open up to cardiac electrophysiology manufacturers, who will be able to install their navigation system there and develop new training courses for their technological innovations. The first training session in this simulation room was held on Tuesday May 16, 2023 with Medtronic.

At the same time, this space will host new generation simulators geared towards interventional cardiology with, in particular, the possibility of simulating cardiac pacemaker implantation systems (probes, pacemakers, defibrillators, etc.) and implantable valve-type devices.

In addition to the proven pedagogical interest, this future space for training through simulation is in line with the recommendations of the French National Authority for Health for the development of simulation in healthcare, in the service of greater patient safety. ■



SIMPLEX (Real-time EP simulator for interactive training): the simulator of the future.

SIMPLEX offers the unique opportunity to learn how to manipulate catheters and establish a diagnosis in real conditions, through the generation of cardiac electrical signals in a virtual patient. During its presentation by Dr. Josselin Duchateau at the Innovation Summit of the EHRA 2023 congress in Barcelona, SIMPLEX appeared to be the most successful simulator in its category. ■

THE LIRYC SUMMER SCHOOLS ARE BACK FOR A THIRD EDITION

As part of the University of Bordeaux's Summer University programme, the new edition of Liryc's Summer Schools took place in June. Building on their success, they offer 60 national and international researchers, medical students and engineers an intensive course program over several days, combining theoretical and practical sessions. Once again this year, participants met world-renowned experts and were trained in cutting-edge cardiology innovation techniques. ■

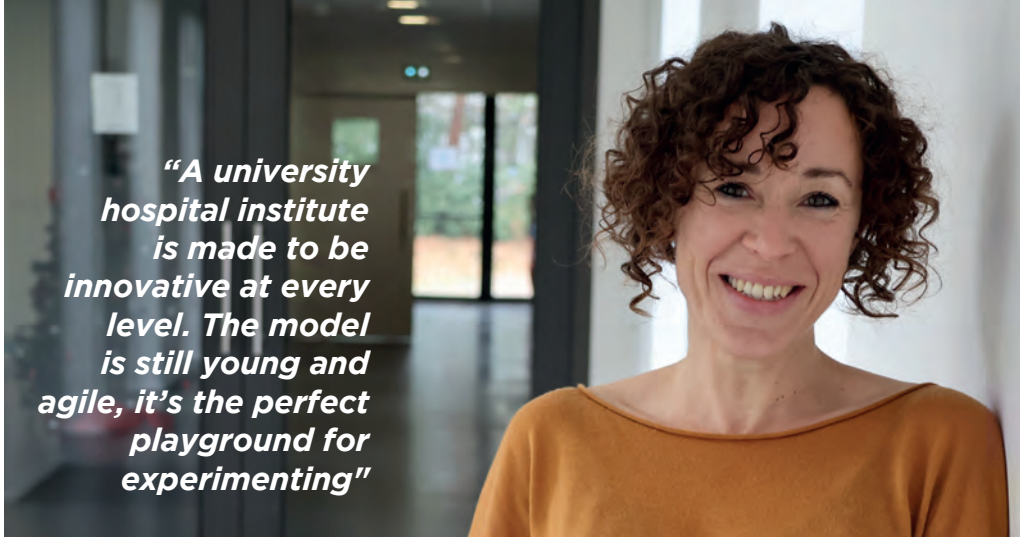
Want to find out more? Visit bit.ly/summerschoolsLiryc2023

LIRYC ADOPTS A NEW IDENTITY

In 2023, Liryc is renewing its commitment to patients and is charting a new trajectory that is more open to its ecosystem. With this momentum, the institute has chosen to change its identity to become **Liryc, the heart rhythm disease institute**. Although this is an area of excellence, the evolution towards greater readability is part of a process of greater openness to the public and to patients. At the same time, the institute's logo has been reworked and the website updated and enriched.

MEDTRONIC COMMITS ITSELF AND BECOMES A MAJOR PATRON

In July 2022, Medtronic renewed its support for the Liryc Institute by signing a multi-year donorship agreement. This agreement commits the world leader in health technologies for five years to become one of the most generous donors of the institute. With the ambition of supporting Liryc's training program, Medtronic contributes to the optimal transmission of knowledge resulting from the research conducted at the university hospital institute, thereby enabling better care for patients throughout the world. ■



FOUR QUESTIONS TO SÉVERINE FRANÇOIS, GENERAL SECRETARY OF THE LIRYC INSTITUTE

What position do you hold within Liryc and since when? Why did you join? I was contacted last year by the Liryc team to apply for this position. At that time, I was at the Pasteur Institute in Paris. It was unexpected, I wasn't looking for a new assignment, but the idea caught on. In the discussions I had with the members of the team and the founders, the University Hospital of Bordeaux and the University of Bordeaux, I found we were aligned on the vision of the university hospital institute, its potential and the challenge for patients. I felt in the same phase.
Discovering Liryc 10 years after it was created aroused my curiosity. I had held the same position at another university hospital institute in the startup phase, and I had just finished an university hospital institute project at the Pasteur Institute. Seeing such an object in different stages of development is a very complete and enriching experience. We refine our vision each time. It was very tempting!

