

PersonalizeAF Seventh Newsletter



Welcome to the seventh newsletter of the PersonalizeAF! The objective of this publication is to keep all our public updated with all information and main ongoing activities while our project is under way.

Do not miss it and stay tuned for all the updates of the Early Stage Researchers' work, new conferences, papers, and other news!

And don't forget to subscribe to our social media.

**PersonalizeAF, the project
bringing universities, hospitals
and companies from all over**

Europe together to tackle Atrial Fibrillation

What is Atrial Fibrillation?

Atrial fibrillation (AF) is a condition that causes an irregular and often abnormally fast heart rate. With different manifestations in each patient, it causes a worsening quality of life and a drastic reduction in life expectancy. Today, it is the most common cardiac arrhythmia, affecting more than 6 million Europeans and its prevalence is expected to double in the next forty years. Moreover, its cost exceeds 1% of European healthcare budgets (13.5 billion per year).

To reverse these figures - or at least reduce them - experts agree on the need to promote individualised patient management by personalising cardiovascular therapies.

What does PersonalizeAF network do?

PersonalizeAF addresses this challenge by delivering an innovative multinational, multi-sectorial, and multidisciplinary research and training programme in new technologies and novel strategies for individualized characterization of AF substrate to and increase treatments' efficiency.

This initiative involves European universities, hospitals and companies researching atrial fibrillation from different fields. Using artificial intelligence, signal processing and stem cell research, PersonalizeAF brings together engineers, clinicians and biologists to improve treatments, develop new diagnostic methods and optimise patient management.

From the research point of view, PersonalizeAF will integrate data and knowledge from in-vitro, in silico, ex vivo and in vivo animal and human models to:

- 1) generate an individual description of the state of the atrial muscle identifying the disease mechanisms and characteristics;
- 2) understand the potential effect that different therapies have on different atrial substrates; and
- 3) combine this information to generate a specific profile of the patient and the best therapy for each patient.

With this purpose, PersonalizeAF partnership aggregates relevant scientific staff from the academic and clinical world with highly specialised biomedical companies which will be involved in a high-level personalised training programme that will train a new generation of highly skilled professionals and guarantee ESRs and future PhD students outstanding

Career Opportunities in the biomedical engineering, cardiology services and medical devices sectors.



PersonalizeAF project updates

Our 15 ESRs and their research projects

The 15 Early Stage Researchers have been working full-time in their projects around all Europe for 3 years, and they are involved in different sectors: academia, clinics and industry. Each of them has been working in his/her individual PhD, but work also collaboratively with the same purpose, improving the paradigm of Atrial Fibrillation patients in Europe from a translational perspective.

Here the last #PersonalizeAF project updates, and where their research has taking them so far:

- **ESR2: Carmen Martínez Antón:** Karlsruhe Institute of Technology (Germany)

"The last months have been an incredible rollercoaster. As the graduation is approaching, the working hours multiply and the scientific results come almost every day. Last month I have been mainly working on the comparison of three different in silico mapping techniques to characterize atrial substrate in non-fully transmural tissue. I am really happy to face the last period of the PhD full of energy and motivation! "

- **ESR3: Eric Invers Rubio** -Institut d'Investigacions Biomèdiques August Pi I Sunyer(Spain)

"Lately I've been involved in learning and improving the skills in the EP-lab. I've been trying to improve my segmentation skills using new modules to analyse CTs and MRIs in a different way. In addition to this, I've been preparing a revision of an article and working on an article about the standardization of atrial regions."

- **ESR4: Sachal Hussain- Università di Bologna (Italy):**

"During this period (June - Dec 2023), I finalized the statistical analysis of the left atrium and left atrial appendage contraction parameters. Then I worked on two manuscripts. I submitted one paper in "Computer Methods and Programs in Biomedicine" by the name of "Patient-specific left atrium contraction quantification associated with atrial fibrillation: a region-based approach". This manuscript is under revision. In the meantime, I worked on my second paper which is based on left atrial appendage contraction analysis and we aim to submit it in January 2024.

