

COMPUTING IN CARDIOLOGY

September 13-16, 2020

Rimini, Italy

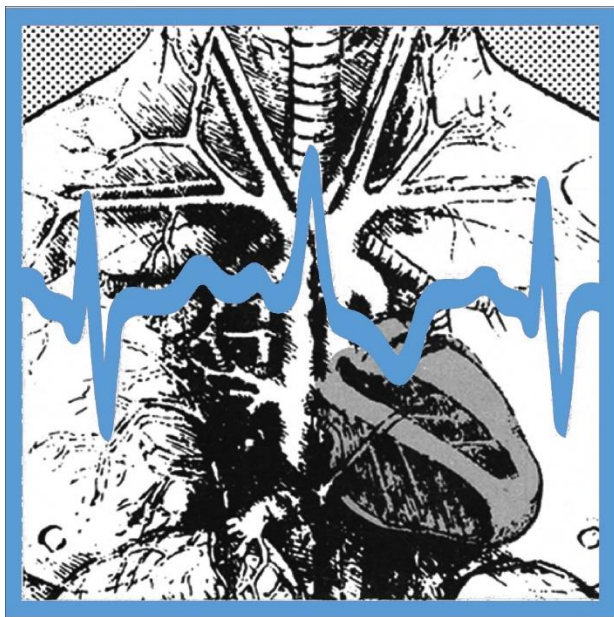


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Sponsors

Computing in Cardiology 2020 is supported by several institutions, companies and academic partnerships.

The Local Organizing Committee would like to thank the following partners:



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Welcome to CinC@Rimini in 2020!



Dear Colleagues and Friends,

On behalf of the Local Organizing Committee, we warmly welcome you to Computing in Cardiology 2020. For those of you who have the printed version of this program book, this is meant to be a warm welcome to the city of Rimini too! Unfortunately, this year only a few of you have been able to travel and take part directly, in person, at CinC. However, we have done our utmost to organize the event for ALL of you as a real “meeting”, that is, a place and a certain time where people meet.

Italy has been the first western country to be widely affected by Covid-19 pandemic and one of those with the highest number of deaths. Our driving idea in the planning of the CinC2020 hybrid format was that there was a need and a potential to 'restart', after months of lockdown; obviously in strict conformity with the rules and without overdoing it, but without standing still or giving up. All of this also to reiterate the importance of science/research and of the encounter, even physical if possible, between people. In any case, our wish is that CinC2020 help us to meet the challenge of ‘social distancing’, a rather unfortunate term to describe what actually is ‘physical distancing’, which must impact as little as possible on our needs and on the possibility of creating and maintaining relationships. To achieve this, technology and telecommunications have been, and will be for CinC2020, a great help.

The city of Rimini is a dynamic city located on the north-eastern Italian coast facing the Adriatic Sea, 120 km SE from Bologna. The city hosts a Campus with more than 5000 students of the University of Bologna, the oldest University of the Western World. Rimini has an extraordinarily dense history: Ariminum was an important Roman city and crossroads of three main Consular roads in Italy. Today, being a famous European tourist location and seaside resort, Rimini also offers everything from top level establishments to traditional small local restaurants and pubs, offering hospitality and high-quality food for every budget. For all those who will experience CinC remotely, we hope this is an incentive to come and visit this surprising city on another occasion!

The conference venue is located at the Rimini Palacongressi, one of the largest and most innovative congress facilities in Italy. The Palacongressi is set in an extensive urban park, in a perfect eco-friendly context within walking distance from both the city center and the seaside. The Palacongressi rooms will be the set of hybrid sessions, from which the presentations will be streamed and intertwined with those of the remote participants.

The focus of the Sunday Symposium will be on Technological Innovations in Cardiac Therapies. Social programs will be focused on activities around both historical Rimini and its seaside resort atmosphere. The Gala Dinner will accompany our attendees in Federico Fellini's cinematographic world. We do hope that, despite the unusual format and the challenging 'boundary conditions', all of you, in person and remote attendees, will find CinC2020 an exciting and pleasant experience... as usual!

Cristiana Corsi and Stefano Severi

University of Bologna, Chairs of the Local Organizing Committee, Computing in Cardiology 2020

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Letter from the President

Dear CinC 2020 Participant,

In this most unusual year, we welcome you to Computing in Cardiology-Reinvented. I should be welcoming you all to share the rich culture, history, and beauty of Rimini, Italy but most of us will not have that pleasure this year. Instead, we will be participating from our local offices and homes and depending on technology to provide access to the excitement that is CinC. More than ever before, this will truly be COMPUTING in Cardiology and it seems appropriate that our conference is going to take computing and technology to new limits so that we can still share ideas, conversations, and our collective progress. This will be a CinC Reinvented!

On the surface, many aspects of this program might look like business as usual! We have kept most of the features that make the conference like few others. The Sunday Symposium organized by the Local Organizing Committee will open the fun. Then will follow the Rosanna Degani Young Investigator Competition, the Physionet Challenge, the Bill and Gary Sanders Posters competition, the Clinical Challenge Award, the Maastricht Simulation Award, and the usual four parallel sessions. There will even be a social event on Monday that will present the best of Rimini.

A closer look, of course, reveals the fact that we are running a meeting in a hybrid format, in which the majority of presentations will occur remotely and be broadcast around the world to participants who will depend on their computers. To provide a valuable experience despite the geographical and temporal distances, we will use a range of communications technologies to broadcast video content, view preprints and posters, and conduct live chats for each presentation. The sessions will run in real-time and we hope you can participate in line with your sleep cycle. The posters will be open to view around the clock and each will include a short video summary. Communication with the authors will be via chat. Will every detail work perfectly? Of course not, but we have become used to many elements of our lives not working as we expect. The Board and the Local Organizing Committee have made all possible efforts to reinvent CinC in the face of a challenge none of us could have imagined.

And this year, more than perhaps ever, we must thank the Local Organizing Committee under the leadership of Stefano Severi and Cristiana Corsi for what has been perhaps the most challenging set of tasks they have ever tackled. This year was not what anyone bargained for and certainly was not what the committee pictured 5 years ago, when they pitched their plans for Rimini in 2020! They would have been forgiven for giving up many times in the past year; but instead, they insisted, adapted, and have truly reinvented CinC for you. Perhaps this is the Italian spirit at work, and we thank them for their commitment.

Ciao,

Rob MacLeod

President, Computing in Cardiology.

Welcome to Brno for CinC 2021

To: all_cardiology_enthusiasts@cinc.org

Subject: CinC 2021, Are you ready?

We'd love to see you among us at Computing in Cardiology 2021 in Brno, Czech Republic!

But don't worry, we're not all serious. It's hard to be serious in the most chill city in the Czech Republic, placed in the heart of a charming wine producing region - Moravia.

Brno is perfectly positioned, so whether you come through Vienna, Budapest or Prague, you'll be here in no time via a comfortable direct train.

Beer? Wine? Slivovice (don't ask)? We have it all. On top of that (or rather before all of that), try the delicious local cuisine. Surround yourself with the hospitable locals or find your zen in the unspoiled nature.

If culture is what you seek then visit the local museums, galleries or artistic cinemas. You'll be amazed to see what the so-called "golden Czech hands" can do.

So come and enjoy an epic dragon hunting quest in the deep caves and mysterious streets of Central Europe's Silicon Valley. Come to Brno and live to tell the tale. Hopefully.

So pack yourself a toothbrush and see you in Brno, 12-15th September 2021.

In the meantime, you can learn the first two Czech phrases:

1) Těšíme se na vás! [t-ye-shee-me se na va:s] - We look forward to seeing you all!

2) Ještě jedno pivo, prosím. [yesht-ye yed-no pee-vo, pro-seem] - One more beer, please.