Can you summarize your background? I chose a generalist education at Sciences Po. It was an excellent way to find my way in very varied universes and shape a course with a few turns. The first took me to Colombia for humanitarian missions with the Red Cross, then the European Commission in Guinea. It was an exciting, intense, formative start. Back in France, I changed worlds to discover political cabinets. This idea had been floating around in my head for a while. The positions of advisers to ministers and elected officials occupied me for nearly eight years. Consulting with leaders is a formative experience; we learn a lot by observing and it's a very demanding environment. In 2014, in a new turn, I joined the Marseille university hospital institute, which was another new world. We're at the beginning of the story, being at the start of such a project is not so common a career path. The energy of the beginning is always very powerful.

What are your assignments as General Secretary? The General Secretary is a pivot in the organization: they must have a 360-degree and dynamic vision of the university hospital institute looking forwards. They work in tandem with the General Director and in conjunction with the Scientific Director. Sharing our thoughts, our questions, and listening is a key to success in the management of a university hospital institute. That's the essence.
In practical terms, the General Secretary is responsible for the governance and general administration of the institute. They take part in defining and implementing strategy, preparing and conducting management boards, running the executive committee, charting financial trajectories, identifying priorities and managing the administrative team on a daily basis to support researchers. It's mainly around these tasks that the life of a General Secretary is organized. So it's varied, intense, everything is connected.
The administrative constraints and compulsory figures are strong. It's a difficulty that I've observed elsewhere, it crosses the entire research sector in France. You have to be creative to simplify processes and to find quick, appropriate solutions. It's a priority and a challenge. It's part of the interest of the job.
Another subject that is close to my heart is supporting young researchers; the stakes are too high for them to be neglected. Careers must not be exhausted for lack of support. Liryc must be attractive and train its young talents to know how to write a grant, be open to innovation, feed on the environment of the university hospital institute. These are things that I'd like to develop. A university hospital institute is made to be innovative at every level. The model is still young and agile, it's the perfect playground for experimenting.

Do you have a favourite quote in a professional capacity? I don't really have a quote, what I like doing is exploring and, above all, having fun doing it. Laughter is a very powerful lever, I'm convinced that it makes you more efficient and that it spreads something positive. Work time, we often forget, is also life time. It has to be qualitative. ■

WOMEN IN SCIENCE IN THE SPOTLIGHT

Dounia El Hamrani

Estelle Renard

Maider Piquet

Manon Desclides

Mariette Dupuy

Rokhaya Faye

Sabine Charron

Liryc counts 73 women and as many inspiring backgrounds and unique voices, which resonate to represent the diversity of the scientific world. During the Women in Science Day, we had the chance to discover the career paths of six of them, who are all committed to improving the diagnosis and management of heart rhythm disorders. ■

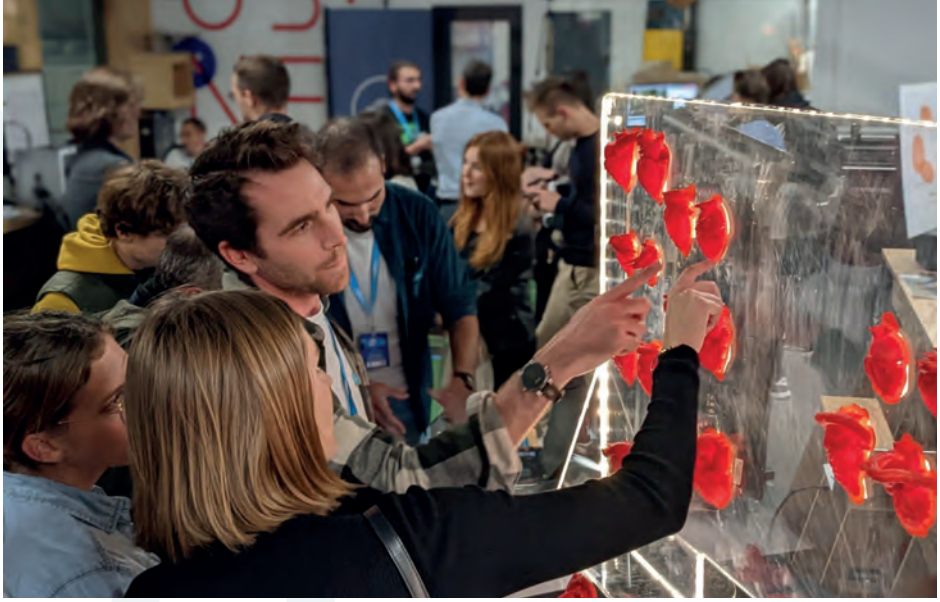
Read their portraits: bit.ly/WSLiryc2023

LIRYC IS RANKED ELEVENTH IN THE LIST OF INTERNATIONAL UNIVERSITIES AND RESEARCH CENTRES IN CARDIAC RHYTHMOLOGY

It ranks 2nd among French research centers in this category. This ranking testifies to the dedication and scientific excellence of the research teams who have succeeded in raising Liryc just behind prestigious institutions such as Harvard Medical School.

