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MultidisciplinarY training network for ATrial fibRillation monItoring, treAtment and progression

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1. Summary

This document describes the activities of the second Summer School of the MY-ATRIA consortium. The theme of the school was *Modelling and Signal Processing*, hosted by University of Zaragoza at the campus in Jaca, Spain. The event provided supervision opportunities for the ESRs and practice of conference-like communication. The lectures were mostly focused on invasive signals for ablation guidance, and modeling of the human atria, but also two talks on surface ECG analysis in AF were organized (see agenda below).

The Summer School lasted for three days, with ESR presentations and discussion during the first day and scientific lectures during the remaining two days. The Summer School also included a social event.

An evaluation of the Summer School was performed after the school and the results will be reported in a following Deliverable D5.6.

2. Summer school objectives and agenda

The objectives of the Summer School in Jaca were:

- For ESRs to present their project and to receive feedback from other ESRs and supervisors.
- To train the ESRs in modeling and signal processing techniques.
- To train the ESRs in modeling of the human atria.
- To discuss and plan secondments.

The meeting started at 9 on September 24, 2019 and lasted until 15.00 on September 26, 2019, see agenda below.

Monday, 23 September2019		
Timing	**Topic**	**Responsible partners/beneficiary**
Morning	**ESRs presentations**	
09:00 - 09.30	ESR-1: Bottom-Up study on the implications of interatrial block in the mechanisms of atrial fibrillation	**POLIMI – Jordan Eliot**
09:30 – 10:00	ESR-2: Detailed 3-D computer models of human atria and torso for studying atrial fibrillation initiation and progression	**Rebecca Belletti UPV**
10:00 - 10.30	ESR-3: Atrial Flutter characterization and discrimination using 12-lead simulated ECG	**Giorgio Lungo KIT**
10:30 – 11:00	*Coffee break*	
11:00 – 11:30	ESR-4: Atrial complex networks in endocavitary recordings during AF	**Muhamed Villa UMIL**
11:30 – 12:00	ESR-5: Paroxysmal atrial fibrillation: Continuous tracking of arrhythmia progression	**Riccardo Salinas Martínez MIE**
12:00 – 12:30	ESR-6: AF screening using everyday sensors and data fusion	**Hesam Halvaei LU**
12:30 – 13:00	Panel session	**Johan de Bie**
13:00 – 14:30	*Lunch*	
Afternoon	**ESRs presentations**	
14:30 – 15:00	ESR-7: Risk stratification and prediction of intervention outcome in AF using novel ECG-based markers of atrial remodelling ,	**Mustafa Abdollahpur LU**
15:00 – 15:30	ESR-8: Assessment of the AF triggers and their role in its progression	**Javier Saiz BRC**
15:30 – 16:00	ESR-9: Evaluation of the interplay mechanism between AF and AT detected by a single lead ECG	**Guadalupe García Isla POLIMI**
16:00 – 16:30	*Coffee break*	
16:30 – 17:00	ESR-10: Integrated and personalized computational model of atria with AF for an efficient ablation therapy	**Luca Azzolin KIT**
17:00 – 17:30	ESR-11: Assessment of AF therapies targeting ion channels and neural components	**Chiara Celotto UNIZAR**
17:30 – 18:00	ESR-12: Effect of atrial fibrillation dynamics on the efficacy of ablation therapies	**Jennifer Riccio UNIZAR**
18:00 – 18:30	Panel session	**Helena Fernandez**
09:00	Dinner	