#herebedragons #cinc2021

Sincerelly yours,

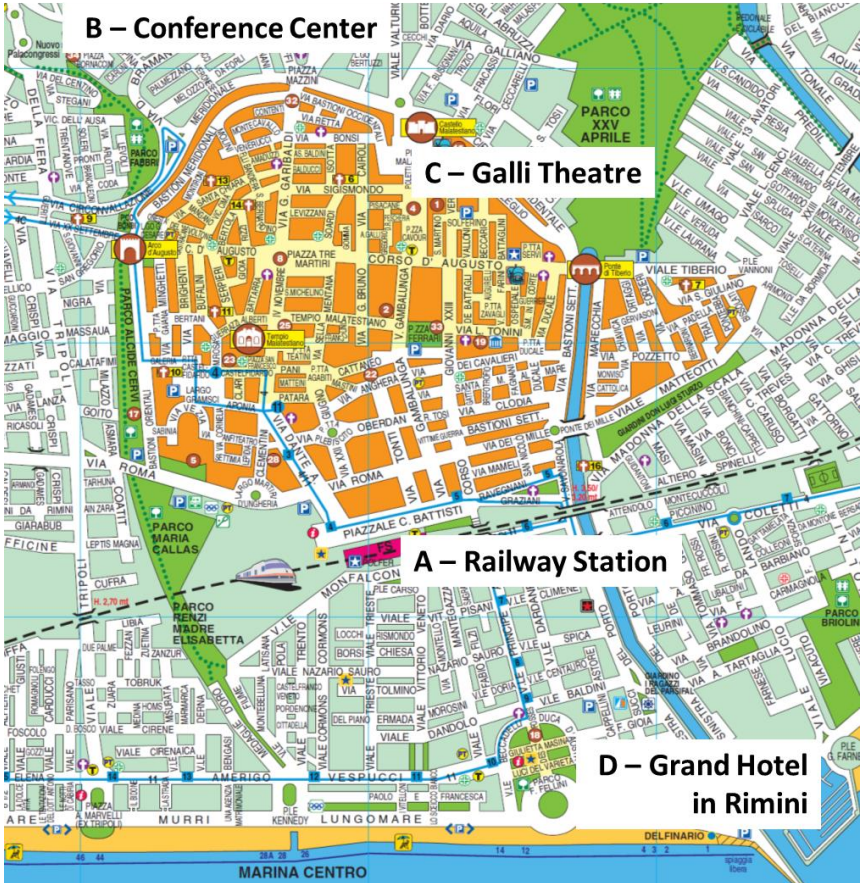
CinC 2021 Team

PS. Do not hesitate. CZECH IT OUT.



Maps

General Map of Rimini



A - Railway Station

B - Sunday symposium and Conference location (Palacongressi, Via della Fiera 23, 47923 Rimini (RN) Italy – tel. 0541 711500)

C - Galli Theatre (Piazza Cavour, 22, 47921 Rimini (RN) – tel. 0541 793811)

D - Gala dinner at the Grand Hotel

Gala dinner



The gala dinner will be held at the **Grand Hotel** in Rimini.

With its international appeal and a five-star hospitality, the Grand Hotel Rimini boasts a century of history always in the mark of the mythical cinematographer Federico Fellini.

The hotel was designed by the South American architect, Paolo Somazzi. It was inaugurated on July 1, 1908 and continues to function as a hotel today. A serious fire destroyed the two decorative domes which adorned the roof in July 1920: the domes were never replaced. The hotel, badly damaged during the war, was reconstructed in the 1950s.

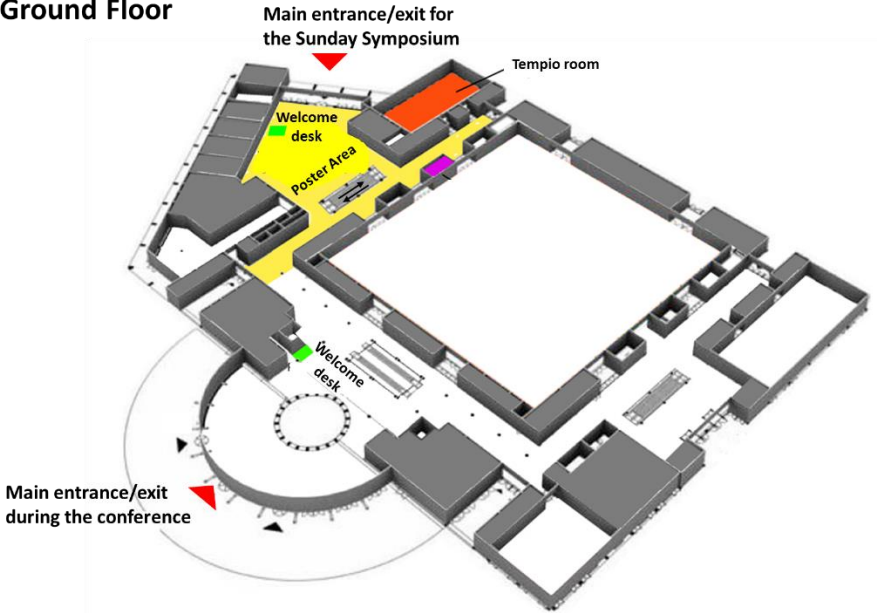
In 1994 the Grand Hotel Rimini was recognized as a national monument and it is under the protection of the Superintendent of Fine Arts. The hotel became world-famous through Federico Fellini's films. The Grand Hotel is featured particularly in his film *Amarcord*, where it is in the background of some of the film's most memorable scenes.

Fellini himself loved to be a guest at the Grand Hotel once he was successful and stayed in his favourite suite on a regular basis.

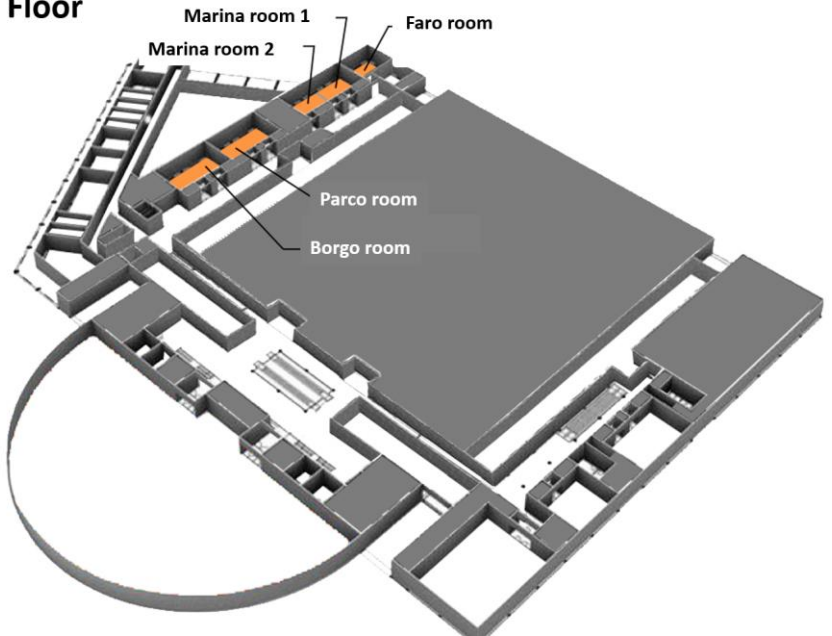
Address: Parco Federico Fellini 1, 47921 Rimini

Map of the Conference Venue

Ground Floor



First Floor



Transportation, Hotels and Practical Information

Transportation

Rimini is strategically positioned halfway between the north and south of Italy. As part of an extensive network of transport links, Rimini is easy and convenient to reach both from Italian destinations and from abroad.

By air

Bologna's International "Guglielmo Marconi" airport is approximately 100 km away from Rimini by motorway and can be reached in an hour, also with shuttle buses or private vehicles. Unfortunately, it will be CLOSED on 11th-22th September due to airport infrastructure improvements, with no landing or take-off allowed during this period. For further information: www.bologna-airport.it.

The International Airport 'Federico Fellini' is located in the heart of the city of Rimini (<http://riminiairport.com/en/>). However, with few international connections.

Additionally, many near-by-Italian cities are reached by air:

- + Ancona (<http://www.marcheairport.com/en>, 92 km south, 1 hour by train)
- + Milan (<https://www.milanomalpensa-airport.com/en/>, 382 km north)
- + Bergamo (<https://www.milanbergamoairport.it/en/>, 356 km north)
- + Venice (<https://www.veneziaairport.it/en/>, 272 km north)
- + Florence (<https://www.aeroporto.firenze.it/en/>, 215 km north west)

From each of these airports land connection to Rimini can be done either by train, shuttle bus, Flixbus, or car.

By car

Thanks to the motorway network, Rimini is well connected with the rest of Italy and Europe on the A14 Milano-Bari motorway, and is served by two exits: Rimini Nord and Rimini Sud. With the A14, from Rimini it is easy to reach the A4 to Venice and the A22 to the Brenner pass. Florence, Rome and Naples are equally accessible with the A1 motorway. For further information: www.autostrade.it.

By train

The rail network also helps to link the Rimini Riviera with the rest of Italy. From Rimini station, just 1.5 km from the Palacongressi, you can conveniently reach also by high speed connections, Bologna in 1 hour, Milan in 2 hours and Rome in less than 4 hours. For further information: www.trenitalia.it.