During this period, I completed my last secondment in Simula academy, Oslo, Norway where I worked on static and dynamic computational fluid dynamic models using patient-specific left atrium models."

- **ESR5: Ozan Özgül- Maastricht University (The Netherlands):**

"The last few months were exciting as I submitted two manuscripts and started writing my thesis. Meanwhile, I have started working on another project where we experiment with various deep-learning strategies to distinguish patients with different forms of AF and those more likely to benefit from catheter ablation. I already achieved to predict AF burden by only looking at a 5-second-long sinus rhythm ECG! I will finalize this work and add another chapter to my thesis."

- **ESR6, Teresa Schiatti at Universitaets-Klinikum Freiburg (Germany):**

"In the last newsletter I talked a little bit about the secondment I did in Valencia, it has been a memorable chapter of personal growth. After coming back to Freiburg, I had new ideas to test and a lot of motivation. Unfortunately the summer is never really productive experimentally because we receive less biopsies from the hospital. Now we are completely back on track and I have obtained a lot of interesting results in SR versus AF tissues. There are exciting times ahead!"

- **ESR10: Narimane Gassa- University of Bordeaux (France)**

"Primarily, significant efforts have been made in advancing the thesis writing process. Additionally, we have successfully applied our novel approach to a new set of clinical data, specifically targeting the detection of ectopic foci. This application serves as a crucial test for the robustness of our methodology in real-world clinical scenarios. Furthermore, our ongoing work includes an in-depth exploration of the impact of heart motion on Electrocardiographic

Imaging (ECGI). This study aims to comprehensively understand how the dynamic nature of the heart influences the accuracy and reliability of ECGI outcomes."

- **ESR11: Carlos Fambuena Santos** Universitat Politècnica de València (Spain)

"During these months I have finished all the secondments required for my Phd. The last one in Switzerland! There, I had the chance to study the mathematical behavior of ECGI in AF by evaluating what parameters are more reliably measured with this technology. I have also developed a new methodology for local activation time (LAT) In the atria. This parameter allows electrophysicians to understand the circuits in regular tachycardias. In AF this is particularly useful to estimate slow conduction areas which are susceptible to maintain AF. We have already a manuscript written that we plan to submit soon to a journal. In the coming months I will focus on writing my thesis and getting everything wrapped up to become a doctor!"

- **ESR13: Sergio Nabil Gadur-** SIMULA (Norway)

"I have spent the last months in Cesena, Bologna, Italy complying with my last secondment. During this time I have been writing the literature review of my first paper, a special syllabus to present to the University of Oslo to complete with my credits and attended the last consortium meeting in Valencia, Spain to present my work."

- **ESR14: Victor Gonzalves Marqués** - Maastricht University (Netherlands):

"After our recent get-together in Valencia for PersonalizeAF, my attention has been on wrapping up some papers with the findings from my PhD work. Two papers that will eventually be part of my thesis are currently going through the review process. Speaking of the thesis, I've started drafting the main document, just like many of the other ESRs. It's a pretty cool process, looking back and figuring out the common thread that ties everything into a cohesive story and then crafting that story into an understandable text. Fortunately, those early writing courses are really paying off now. At the same time, I'm rounding up my latest results and putting the finishing touches on analyses to wrap up the remaining chapters and papers."

If you want to get to know the Early Stage Researchers way better and their pathway, stories and experiences, click [here](#)

Conferences and journal papers

We are sharing here some of the participation in conferences and journal papers the ESRs have participated or will be participating. The information of all the publications made by the ESRs will be available in PersonalizeAF website.

ESR2, Carmen, attended to CINC 2023 Conference in Atlanta, "*As every time I had the opportunity to join CinC, the friendly and nice atmosphere makes science even funnier!*"

ESR4, Sachal Hussain, attended to Computing in Cardiology Conference in Atlanta. He also presented an E-poster in CSI Focus LAA in Frankfurt, Germany about "Left Atrial Appendage Contraction Analysis in AF patients" and for this work, he received Best E-Poster award!

ESR5, Ozan Özgül has been preparing two papers, which are in review process: (i) source ranking strategy for detecting AF drivers and (ii) composite mapping in simulations.