Tuesday, 24 September 2019		
Timing	**Topic**	**Responsible partners/beneficiary**
Morning	**Lectures**	
09:00 - 09.30	Atrial fibrillation, how to look for the best electrograms?	**Ruben Casado, Hôpital Erasme - ULB Cliniques universitaires de Bruxelles**
09:30 – 10:00	Non-invasive ECG imaging to solve cardiac arrhythmias	**Felipe Atienza, Hospital General Universitario Gregorio Marañon de Madrid.**
10:00 - 10.30	Interatrial electromechanical synchrony assessed by bidimensional strain in hypertensive patients with Bayes syndrome	**Emiliano Diez Postdoctoral researcher, Mendoza University, Argentina**
10:30 – 11:00	*Coffee break*	
11:00 – 11:30	Bridging the Innovation Gap: Successes, Failures and Recommendations	**Helena Fernandez GRADIANT, Vigo, Spain**
11:30 – 12:00	Research opportunities after an ITN Fellowship	**Elena Portero. European project office, Zaragoza University**
12:00 – 13:00	Modelling equations and numerical methods for cardiac electrophysiology	**Jose Felix Rodriguez, POLIMI, Italy**
13:00	Lunch + Social event (Visit to San Juan de la Peña Monastery) + Gala Dinner (Rest. Las Ranas)	

Wednesday, 25 September 2019		
Timing	**Topic**	**Responsible partners/beneficiary**
08:00 – 09:00	supervisory Board meeting	
Morning	**Lectures**	**Presenter**
09:30 – 10:00	AV node conduction modelling in AF	**Frida Sandberg, Associated professor Lund University**
10:00 – 10:30	Interdisciplinarity at research teams	**Oscar Lopez, Director Ejecutivo, Instituto de Investigación sanitaria de Aragón, Zaragoza**
10:30 – 11:00	Multimodal intracardiac data analysis towards a better ablation guiding of cardiac arrhythmias	**Alejandro Alcaine, Postdoctoral researcher, Pompeu Fabra University, Barcelona**
11:00 – 11:30	*Coffee break*	
11:30 – 12:00	Multiscale computational modelling in Human Atria.	**Carlos Sanchez, University of Zaragoza**
12:00 – 12:30	Electrical amplifier during atrial fibrillation	**Gonzalo Rios, Hospital Gregoria Marañon, Madrid**
12:30 – 13:00	Atrial repolarization and AF	**Roberto Sassi** **Milan University**
13:00	Lunch + School end	

3. ESR presentations (day 1)

The ESR presentations were performed as an extended conference-like 15-min presentation followed by 15 min discussions, as shown in the Table at page 6. Some of the ESRs had already presented at conferences whereas for others it was the first conference-like presentation. The ESRs and the supervisors participated in the discussions. The questions and related discussion were now much more detailed than during the first Winter school. More focus was now put on methods and results.

4. Panel discussions (day 1)

After both the first six and the last six ESR presentations, a panel discussion was organized (see Table page 6). Several of the ESRs wanted to discuss their projects in relation to when and how it can make a difference in the daily work at the hospital. Some of the PhD students work with modeling which is more long-term research while others work with in projects and environments where the results are already used in some application. Supervisors gave their view on this and also on how to think about patents.

5. Scientific lectures (day 2-3)

The major part of the scientific program was focused on modelling of the human atria and how to connect this to ablation therapy by performing intra-atrial measurements (see Table page 7-8). There were also lectures about research opportunities after ITN fellowships and on patent/innovation strategies. Several lecturers were invited from Spanish clinical and research institutions, but there were also lecturers from Brussels, Milan (2), Lund and Mendoza.

7. Networking activities

During the Summer School there were also several social activities and networking opportunities including lunches, dinners, and a social event with a visit to the monastery San Juan de la Peña. The Summer School was finished by a dinner at a local restaurant where all participants, in addition to food, were offered beautiful folkloristic, Aragonesian music and dancing.

8. Summer school evaluation

An online survey, following the guidelines described in the Deliverable D5.4 “Evaluation Questionnaries M12” was created with Google Forms and completed by each ESR. The results of the survey were reported in the Deliverable D5.6 “Evaluation Questionnaries M24”, due in month 24th.

9. Conclusions

The objective of the Summer school in Jaca was to guide the ESRs into the more advanced topics of modeling and signal processing and, at the same time, perform a conference-like presentation with more discussions than previously done. The ESRs performed a 15-minute presentation with more detailed results of their first project, receiving more detailed feedback from other ESRs and supervisors during the subsequent 15-min debate. Scientific lectures on a broad area of themes were delivered showing the differences between signal processing of real signals and modeling of the human atrial activity resulting in simulated signals. Additional lectures on innovation/patenting and on opportunities after the ITN were also provided.