Local Transportation in Rimini

By bus

Rimini has a modern and efficient urban transport network, run with minibuses, the latest generation of coaches and fast, eco-friendly vehicles. The Palacongressi is linked to the town centre by line 7. Timetable on <https://www.startromagna.it/#>.

The following information covers the entire Rimini urban area (area 900) and the Metromare (<https://www.startromagna.it/servizi/metromare>). Single ride (red) ticket allows you to travel on board of more than one mean of transport in the Rimini urban area. It must be validated as you get on board in the provided validating machine. The time limit of the travel is 75 minutes and it will start from validation time (printed on the back by the validating machine). It costs 1.5€.

Multi-journey ticket, called 'Carnet 10 corse', is a magnetic stripe ticket valid for 10 journeys and it can be used by several people at once, validating the ticket for each person, maximum 7 contemporary validations. The time limit of the travel is 60 minutes. The cost is €12.

Romagna SmartPass covers a wide territory of the 3 provinces of Romagna (Ravenna, Forli-Cesena and Rimini) with a single ticket valid for 3 days (€11) or 7 days (€22), with the freedom to board from any stop and for any destination on the network. Romagna SmartPass must be validated on the first trip using the appropriate validating machines and from then on, depending on the solution chosen, it is valid for the next 3 days (72 hours) or 7 days (168 hours) on the entire Start Romagna network.



By bike

For those seeking an eco friendly alternative, there are numerous cycle lanes through parks and along the river. Bikes are available free of charge for all guests of the Riviera hotels. Rimini is a people-oriented, bike friendly city offering an innovative bike sharing service. Most of the hotels provide free-rental bike.

Practical Information

Climate

The climate is pleasant, mitigated as it is by sea breezes. The air is neither excessively cold in the winter nor too hot in the summer. The climate in September in Rimini is relatively dry and quite nice (high seasonal norm is 26°C, minimum is 20°C). Sunrise is at 06:48am and sets at 7:21pm.

Money/currency

In Italy the currency is the Euro.

You can withdraw Euros from ATMs using your credit card or exchange currency at any money exchange or bank branch.

Banks are usually open from 9:00am. to 2:00pm., Monday to Friday. Banks are closed on Saturdays and Sundays.

ATMs can be found throughout Rimini. The logos of the type of cards accepted are shown beside the machine. Credit cards (Mastercard and Visa) are accepted in shops, hotels, and restaurants.

Emergency phone numbers

Medical Emergency and Ambulance: 118

The Pan-European Emergency Number (Carabinieri): 112

A.C.I. (Italian Automobile Club) Road Assistance: 116

Fire Department: 115

Electric standards

In Italy, the power plugs and sockets are of type F and L. The standard voltage is 230 V and the standard frequency is 50 Hz.



Left - Type F: This socket also works with plug C and E;

Right - Type L: This socket also works with plug C

Language

Official language in Italy is Italian. English is not very widely spoken overall in Italy, although there is a reasonable prevalence of English speakers in larger cities like Rome, Florence and Milan, also in Rimini as it is a holiday destination.

Time Zones

Italy has only 1 time zone. Central European Summer Time (CEST) is observed when Daylight Saving Time (DST) is in force (UTC +2).

Mobile Phones

Mobile Phones use GSM technology with frequencies between 900-1800MHz. For Europeans, when you travel outside your home country to another EU country, you do not have to pay any additional charges to use your mobile phone. The same rule also applies to any calls or text messages received while you're abroad - you won't be charged extra to receive calls or texts while roaming, even if the person calling you is using a different service provider.

The international telephone country code for Italy is +39.

Safety and Security

Rimini is a safe place but being careful about the behaviour to keep is always important.

Access to the beach is forbidden between 1:00am and 5:00am.

COVID-19 emergency – Main general rules in Emilia - Romagna

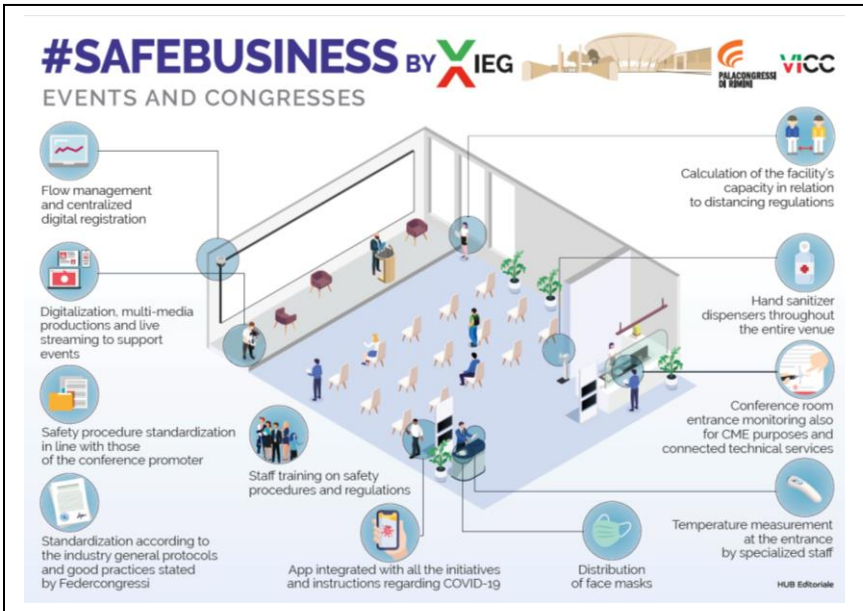
- It is mandatory to maintain an interpersonal safety distance of at least one meter (at least two meters during sport activities).
- Frequent and careful hand sanitization is strongly recommended.
- It is mandatory to use face masks in indoor places open to the public, including means of transport and in all occasions when it is not possible to continuously guarantee the maintenance of the safety distance.
- The mask is also mandatory outdoors, in the spaces pertaining to places and premises open to the public as well as in public spaces (squares, open spaces, streets, promenades), from 6:00pm to 6:00am
- Subjects with respiratory infection characterized by fever (higher than 37.5 °C) must stay at home and contact health service.
- Installation of the Immuni app on smartphones is highly recommended. Immuni is an app that alerts the users who have had a risky exposure—even if they are asymptomatic. Info and download: <https://www.immuni.italia.it/>

COVID-19 emergency – Safety rules and procedures at Palacongressi

Computing in Cardiology 2020 at the Palacongressi di Rimini is organized in complete safety, and in full compliance with the rules and health protocols, protecting the health of both organisers and visitors. In addition to the here reported rules, we strongly encourage all CinC participants to always wear face masks, even when/where it is not mandatory.

- In each conference room, safety procedures are implemented (see figure #SAFE BUSINESS). In particular: temperature measurement at the entrance by specialized staff, and prohibition of access with temperature higher than 37.5 °C;
- distribution of face masks and obligation to wear them.
- hand sanitizer dispensers throughout the entire venue.
- entrance and exit organized in order to avoid gatherings of people and facilitate distancing between attendees.
- calculation of the facility's capacity in relation to distancing regulations.
- staff training on safety procedures and regulations.
- adequate information on prevention measures provided, both with the aid of special signs and posters and / or audio-video systems, and by the staff in charge of monitoring and promoting compliance with the prevention measures.
- obligation to keep the names of registered visitors and their contact information in the digital archive for a period of 14 days from end of the event.
- assistance and reception desks equipped with physical barriers; the speakers' podium for presentations rearranged to allow for a safe distance that allows speakers / chairmen to speak without the use of a mask;
- regular cleaning and disinfection of the rooms, with particular attention to the surfaces most frequently touched, to toilets and common areas (e.g. refreshment areas, keypads of vending machines and snacks);
- all the devices and equipment available to speakers, chairmen and attendees (e.g. microphones, keyboards, mouse, laser pointers) disinfected before initial use, subsequently they must be protected from possible contamination by a plastic film to be replaced possibly at each user;
- the company in charge of the catering service will ensure full and constant adherence to hygiene practices and cleaning and disinfection procedures, as required by the legislation;

- in the event that a person inside the building develops fever and symptoms of respiratory infection, he/she will be isolated in a room identified in collaboration with the competent health authorities and managed according to the rules given by the Local Health Authorities and the Ministry of Health.



Coffee breaks and lunches will be also provided in conformance of COVID-19 regulations.

Outside the conference center, attendees can find:

- reserved parking spaces for bikes and e-scooters.
- shuttle connection on request with on-board sanitizers, fixed number of passengers and obligation to wear face masks.

During the conference, even outdoor, all attendees are invited to wear face masks, keep safety distances and sanitize hands often.

Internet Access

Wi-fi connection is available at the conference site. Through a captive portal each attendee can register using his/her email address and he/she will receive a password to connect.