Our **ESR6**, Teresa Schiatti, collaborated with the Victor Chang Cardiac Research Institute in Australia in a paper recently published, named "Functional coupling between Piezo1 and TRPM4 influences the electrical activity of HL-1 atrial myocytes".

ESR10, Narimane Gassa, has attended FIMH 2023 conference at Lyon in a poster session: Numerical Investigation of Methods Used in Commercial Clinical Devices for Solving the ECGI Inverse Problem".

Carlos Fambuena, **ESR11**, attended ECGI SUMMIT 2023 and presented his poster "Estimation of Ventricular Ectopic Beat Origin with ECGI".

ESR13, Sergio Nabil was accepted to present a poster and give a talk in the International Congress on Industrial and Applied Mathematics which will take place in Waseda University, Tokyo, Japan during August, 2023.

ESR14, Victor Gonçalves He attended CINC 2023 in Atlanta, giving an oral presentation.

We are glad to announce that some of the ESRs and supervisors have also submitted journal papers related to the PersonalizeAF network. and you can find the journal papers submitted in our Open Access repository, [ZENODO](#), as well.

We are presenting the list of the publications here:

-"[Local Electrical Impedance Mapping of the Atria: Conclusions on Substrate Properties and Confounding Factors](#)", by Laura Anna Unger; Leonie Schicketanz; Tobias Oesterlein; Carmen Martínez Antón; Kerstin Schmidt; Olaf Doessel; Armin Luik;

-"[An evaluation on the clinical outcome prediction of rotor detection in noninvasive phase maps](#)". by "C. Fambuena-Santos; I. Hernández-Romero; R. Molero; A.M. Climent; M.S. Guillem;

-"[ECGI Periodicity Unraveled: A Deep Learning Approach for the Visualization of Periodic Spatiotemporal Patterns in Atrial Fibrillation Patients](#)" by Alexander Lacki; Ismael

Hernández-Romero; María S Guillem; Andreu M Climent;

- ["Spatial Relationship Between Atrial Fibrillation Drivers and the Presence of Repetitive Conduction Patterns Using Recurrence Analysis on In-Silico Models"](#) by Victor G Marques; Ali Gharaviri; Simone Pezzuto; Pietro Bonizzi; Stef Zeemering; Ulrich Schotten;

-["Benchmark of deep learning algorithms for the automatic screening in electrocardiograms transmitted by implantable cardiac devices"](#) by Narimane Gassa; Benjamin Sacristan; Nejib Zemzemi; Maxime Laborde; Juan Garrido Oliver; Clara Matencio Perabla; Guillermo Jimenez-Perez; Oscar Camara; Sylvain Ploux; Marc Strik; Pierre Bordachar; Remi Dubois;

-["High Coverage and High-Resolution Mapping of Repetitive Patterns During Atrial Fibrillation"](#) by Ozan Özgül; Ben Hermans; Arne van Hunnik; Sander Verheule; Ulrich Schotten; Pietro Bonizzi; Stef Zeemering;

-["Clinical and electrophysiological predictors of device-detected new-onset atrial fibrillation during 3 years after cardiac surgery"](#) by: Elham Bidar; Stef Zeemering; Martijn Gilbers; Aaron Isaacs; Sander Verheule; Matthias D. Zink; Bart Maesen; Sander Bramer; Michal Kawczynski; Isabelle C. Van Gelder; Harry J.G.M. Crijns; Jos G. Maessen; Ulrich Schotten;

-["Consecutive-Day Ventricular and Atrial Cardiomyocyte Isolations from the Same Heart: Shifting the Cost–Benefit Balance of Cardiac Primary Cell Research"](#) by Joachim Greiner; Teresa Schiatti; Marica Dente; Alina Semenjakin; Thomas Kok; Dominik J. Fiegler; Thomas Seidel; Ursula Ravens; Peter Kohl; Rémi Peyronnet; Eva A. Rog-Zielinska;

-["Spiral Waves Generation Using an Eikonal-Reaction Cardiac Electrophysiology Model"](#) by Narimane Gassa; Nejib Zemzemi; Cesare Corrado; Yves Coudière;