CONGRATULATIONS

- **Prof. Michel Haïssaguerre** is the recipient of a European Research Council Advanced Grant for his HELP project. He is also the winner of the Eric N. Prystowsky Lectureship Award given by the members of the Heart Rhythm Society and the Scientific Committee of the congress.
- **Prof. Aurélien Bustin**, is the recipient of a European Research Council Starting Grant 2022 (Horizon Europe) of €1.5 million for his "SMHEART" cardiac imaging project.
- Congratulations to **Andony Arrieula, Bastien Guillot** and **Elodie Surget** for obtaining their thesis.
- **Prof. Pierre Jaïs, Prof. Olivier Bernus, Laura Bear and Edward Vigmond**, are recipients of funding from the ANR (National Research Agency) in 2022 for their research projects.

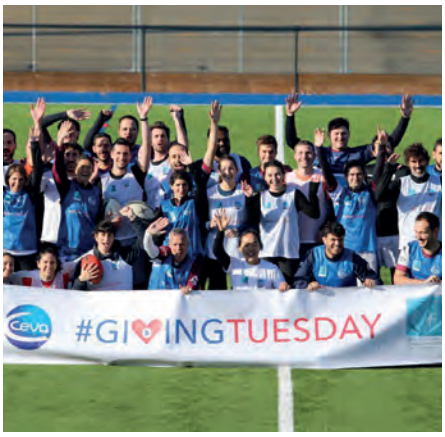


SEPTEMBER 30, 2022

During the European Researchers' Night organized at Cap Sciences, teams from Liryc went out to meet the public to present them the heart as it had never been seen before. On the program were debates, workshops, exhibitions, exchanges and playful demonstrations. ■

DECEMBER 3, 2022

On Giving Tuesday, Ceva Santé Animale, already actively engaged for the past year, presented a €5,000 cheque to support research in cardiology. The Liryc teams had the pleasure of receiving this award during the Union Bordeaux Bègles – CA Brive Top 14 rugby match, which was an excellent opportunity to raise awareness of heart rhythm disorders through sport. ■



JANUARY 30, 2023

Led by Prof. Pierre Jaïs and Dr. Richard Walton, Liryc was honoured at the Health Conference organized by the Librairie Mollat book store and the Bordeaux University Hospital Centre on the theme of heart rhythm disorders. An open evening that you can see or review on YouTube! ■

bit.ly/conferencemollat

APRIL 4, 2023

The ANCRE Vie association has renewed its multi-year support for Liryc. As such, ANCRE, a loyal donor, demonstrates its confidence in the teams of the institute, strengthening a relationship already established for several years. "I'm happy to see these teams committed to advancing science, thanks to the passion that drives them," said Jean-François Debrois, President of ANCRE. ■

SUPPORT LIRYC!

Join the fight against heart rhythm disease.

Through your generosity, you provide Liryc doctors and researchers with the means to reduce heart rhythm disorders in as many patients as possible throughout the world.

Sur **www.ihu-liryc.fr/en/**

or by cheque to:
IHU Liryc – FBU
Campus Xavier Arnozan
Av. du Haut Lévêque
33600 Pessac

THEY ARE DONORS:

J. Achin , Abbott, Ancre, Accuracy, Association Paul et Philippe, Perrot, Bernard Magrez SAS, Biosense Webster, Boston Scientific, Cap Ingelec, Ceva Santé Animale, Clavis Fondation, Crédit Mutuel Arkéa, Fondation Bettencourt Schueller, Fonds de Dotation Rondeau, Lemer Pax, Maincare, Medtronic, M. & L. Bailey, PNY Technologies, Reuben Fondation, Rubis, Groupe Néméa and two anonymous donors. ■

"THE LIRYC BEAT"

NEWSLETTER N° 15 /// SEPTEMBER 2023
Publication Directors: Management committee, comprising P. Jaïs, M. Hocini, R. Walton, S. François, P. Dos Santos, H. Normand • **Editors:** M. Hans / S. Witvoet / E. Gaillacq • **Graphic design:** F. Garcia • **Photo credits:** @Liryc, @Marie-Astrid Jamois, @Grilled Cheese, @Gautier Dufau • **Translation:** D. Williams

IMPRIM'VERT
Printed on 100% reclycled cyclus paper.

liryc
www.ihu-liryc.fr/en/