Should you need assistance in getting connected, please ask the nearest staff-volunteer for help.

Meals

The delegates will not have to worry about meals. To ensure that the meeting is running in a timely fashion, the attendees are kindly asked to proceed quickly to the buffet immediately after the session finishes.

- the **Sunday symposium** concludes with a reception at 6:30pm at the **Ressi Room** in the Galli theatre, downtown Rimini (Piazza Cavour 22, tel. +39 0541 793811). Please, show your CinC2020 badge at the entrance.
- on **Monday**, a lunch box will be provided for all participants at the ground floor of the Palacongressi, before leaving for the social activities.
- after the social activities on **Monday** afternoon at 7:00pm, the conference gala aperitif and dinner will be held at **Grand Hotel** at the seaside (Parco Federico Fellini 1, tel. +39 0541 56000);
- on **Tuesday** and **Wednesday** the lunch will be served at the ground floor of the conference site after the morning sessions.

Accompanying Persons (Guests)

The accompanying person (guest) registration allows the guest to attend:

- the reception on Sunday evening (after the symposium);
- the Monday box lunch and social event including the gala dinner at the Grand Hotel;
- the closing plenary session.

Conference Information

General Information

The conference registration and information desk will be located at the main entrance of the Palacongressi (see the map of the conference venue). The registration desk will be labelled with the CinC sign and will be open during the following hours:

- Sun, 13rd September 1:00pm – 06:00pm
- Mon-Wed, 14th – 16th September 8:00am – 12:00pm

Sunday Symposium

This year, the Sunday Symposium will be held at the same location as the conference, which is at Palacongressi in Rimini.

The topic of this year will be “TECHNOLOGICAL INNOVATIONS IN CARDIAC THERAPIES: Visions from clinicians, regulatory agencies and companies”, where five exciting talks by renowned experts in the field will present some innovative therapies in cardiac clinic. The day will end with a round table in which we will discuss the future of cardiac therapies with the participation of various industrial company representatives.

Following the Symposium all attendees are welcome for a reception at the Sala Ressi at the Galli Theatre downtown. Please show your badge at the entrance of the Galli theatre.

Programme outline

- 2:00 – 2:30pm: **What’s the future for cardiac ablation therapy?**
Prof. Michel Haissaguerre – IHU Liryc, Bordeaux, France
- 2:30 – 3:00pm: **How to choose who will really benefit from CRT?**
Dr. Mauro Biffi – Sant’Orsola University Hospital, Bologna, Italy
- 3:00 – 3:30pm: **Integration of structural and functional information into cardiac invasive procedures: where are we and what’s the added value?**
Dr. Maurizio Del Greco – APSS, Rovereto, Italy
- 3:30 – 4:00pm: Coffee break
- 4:00 – 4:30pm: **Cardiac models now really matters: the CiPA initiative and beyond**
Eng. Zhihua Li– FDA, USA

4:30–5:00pm: **Pre-operative planning and augmented reality in cardiac invasive procedures**
Prof. Alberto Redaelli, Polytechnic University of Milan, Italy –
Co-founder of Artiness

5:00 – 6:00pm: **The future of cardiac therapies: the company’s visions**

Moderator of the round table:

Prof. Angelo Auricchio – Fondazione Cardiocentro Ticino, Lugano (CH)

Confirmed Participants:

Eng. Giorgio Corbucci - Boston Scientific

Eng. Federico Veronesi -General Electric

Eng. Luca Emili -InsilicoTrials

Eng. Nathalie Virag - Medtronic

Eng. Matthijs Cluitmans - Philips

6:30pm onwards: Reception at the Sala Ressi at the Galli theatre.

Conference site

The 47th annual international conference of Computing in Cardiology will take place from Sunday, September 13th through Wednesday, September 16th, 2020. The conference venue is located at the Rimini Palacongressi, one of the largest and most innovative congress facilities in Italy. The Palacongressi is set in an extensive urban park, in a perfect eco-friendly context within walking distance from both the city centre and the seaside.

The Palacongressi can be reached from the town centre and from the railway station by the bus lines 7.

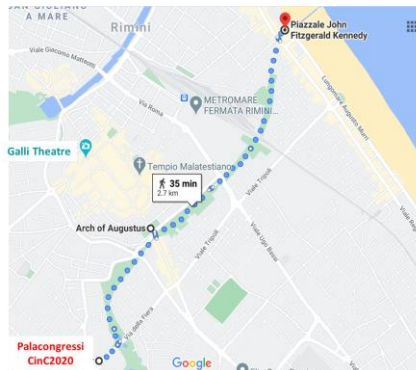
A parking area is freely available for attendees reaching the Palacongressi by car: Parking CONAD (level 0)

Via della Fiera /Via Don Oreste Benzi

GPS coordinates: N 44° 02' 52" E 12° 34' 02"

All presentations, poster sessions and lunches are situated at either Palacongressi ground or first floor (see “Map of the Conference venue”).

The Palacongressi is at walking distance from the seaside (2.7 km across a park)



The room Marina 2 at the first floor of the conference site will be available for attendees (maximum capacity 35 persons) when they are not busy with sessions in case they want to work.

Monday Social Program

All social program participants are required to wear their CinC badges and T-shirts.

Each year at CinC, Monday afternoon is set aside for a social event. This is an important part of the conference program as it allows attendees to meet each other in a more informal setting away from the scientific sessions.

Despite this uncertain and difficult time, even this year we are organizing a fantastic and unforgettable social event in complete safety!

This year, we have lined up different activities to involve both action seekers (activist) as well as those who want to know more about Rimini's history and culture (passivist).

Participants can choose between activist or passivist activities during registration.

The social program will start at 01:00pm on Monday, after the morning sessions, with lunch at the Conference Venue. As the social program starts immediately after the sessions, the participants may consider comfortable informal dress for the whole day. Later, the attendees will be split in two groups depending on the chosen activity. All activities will start at 2:00pm and will finish at 6:00pm.

Activist program

Unfortunately, due to the small numbers of attendees who selected the Ultimate frisbee on the beach, this activity was cancelled. However, the professional frisbee included in the conference bag will allow the attendees to play frisbee on the beaches of Rimini, during free time!

Go Kart experience

If you love speed, motorsports, and races on four wheels, this experience guarantees you unique thrills!

In the same weekend of the Misano MotoGP race, and very close to the International Misano Circuit, we offer excitement and enjoyment at the Riviera Verde kart park, by organizing a go kart race between CinC friends!

It is not necessary to be an expert driver to be able to drive them, but it is important to follow technical precautions to avoid spinning and getting off-track. Before getting on the track, however, here are some tips to follow to have fun in total safety:

- karts only have brakes on the rear wheels and have no electronic help. Their power unloads directly on the asphalt, so when you brake, you have to be decisive.
- arms firm and steady: keep them attached to the steering wheel and never detach them.
- karts have two pedals: accelerator and brake. They should never be used together!
- take the curves gently and carefully: never too early, never too late. Enter at the right speed and accelerate only when you are in the center of them. The brake? Don't even look at it, you could risk skidding at the very thought.
- before each corner, remember to brake and then downshift. This is the right order to follow.
- and have fun!



Passivist program

Explore and discover the city and its history with a special guided tour. The city walls, the Arco d'Augusto (the Arch of Augustus), the Ponte di Tiberio (Tiberius Bridge), and the Roman amphitheater are only some of the most important artistic attractions in Rimini. History has left us a veritable plethora of treasures, like the **Palazzo dell'Arengo**, in the beautiful **Piazza Cavour**, the **Medieval Church of Sant'Agostino** (1274), an artistically important building that houses the best works of the Riminese painting school of the 14th century, or the **Tempio Malatestiano**, work of Leon Battista Alberti, which preserves the Crucifix by Giotto and a fresco by Piero della Francesca.

Moreover, the Roman Surgeon's House is an opportunity to discover what cardiologists were using... before computers! (more than 2000 years ago). This important archaeological complex, situated in the heart of the town center, was discovered in 1989. The sudden destruction of the House by the fire managed to preserve quite well fittings, furnishings and mosaics. The 150 bronze surgical instruments found, make up the most **important medical collection in the world** for type and number of surgical instruments.



Left panel: The Arch of Augustus (photo M.Pracucci); right panel: Castel Sismondo (Photo Archives – Assessorato al Turismo Comune di Rimini).

To end of the day, we will have the conference gala dinner at the Grand Hotel, which is an historical building located at the heart of Rimini.

For Authors and Speakers

This year Computing in Cardiology 2020 edition will be a HYBRID format conference which means we will have both an IN PERSON edition and a REMOTE online version of the conference going at the same time.