-["AF driver detection in pulmonary vein area by electrocardiographic imaging: Relation with a favorable outcome of pulmonary vein isolation"](#) by Carlos Fambuena Santos; Ismael Hernández-Romero; Rubén Molero; Felipe Atienza; Andreu M Climent; M S. Guillem

-["In-silico drug trials for precision medicine in atrial fibrillation: From ionic mechanisms to electrocardiogram-based predictions in structurally-healthy human atria"](#) by Albert Dasi; Aditi Roy; Rafael Sachetto; Julia Camps; Alfonso Bueno-Orovio; Blanca Rodríguez

-["Combining atrial activation maps for the big picture of simulated atrial fibrillation mechanisms"](#) by O Ozgul, BJM Hermans, A Van Hunnik, S Verheule, U Schotten, P Bonizzi, S Zeemering

-["Standardized 2D atrial mapping and its clinical applications"](#), Tiantian Wang, Joël Karel, Eric Invers-Rubio, Ismael Hernández-Romero, Ralf Peeters, Pietro Bonizzi, Maria S Guillem.

-["Numerical Investigation of Methods Used in Commercial Clinical Devices for Solving the ECGI Inverse Problem"](#); Gassa, N., Kalinin, V., Zemzemi, N.

[-Functional coupling between Piezo1 and TRPM4 influences the electrical activity of HL-1 atrial myocytes](#) ; Yang Guo, Delfine Cheng, Ze-Yan Yu, Teresa Schiatti, Andrea Y. Chan, Adam P. Hill, Rémi Peyronnet, Michael P. Feneley, Charles D. Cox, Boris Martinac

Events and training courses

Last Meeting of the PersonalizeAF Network in Valencia, October 2023

In a grand finale, the COR research group at the ITACA Institute of the Polytechnic University of Valencia recently hosted the final meeting of the project. This meeting concluded the four-year PersonalizeAF project with a dynamic meeting in Valencia. Early Stage Researchers (ESRs) presented their findings in a series of engaging sessions, from quickfire elevator pitches envisioning the future of PersonalizeAF to in-depth updates on project milestones. The agenda also featured a pivotal discussion on data management, highlighting the team's commitment to ensuring the accessibility and quality of project data. As the curtains closed, the meeting celebrated the collective achievements of researchers and their significant impact on the field of atrial fibrillation research.

PersonalizeAF's final meeting showcased not only scientific excellence but also the passion that fueled four years of dedicated research. The blog post recaps the event, capturing moments of innovation, lively discussions, and reflections on the journey's highs and lows. The ESRs, who took center stage with elevator pitches and updates, demonstrated not just the results of their projects but also their vision for the project's future. The meeting concluded with a nod to the collaborative spirit that defined the project, acknowledging the tireless efforts of researchers and their invaluable contribution to advancing our understanding of atrial fibrillation.

Thanks to everyone for attending and making the meeting and project a success!



Last PersonalizeAF meeting in Valencia, 23rd and 24th of October 2023



Enjoying a night in the city center of Valencia after a fruitful meeting

ECGI SUMMIT 2023

ECGI Summit first edition was organized by the CEI consortium and Universitat Politècnica de València during 5-8th of November 2023.