The platform we are developing for the CinC remote attendance will be available for all registrants for one year allowing access to all oral presentations and posters.

Oral presentations

IN PERSON oral presentations

The time allocated for each oral presentation is 10 minutes, followed by 5 minutes for discussion. Speakers are expected to adhere strictly to this schedule, which will be enforced by session chairpersons to finish sessions on time and to permit participants to move successfully from one parallel session to another.

All rooms will be equipped with a computer projection system (projector and PC with Windows 10, Office 2019 Pro Adobe Acrobat VLC Player).

Speakers are required to allow adequate time before their session to load and check their presentation. Also, speakers are required to meet with their session chairpersons in the scheduled rooms at least 10 minutes before the beginning of the session. It is a good idea to ensure that the chairperson knows how to pronounce your name correctly.

In each room a local person will be available to provide technical assistance.

REMOTE oral presentations

All online presentations will be video pre-recorded and replayed at the time of their slot in the program. Online speakers are required to be live to answer the 5 minutes Q&A session at the end of the recorded video.

All of the most common video formats are accepted. We suggest you the following software solutions to record your video

1. **Stream Yard** a very high-quality video conferencing platform that allows the speaker to record voice and screen and download their video file.
You can log in to the platform by using the gmail account **2020cinc@gmail.com**, password **CINC2020**. Please do not make any change to the account settings, be aware it is a shared account for all the CinC presenters;
2. **OBS studio**

Here you can find a tutorial to OBS studio suite
https://www.youtube.com/watch?v=DTk99mHDX_I

Speakers have to connect 15 minutes prior to the start of the session. A staff will provide technical assistance for the connection.

We will soon give you updates on the platform that we will use on the day of your speech. Meanwhile, to make sure that everything will work that day, we ask you to check:

- Your connection which must have an upload speed greater than 3 MB/s
- The operation of your microphone
- The functioning of your webcam

Please send your video presentation by the 6th of September

Q&A during oral presentations

For both IN PERSON and REMOTE presenters, Q&A time slot will be live. Attendees will have access to a dedicated online chat that can be used to comment and ask questions. Questions, both from the online chat and the in room audience, will be asked exclusively at the end of each speech, in order to avoid interruptions and guarantee online attendees a better experience.

Poster presentations

IN PERSON poster session

All the posters (in person and remote) will be uploaded on the online Platform where Cinc 2020 will be held, so please provide us the PDF file (A0 format) of your work within September 6.

Presenters coming to Rimini are required to print their own poster. A local poster print service is available: TECNOELIO, located immediately outside the Palacongressi. Posters can be printed: i) by sending the pdf by email (ntelio@tin.it or ntelio@libero.it) and picking it up on site (8:30am-1:00pm and 3:00pm-6:00pm working days) ii) visiting the shop directly to take advantage of same-day printing. Cost starts from 15€ for A0 format on standard paper.

Poster sessions will take place in the foyer area close to the Tempio room on the ground floor of the Palacongressi. Poster session P7_1-P7_8 is on Tuesday, 14th September from 3:45pm onwards, and Poster session PA_1-PA_7 is on Wednesday, 16th September, from 12:00pm-2:00pm.

Authors are required to be present at their posters during their assigned session to discuss their work with other conference attendees.

- Check in: authors presenting posters must check in at the poster desk in the exhibition area from early morning before the poster sessions in which their presentations are scheduled.
- Posters may be hung after 8:00am and prior to the start of the poster sessions on the day of presentation (either Tuesday or Wednesday).
- Posters stands and mounting material will be provided. The maximum size of poster that can be accommodated at CinC 2020 is A0 portrait (841 mm wide by 1189 mm high). Please note that any size larger than this, including A0 landscape, cannot be accommodated on the poster boards that will be available. Please use font size as big as possible to help distancing during the session!
- Posters are grouped by subject area, and each poster should be placed on the stand assigned to it (marked with a card corresponding to the ID number of the abstract in the booklet).
- Posters must be removed at the end of the day of presentation.

REMOTE poster session

All the posters (in person and remote) will be uploaded on the online Platform where Cinc 2020 will be held, so please provide us the PDF file (A0 format) of your work within September 6.

You are also required to record a short video presentation of your poster that will be uploaded with the PDF to the online platform. The maximum length of the video should be 5 minutes. Please check out our recommendations on the video recording software suggested for remote oral presentations.

In the on-line platform each poster will have a dedicated space in which the pdf and the video are available. A dedicated chat will also be available for each poster, to connect with the authors and ask questions.

Rosanna Degani Young Investigator Award

Computing in Cardiology hosts an annual competition to encourage young investigators and to provide a living memorial to Rosanna Degani.

Finalists in the competition will present their work in session RDYIA, at 8:45am on Monday, 14th September at the Tempio room (see “Map of the Conference venue”). The name of the winner will be announced during the closing plenary session on Wednesday.

The Rosanna Degani YIA finalists are required to give their talk live even if they are presenting remotely. They are each allotted 15 minutes for their talks, followed by 5 minutes for discussion.

Clinical Needs Translational (CTA) Award

Computing in Cardiology and the Working Group on e-Cardiology of the European Society of Cardiology (ESC) support this award designed to encourage participation of multidisciplinary research teams, with emphasis on the potential clinical applicability and impact of the research.

A representative of the winning team will present their work at the beginning of the Closing Plenary Session on Wednesday, 16th September in the Tempio room (see “Map of the Conference venue”).

PhysioNet/Computing in Cardiology Challenge 2020

Since 2000, Computing in Cardiology has annually issued a Physionet Challenge in cooperation with Physionet, part of the NIH sponsored Research Resource for Complex Physiologic Signals. The title of this year’s challenge is “Classification of 12-lead ECGs”, The early and correct diagnosis of cardiac abnormalities can increase the chances of successful treatments. However, manual interpretation of the electrocardiogram is time-consuming and requires skilled personnel with a high degree of training. Automatic detection and classification of cardiac abnormalities can assist physicians in the diagnosis of the growing number of ECGs recorded. The PhysioNet/Computing in Cardiology Challenge 2020 provides an opportunity to address this problem by providing data from a wide set of sources.

Please see <https://physionetchallenges.github.io/2020/> for all information about this year’s Challenge.

The challenge sessions are on Tuesday afternoon:

- Oral sessions S51 (at 00:30pm) & S61 (at 02:15pm)
- Poster session P7_8 (at 03:45pm)

Maastricht Simulation Award (MSA)

The goal of this award is to recognize the best submission to the conference each year on the topic of cardiovascular simulations. A representative of the winning submission will present the work at the Closing Plenary Session on Wednesday, 16th September in the Tempio room (see “Map of the Conference venue”).

Deadlines

Please be careful to respect the final date to deliver the materials. If you have any specific problem in dealing with it, please contact info@cinc2020.org

Onsite Speech presentations: speakers are asked to bring slides on a USB device and upload it on the PC connected to the projectors 15 minutes prior to the session.

Online Speech: video have to be received by the 6th of September (11:59pm, CEST). All videos must be sent to event@searchon.it or uploaded using this [Google form](#).

Poster presentations: all the posters and video have to be received by the 6th of September (11:59pm, CEST). All documents must be sent to info@cinc2020.org. Authors attending onsite event in Rimini have also to print the poster and bring it to Rimini on the 13th of September.

All documents must be sent to info@cinc2020.org or uploaded using this [Google form](#).

Manuscripts

Computing in Cardiology will publish the conference proceedings containing the complete manuscripts of all presentations made at the conference. The complete proceedings will be freely available via the CinC Web site (<http://www.cinc.org>). The proceedings will also be published by IEEE in the IEEEExplore digital library.

The deadline to upload your 4-pages preprint of your paper before the conference is September 6th 2020. Based on comments you receive from your presentation, there will be time after the conference to make any final revisions to the document and upload it again to the CinC abstract and paper collection site. The deadline for this final submission is October 1st 2020.

For any questions about manuscripts, consult the CinC web site <http://www.cinc.org> or contact via email editor@cinc.org.

Scientific Program Details

P: in person; R: remotely connected

RDYI Rosanna Degani Young Investigator Finals

Chairs: Cristiana Corsi (P) and Pyotr Platonov (R)
Room: Tempio

279 - Quantifying the Spatiotemporal Influence of Acute Myocardial Ischemia on Volumetric Conduction Speed (R)

Wilson Good*, Jake Bergquist, Brian Zenger, Lindsay Rupp, Karli Gillette, Gernot Plank, Rob MacLeod

113 - Post-processing of Electrocardiographic Imaging Signals to Identify Atrial Fibrillation Drivers (R)

Rubén Molero Alabau*, Andreu M. Climent, Maria de la Salud Guillem Sánchez

111 - openCARP: An Open Sustainable Framework for in-silico Cardiac Electrophysiology Research (P)

Jorge Sánchez*, Mark Nothstein, Aurel Neic, Yung-Lin Huang, Anton J. Prassl, Jochen Klar, Robert Ulrich, Felix Bach, Philipp Zschumme, Michael Selzer, Gernot Plank, Edward Vigmond, Gunnar Seemann, Axel Loewe

409 - Unravelling the Mechanistic Links between Pro-Arrhythmia and Mechanical Function (R)

Hannah Smith*, Francesca Margara, Blanca Rodriguez

S21 Membrane and Cellular Modelling

Chairs: Mary M Maleckar (R) and Stefano Severi (P)
Room: Tempio

296 - Investigation of the Extracellular Calcium Effects on Action Potential using the Most Recent Human Ventricular Cell Models

Chiara Bartolucci*, Michelangelo Paci, Stefano Severi (P)

381 - Assessment of the Effects of Online Linear Leak Current Compensation at Different Pacing Frequencies in a Dynamic Action Potential Clamp System

Alan Fabbri*, Adrianus Prins, Teun P. de Boer (P)

75 - Global Sensitivity Analysis for Uncertain Parameters Applied to a Cardiac Mitochondrial Model (R)

Bachar Tarraf*, Michael Leguèbe, Yves Coudière, Emmanuel Suraniti, Camille Colin, Stephane Arbault, Philippe Diolez

319 - A Computational Model for the Human Foetal Ventricular Myocyte to investigate Foetal Arrhythmia (R)

Adelisa Avezzi*, Anita Alvarez-Laviada, Francisca Schultz, Tharni Vasavan, Julia Gorelik, Catherine Williamson, Steven Niederer

355 - Human Atrial Cell Models to Analyse the Effect of Extracellular Calcium on Action Potential Duration (P)

Fazeelat Mazhar*, Chiara Bartolucci, Stefano Severi

S22 Advances in ECGI

Chairs: Jana Svehlikova (R) and Peter Van Dam (P)
Room: Marina 1

273 - Improving Localizing Cardiac Geometry Using ECGI (R)

Jake Bergquist*, Jaume Coll-Font, Brian Zenger, Lindsay Rupp, Wilson Good, Dana Brooks, Rob MacLeod (R)

97 - Variability of Electrocardiographic Imaging Within and Between Leadsets (R)

Job Stoks*, Bianca van Rees, Sanne Groeneveld, Diantha Schipaanboord, Lennart Blom, Rutger Hassink, Matthijs Cluitmans, Ralf Peeters, Paul Volders

387 - Robustness of ECG Imaging of Focal Ventricular Activation for Lead-Reduced Systems (R)

Danila Potyagaylo*

329 - Use of Simulated Data for the Estimation of Prior Models in Kalman Filter-Based Electrocardiographic Imaging (R)

Yesim Serinagaoglu Dogrusoz* and Taha Erenler

466 - Shape Analysis of Segmentation Variability (R)

Jess Tate*, Nejib Zemzemi, Wilson Good, Peter van Dam, Dana Brooks, Rob MacLeod

200 - CT-Scan Free Neural Network-Based Reconstruction of Heart Surface Potentials from ECG Recordings (R)

Kamil Bujnarowski*, Pietro Bonizzi, Ralf Peeters, Matthijs Cluitmans, Joel Karel

S23 Cardiovascular Mechanics

Chairs: Axel Loewe (P) and Steven Niederer (R)
Room: Borgo

- 246 - Consequences of Using an Orthotropic Stress Tensor for Left Ventricular Systole (P)**
Tobias Gerach*, Steffen Schuler, Ekaterina Kovacheva, Olaf Doessel, Axel Loewe
- 212 - Investigating Strain as a Biomarker for Atrial Fibrosis Quantified by Patient Cine MRI Data (R)**
Ahmed Qureshi*, Henry Chubb, Adelaide de Vecchi, Oleg Aslanidi
- 348 - Multi-Scale Modelling of Doxorubicin Cardiotoxicity in Heart Contraction (R)**
Alex Lewalle* and Steven Niederer
- 80 - Heart Sound Analysis in Individuals Supported with Left Ventricular Assist Devices: A First Look (R)**
Xinlin Chen*, Leslie Collins, Priyesh Patel, Ravi Karra, Boyla Mainsah
- 30 - His Bundle Pacing but not Left Bundle Pacing Corrects Septal Flash in Left Bundle Branch Block Patients (R)**
Marina Strocchi*, Aurel Neic, Julien Bouyssier, Karli Gillette, Mark Elliot, Justin Gould, Jonathan Behar, Baldeep Sidhu, Martin Bishop, Edward Vigmond, Gernot Plank, Christopher Rinaldi, Steven Niederer
- 341 - Computational electrophysiology to support the epicardial veins mapping in cardiac resynchronization therapy (R)**
Simone Stella*, Christian Vergara, Massimiliano Maines, Domenico Catanzariti, Pasquale Claudio Africa, Cristina Demattè, Maurizio Centonze, Fabio Nobile, Maurizio Del Greco, Alfio Quarteroni

S24 Heart Rate variability: Methods

Chairs: Martin Schmidt (P) and Ivo Provaznik (R)
Room: Parco

- 233 - **Blunted Autonomic Reactivity to Mental Stress in Depression Quantified by Nonlinear Cardiorespiratory Coupling Indices (R)**
Spyridon Kontaxis*, Pablo Laguna, Esther García Pages, Mar Posadas-de Miguel, Sara Siddi, Maria Luisa Bernal, Josep Maria Haro, Jordi Aguiló, Concepción de la Camara, Raquel Bailón, Eduardo Gil

- 270 - **Application of Permutation Entropy in the stratification of patients with Chagas disease (R)**
Diego Rodrigo Cornejo Luque*, Maria Fernanda Rodriguez Pilco, Luz Alexandra Diaz Pareja, Esteban Segundo Alvarez, Miguel Vizcardo

- 312 - **Novel Classification of Ischemic Heart Disease Using Artificial Neural Network (R)**
Giulia Silveri*, Marco Merlo, Luca Restivo, Gianfranco Sinagra, Agostino Accardo

- 122 - **U-shaped patterns in HRV from a polysomnographic point of view: a quantitative analysis (R)**
Mateusz Soliński*, Jan Żebrowski, Paweł Kuklik

- 65 - **Frequency Domain Heart Period and QT Interval Variability Markers Are Linked to Arrhythmic Risk in Long QT Syndrome Type 2 (P)**
Vlasta Bari*, Giulia Girardengo, Beatrice De Maria, Beatrice Cairo, Lia Crotti, Peter J Schwartz, Alberto Porta

- 365 - **Validation of Sympathetic Activity Index from Heart Rate Variability series: A Preliminary Muscle Sympathetic Nerve Activity Study (P)**
Gaetano Valenza, Francesco Faita, Luca Citi, Philip J Saul, Rosa Maria Bruno, Riccardo Barbieri*

Tuesday, September 15, 2020

8:30

S31 Special Session 1: Role of Statistical Genetics in Assessing Cardiovascular Risk. Challenges and Potential

Chairs: Julia Ramirez (R) and Michele Orini (R)

Room: Tempio

477 - Genetic Architecture of Quantitative Cardiovascular Traits: Blood Pressure, ECG and Imaging Phenotypes (R)

Nay Aung*, William Young, Stefan Van Duijvenboden, Julia Ramírez, Steffen Petersen, Patricia Munroe

478 - Interaction between ECG and Genetic Markers of All-Cause Mortality Risk (R)

Julia Ramírez*, Stefan van Duijvenboden, William Young, Andrew Tinker, Pier Lambiase, Patricia Munroe, Michele Orini

481 - Will Genetic Data Significantly Change Cardiovascular Risk Prediction in Daily Practice? (R)

William Young*, Julia Ramírez, Stefan van Duijvenboden³ Andrew Tinker, Pier Lambiase, Patricia Munroe, Michele Orini

483 - Evaluating the Impact of Physiological Variability in Genome-Wide Association Studies of Resting Heart Rate (R)

Stefan van Duijvenboden*, Julia Ramírez, William J. Young, Andrew Tinker, Patricia B. Munroe, Pier D. Lambiase, Michele Orini

Final Discussion

Tuesday, September 15, 2020

8:30

S32 Experimental and Clinical ECGI

Chairs: Laura Bear (R) and Matthijs Cluitmans (R)
Room: Marina 1

190 - Experimental Validation of a Novel Extracellular-Based Source Representation of Acute Myocardial Ischemia (R)