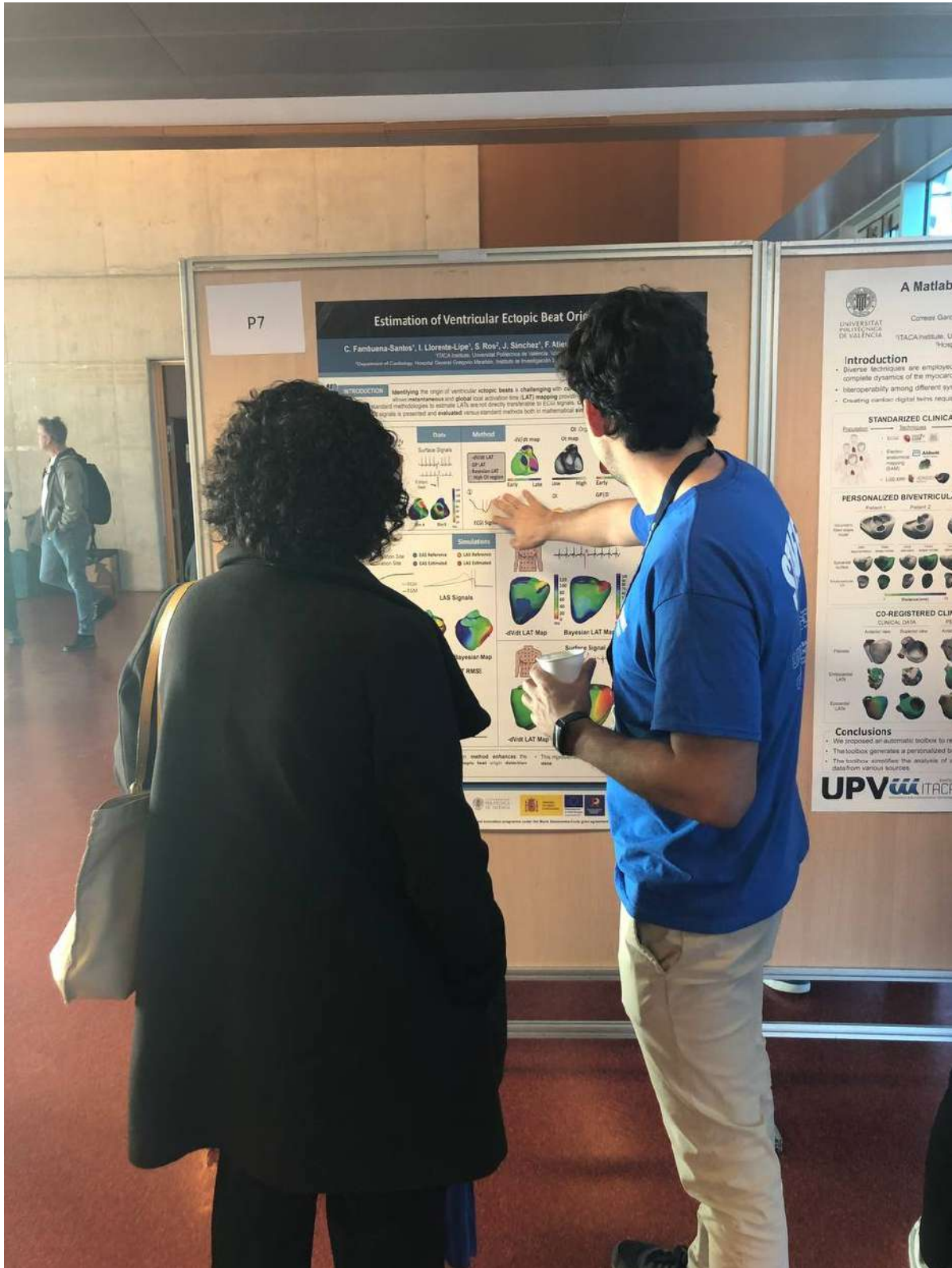
More than 80 attendees focused on Electrocardiographic Imaging gathered to enjoy invited talks and scientific sessions focused on new and emerging technologies in ECGI, and developing new connections in the ECGI community. This was an exceptional opportunity to connect with leading experts, engage in valuable networking, and explore the cutting-edge advancements in Electrocardiographic Imaging.

Some of our ESRs such as Patricia Martínez Carlos Fambuena participated giving an oral presentation and poster presentation, respectively.

Next ECGI SUMMIT will be celebrated in Krakow, Poland, in 2025. Stay tuned in <https://ecgisummit.com/>



Patricia Martínez, ESR12, presenting her work in ECGI Summit 2023



Carlos Fambuena, ESR11, sharing his research in PersonalizeAF project

Computing In Cardiology 2023

CinC 2023 was the 50th CinC conference, which has been held annually since 1974. CinC 2023 happened in Atlanta, Georgia, USA on 1st - 4th October 2023.