Brian Zenger*, Jake Bergquist, Wilson Good, Lindsay Rupp, Rob MacLeod

156 - ECGI Metrics in Atrial Fibrillation Dependency on Epicardium Segmentation (R)

Ana González-Ascaso*, Rubén Molero Alabau, Andreu M. Climent, Maria de la Salud Guillem Sánchez

458 - Novel Experimental Preparation to Assess Electrocardiographic Imaging Reconstruction Techniques (R)

Jake Bergquist*, Brian Zenger, Wilson Good, Lindsay Rupp, Laura Bear, Rob MacLeod

304 - The Influence of the Most Powerful Signals on the Pacing Site Localization by Single Dipole (R)

Jana Svehlikova*, Beata Ondrusova, Jan Zelinka, Milan Tysler

237 - Solving the ECGI problem with known locations of scar regions (R)

Mohamadou Malal Diallo*, Mark Potse, Remi Dubois, Yves Coudière

188 - High-Capacity Cardiac Signal Acquisition System for Flexible, Simultaneous, Multidomain Acquisition (R)

Brian Zenger*, Jake Bergquist, Wilson Good, Bruce Steadman, Rob MacLeod

S33 ECG processing and classification

Chairs: Alfredo Hernandez (P) and José Joaquín Rieta (R)
Room: Borgo

- 119 - **Can Laplacian Eigenmaps be used for differentiation between healthy subjects and patients with corrected Tetralogy of Fallot?** (R)
Ben Jacobs*, Amalia Villa Gómez, Jonathan Moeyersons, Rik Willems, Sabine Van Huffel, Carolina Varon
- 194 - **Characterization of Impaired Ventricular Repolarization by Quantification of QT Delayed Response to Heart Rate Changes in Stress Test** (R)
Cristina Pérez*, Esther Pueyo, Juan Pablo Martínez, Jari Viik, Pablo Laguna
- 243 - **Detection of left arm and left leg lead-wire interchange based on serial ECGs** (R)
Richard Gregg* and Saeed Babaeizadeh
- 298 - **Novel Classifiers to Differentiate Focal and Macroreentrant Atrial Flutter using 12-Lead Surface Electrocardiogram** (R)
Muhammad Usman Gul*, Kushsairy Kadir, Muhammad Haziq Kamarul Azman
- 333 - **Detection and Classification of Cardiac Arrhythmias by Machine Learning: A systematic review** (R)
Rafael Fernandes*, Jimena Paredes, João Salinet
- 403 - **Interpretability Analysis of Machine Learning Algorithms in the Detection of ST-Elevation Myocardial Infarction** (P)
Matteo Bodini*, Massimo W Rivolta, Roberto Sassi

S34 Heart Rate variability: Applications

Chairs: Roberto Sassi (P) and Juan Pablo Martínez (R)
Room: Parco

- 78 - **Fundamental Considerations of HRV Analysis in the Development of Real-Time Biofeedback Systems (R)**
Mariam Bahameish* and Tony Stockman
- 350 - **NeuroSky Mindwave Mobile Headset 2 as an Intervention for Reduction of Stress and Anxiety Measured with Pulse Rate Variability (R)**
Habshi Alkaf*, Ahsan Khandoker, HF Jelinek
- 423 - **Assessment of Heart Rate Variability derived from Blood Pressure Pulse Recordings in Intensive Care Unit Patients (P)**
Maximiliano Mollura*, Edoardo Maria Polo, Li-wei Lehman, Riccardo Barbieri (P)
- 268 - **QT Interval Variability and QT-HP Coupling Strength in Amyotrophic Lateral Sclerosis Patients (R)**
Beatrice De Maria*, Gabriele Mora, Kalliopi Marinou, Riccardo Sideri, Vlasta Bari, Beatrice Cairo, Emanuele Vaini, Laura Adelaide Dalla Vecchia, Alberto Porta
- 308 - **Autonomic Nervous System Response During Scuba Diving Activity (R)**
Alberto Hernando*, María Dolores Pelaez Coca, Carlos Sánchez, Bolea Juan, David Izquierdo, María Teresa Lozano Albalate, Eduardo Gil
- 280 - **Online Tool for Dynamical Heart Rate Variability Analysis (R)**
Matti Molkkari*, Janne Solanpää, Esa Räsänen

S41 Modelling Drug Effects and Mutations

Chairs: Blanca Rodriguez (R) and Olaf Dössel (P)

Room: Tempio

- 451 - **Computer Modelling the Effects of Chloroquine on KCNJ2 D172N and E299V Mutations-linked Short QT Syndrome (R)**
Cunjing Luo*, Ying He, Kuanquan Wang, Henggui Zhang
- 430 - **Characterization of Temporal Repolarization Variability in the Long QT1 Syndrome under β -Adrenergic Stimulation by Dimension Reduction and Adaptive Filtering (R)**
David Adolfo Sampedro-Puente*, Fabien Raphel, Jesus Fernandez-Bes, Pablo Laguna, Damiano Lombardi, Esther Pueyo
- 463 - **The Role of M cells and the Short QT Syndrome in Cardiac Arrhythmias: A Simulation Study (R)**
Cunjing Luo*, Ying He, Kuanquan Wang, Henggui Zhang
- 411 - **Multiscale Computational Analysis of the Effect on Heart Rate of a HCN4 Gene Double Mutation: from the Single Channel to the Clinical Phenotype (P)**
Eugenio Ricci*, Alan Fabbri, Teun de Boer, Stefano Severi
- 361 - **In-silico Trials for Drug Safety and Efficacy Assessment Using a Novel Human Purkinje Fibre Model (R)**
Cristian Trovato*, Camille Dusserre, Elisa Passini, Blanca Rodriguez
- 386 - **Human Ventricular Modelling and Simulation of Drug Action on Electrophysiology and Contraction (R)**
Francesca Margara*, Zhinuo Wang, Alfonso Bueno-Orovio, Blanca Rodriguez

S42 Cardiovascular Imaging

Chairs: Sara Moccia (P) and Cristiana Corsi (P)
Room: Marina 1

- 204 - **A Convolutional Neural Network-based Deformable Image Registration Method for Cardiac Motion Estimation from Cine Cardiac MRI Images (R)**
Roshan Reddy Upendra*, Brian Jamison Wentz, Suzanne M. Shontz, Cristian Linte
- 247 - **Automated Left and Right Chamber Segmentation in Cardiac MRI Using Dense Fully Convolutional Neural Network (P)**
Marco Penso, Sara Moccia*, Stefano Scafuri, Giuseppe Muscogiuri, Gianluca Pontone, Mauro Pepi, Enrico Caiani
- 346 - **Right Ventricular Shape Distortion in Tricuspid Regurgitation (R)**
Ashley E. Morgan*, Atefeh Kashani, Brian Zenger, Lindsay Rupp, Maura D. Perez, Markus D. Foote, Alan K. Morris, Mark B. Ratcliffe, Vikas Sharma, Rob MacLeod, Shireen Elhabian
- 459 - **An Image-based Approach for 3D Left Atrium Functional Measurements (R)**
Alan Morris*, Eugene Kholmovski, Nassir Marrouche, Joshua Cates, Shireen Elhabian
- 306 - **Performance Comparison of Deep Learning Approaches for Left Atrium Segmentation from LGE MRI Data (P)**
Davide Borra*, Daniela Portas, Alice Andalò, Claudio Fabbri, Cristiana Corsi
- 418 - **Probabilistic Pseudohealthy Synthesis of Aortic Root Shapes using Shape Primitives in Latent Space (R)**
Jannis Hagenah* and Floris Ernst

Tuesday, September 15, 2020

10:15

S43 ECG and Signal Processing I

Chairs: María Pérez-Zabalza (R) and Roberto Sassi (P)
Room: Borgo

- 18 - **Improving prediction of the PVC origin non-invasively using the standard 12-lead ECG (P)**
Peter van Dam*, Ivo Strebel, Roger Abächerli
- 62 - **An Improved Iterative Pace-Mapping Algorithm to Detect the Origin of Premature Ventricular Contractions (R)**
Andony Arrieula*, Hubert Cochet, Pierre Jaïs, Michel Haïssaguerre, Mark Potse
- 209 - **Sudden Cardiac Death Prediction in Chronic Heart Failure Patients by Periodic Repolarization Dynamics (R)**
Saúl Palacios*, Juan Pablo Martínez, Esther Pueyo
- 244 - **New Insights into Non-Invasive His Bundle Potential Detection on High Resolution Body Surface Recordings (R)**
Nolwenn Tan*, Romain Tixier, Josselin Duchateau, Laura Bear, Remi Dubois
- 251 - **An ECG-based System for Respiratory Rate Estimation Tested on a Wearable Armband During Daily Life (R)**
Jesus Lazaro*, Natasa Reljin, Raquel Bailón, Eduardo Gil, Yeonsik Noh, Pablo Laguna, Ki Chon
- 427 - **Improved methods for processing optical mapping signals from human left ventricular tissues at baseline and following adrenergic stimulation (R)**
María Pérez-Zabalza*, Emiliano Raúl Diez, Julia Rhyins, Konstantinos Mountris, Margarita Segovia-Roldán, Aida Oliván-Viguera, Esther Pueyo