Computing in Cardiology (CinC) is an international scientific conference for computing in clinical cardiology and cardiovascular physiology. Some of our ESRs, such as Victor, Carmen and Narimane were there to share their latest updates!



Carmen Martínez, ESR2, presenting her work in Atlanta, CINC 2023

PersonalizeAF video

The PersonalizeAF video shared its promotional video, don't miss it!



Next Events

Computing in Cardiology 2024

51st international Computing in Cardiology conference is here!

Computing in Cardiology 2024 to be held on September 8-11, 2024, in Karlsruhe, Germany. Located at the heart of Europe, Karlsruhe is easy to reach and very happy to host CinC in Germany after 25 years.

Don't forget to submit your contribution by April 15 [here](#)

You can also combine your trip with the Virtual Physiological Human Conference in Stuttgart (Sep 4-6) and the Cardiac Physiome Meeting in Freiburg (Sep 12-14)!

Atrial Signals 2024

Atrial Signals 2024 will be held in Maastricht, during the 6th-8th June.

Their website and registration will be open shortly, so stay tuned for this event!

EHRA 2024

The annual meeting of the European Heart Rhythm Association (EHRA) brings together scientists, healthcare professionals and other players involved in arrhythmia management from all around the world. Don't miss this date in Berlin - Germany, during Sunday, 07 April - Tuesday, 09 April 2024

More information [here!](#)

49th International Congress of Electrocardiology in Lund, June 12-14th.

The International Congress of Electrocardiology (ICE) is a joint meeting of the ISE and ISHNE, the International Society for Holter and Noninvasive Electrocardiology.

Registrations are open until 1st of May, more information in the [Registration site](#)

Heart Rhythm 2024 Conference

Mark your calendar to join the global EP community in Boston, MA, or online from May 16-19, 2024, at the premier EP event of the year — Heart Rhythm 2024!

More information [here](#)

We recommend: Papers addressing Atrial Fibrillation

In this section, the consortium wants to share some of the Papers addressing Atrial Fibrillation and other arrhythmias with were considered of interest and inspiring for our work. Check them out in order to learn more about Atrial Fibrillation, stem cells, image processing, cardiac modelling, etc!

"Pulsed field ablation for atrial fibrillation – Lessons from magnetic resonance imaging" by Thomas Fink et al.

"Left atrial appendage shape impacts on the left atrial flow hemodynamics: A numerical hypothesis generating study on two cases" by Lida Alinezhad et al

"Regions of Highly Recurrent Electrogram Morphology With Low Cycle Length Reflect Substrate for Atrial Fibrillation" by Shin Yoo et al

"Electrophysiological effects of acute atrial stretch on persistent atrial fibrillation in patients undergoing open heart surgery" by Arif Elvan et al

"Conduction velocity mapping in atrial fibrillation using omnipolar technology" by Yousaku Oukobo et al

"Atrial Fibrillation: JACC Council Perspectives" by Mina K. Chung et al

"Left atrial appendage shape impacts on the left atrial flow hemodynamics: A numerical hypothesis generating study on two cases" by Liza Alinezhad

"Calcium in the Pathophysiology of Atrial Fibrillation and Heart Failure" by Nathan C. Denham et al

PersonalizeAF Youtube Channel

Last blog entries and News

Once a month, our researchers are sharing their latest updates about their research pathway. Do you want to learn more about Atrial Fibrillation? About how researchers life is? Check their articles and follow them on Social media!



January 19, 2024

Final PersonalizeAF meeting in Valencia

Final PersonalizeAF meeting in Valencia This is not a goodbye but a see you later! Hey, PersonalizeAF enthusiasts! We're here to rewind the...

[Read more...](#)



April 4, 2023

Working (and travelling!)

Working (and travelling!) The combination of research and globetrotting in MSCA Hola a tothom! How is it going? Yes, yes, I'm still alive....

[Read more...](#)



March 15, 2023

PersonalizeAF Project Raises Awareness for Atrial Fibrillation and launches a new video^[OBJ]

PersonalizeAF Project Raises Awareness for Atrial Fibrillation and launches a new video With the occasion of the European Day for the Prevention of...

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Personalize AF

Partner organizations



Beneficiaries



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