Tuesday, September 15, 2020

10:15

S44 Special Session 2: Machine Learning in Atrial Fibrillation

Chairs: Leif Sornmo (R) and Pablo Laguna (R)

Room: Parco

476 - Knowledge, Machine Learning and Atrial Fibrillation: more ingredients for a tastier cocktail (P)

Tomas Teijeiro*

181 - Machine Learning to Find Areas of Rotors Sustaining Atrial Fibrillation from the ECG (P)

Giorgio Luongo*, Luca Azzolin, Massimo W Rivolta, Tiago Paggi de Almeida, Juan Pablo Martínez, Diogo Coutinho Soriano, Olaf Doessel, Roberto Sassi, Pablo Laguna, Axel Loewe

221 - Identification of Ablation Sites in Persistent Atrial Fibrillation Based on Spatiotemporal Dispersion of Electrograms Using Machine Learning (R)

Amina Ghrissi*, Fabien Squara, Vicente Zarzoso, Johan Montagnat

255 - Beat-Level Quality Control for Improved Screening of Atrial Fibrillation

Hesam Halvaei*, Leif Sornmo, Martin Stridh (R)

Final Discussion

S51 Challenge I

Chairs: Gari Clifford (R) and Matt Reyna (R)
Room: Tempio

- 236 - **Classification of 12-lead ECGs: the PhysioNet/Computing in Cardiology Challenge 2020 (R)**
Matthew Reyna*, Erick Andres Perez Alday, Annie Gu, Chengyu Liu, Salman Seyedi, Ali Bahrami Rad, Andoni Elola, Qiao Li, Ashish Sharma, Gari Clifford
- 71 - **Multi-class classification of pathologies found on short electrocardiogram signals (R)**
Georgi Nalbantov*, Svetoslav Ivanov, Jeffrey van Prehn
- 253 - **Automated Diagnosis of 12-lead Electrocardiograms using an Ensemble of Generic Temporal Convolutional Networks (R)**
Max Bos*, Jeroen Vranken, Rutger van de Leur, René van Es
- 128 - **Multilabel 12-Lead Electrocardiogram Classification Using Gradient Boosting Tree Ensemble (R)**
Alexander William Wong*, Weijie Sun, Sunil Vasu Kalmady, Padma Kaul, Abram Hindle
- 133 - **Combining Scatter Transform and Deep Neural Networks for Multilabel ECG Signal Classification (P)**
Maximilian Oppelt*, Jan Stefan, Maximilian Riehl, Felix Kemeth
- 202 - **Classification of 12-lead ECGs using digital biomarkers and representation learning (R)**
David Assaraf*, Jeremy Levy, Janmajay Singh, Gal Yefet, Armand Chocron, Joachim A. Behar

S52 Signal-processing for optimisation of cardio-pulmonary resuscitation

Chairs: Pablo Laguna (R) and Luca Mainardi (P)

Room: Marina 1

- 347 - **Multimodal Biosignal Analysis Algorithm for the Classification of Resuscitation Cardiac Rhythms (R)**
Haizea Lasa, Unai Irusta*, Trygve Eftestøl, Elisabete Aramendi, Ali Bahrami Rad, Jo Kramer-Johansen, Lars Wik
- 313 - **A Method to Detect Pauses for Ventilation During Cardiopulmonary Resuscitation Using the Thoracic Impedance (R)**
Enrique Rueda*, Elisabete Aramendi, Unai Irusta, Ahamed Idris
- 364 - **Stationary Wavelet Transform for Extraction of the Impedance Circulation Component During Out-of-hospital Cardiac Arrest (R)**
Iraia Isasi*, Erik Alonso, Unai Irusta, Elisabete Aramendi, Mohamud Daya
- 73 - **A Probabilistic Function to Model the Relationship between Quality of Chest Compressions and the Physiological Response for Patients in Cardiac Arrest (R)**
Trygve Eftestøl*, Svein Erik Stokka, Jan Terje Kvaløy, Ali Bahrami Rad, Unai Irusta, Elisabete Aramendi, Erik Alonso, Trond Nordseth, Eirik Skogvoll, Lars Wik, Jo Kramer-Johansen
- 45 - **Detection of shockable rhythms using convolutional neural networks during chest compressions provided by a load distributing band (R)**
Iraia Isasi*, Unai Irusta, Elisabete Aramendi, Jan-Åge Olsen, Lars Wik
- 317 - **Spectral Algorithm for Chest Compression Rate feedback during Cardiac Arrest based on Cerebral Oximetry (R)**
Libe Lopez de Larruzea*, Unai Irusta, Elisabete Aramendi, Andima Larrea, Ruth Salaberria, Dani Alonso

S53 ECG analysis and rhythm annotation

Chairs: María Pérez-Zabalza (R) and Vicente Zarzoso (P)
Room: Borgo

- 47 - **Comparison of machine learning architectures to classify intracardiac atrial electrograms (R)**
Miguel Rodrigo*, Albert J. Rogers, Mahmood I. Alhousseini, Tina Baykaner, Sanjiv M. Narayan

- 66 - **Automatic ECG-based Discrimination of 20 Atrial Flutter Mechanisms: Influence of Atrial and Torso Geometries (P)**
Giorgio Luongo*, Steffen Schuler, Massimo W Rivolta, Olaf Doessel, Roberto Sassi, Axel Loewe

- 99 - **Electrocardiographic Alternans in Myocardial Bridge: A Case Report (R)**
Ilaria Marcantoni*, Alessia Di Menna, Francesca Rossini, Federica Turco, Micaela Morettini, Agnese Sbrollini, Francesco Bianco, Marco Pozzi, Laura Burattini

- 367 - **Application of Deep Learning for Quality Assessment of Atrial Fibrillation ECG Recordings (R)**
Alvaro Huerta Herraiz*, Arturo Martinez-Rodrigo, Miguel Angel Arias, Philip Langle, José J Rieta, Raul Alcaraz

- 440 - **A Full-Automatic Software Program for Analyzing ECG in Holter Applications (R)**
Antoun Khawaja*

- 446 - **Comparison of Morphology-Based and Delay-Based Measures for Reference Beat Classification during Atrial Tachycardia (P)**
Laura Anna Unger*, Armin Luik, Annik Haas, Olaf Doessel

S54 AFib mapping and learning

Chairs: Fernando Schlindwein (R) and Stef Zeemering (R)
Room: Parco

488 - Update on AF Electrophysiology, Mapping and Ablation

Corrado Tomasi* (P)

46 - Machine learning approaches to classify Atrial Arrhythmias from Intracardiac Electrograms (R)

Miguel Rodrigo*, Albert J. Rogers, Mahmood I. Ahusseini, Tina Baykane

368 - Locating Rotational Activities using Directed Network Mapping in a Simulated Atrial Fibrillation Model (P)

Muhamed Vila*, Sara Rocher, Massimo W Rivolta, Javier Saiz, Roberto Sassi

378 - Classification of Farfield and Nearfield Intracardiac Signals from the Pulmonary Veins using Machine Learning (P)

Vincent Schlageter*, Adrian Luca, Florian Spies, Antonio Madaffari, Michael Kühne, Stefan Osswald, Jean-Marc Vesin, Christian Sticherling, Sven Knecht

383 - Atrial Fibrillation Driver Localization from Body Surface Potentials using Deep Learning (R)

Miguel Ángel Cámara-Vázquez*, Adrián Oter-Astillero, Ismael Hernández-Romero, Miguel Rodrigo, Eduardo Morgado, Maria de la Salud Guillem Sánchez, Andreu M. Climent, Óscar Barquero-Pérez

S61 Challenge II

Chairs: Gari Clifford (R) and Matt Reyna (R)
Room: Marina 1

- 130 - **Automatic 12-lead ECG classification using a deep neural network and unsupervised pre-training (R)**
Antonio H. Ribeiro*, Daniel Gedon, Daniel Martins Teixeira, Manoel Horta Ribeiro, Antonio Luiz Ribeiro, Thomas B. Schön, Wagner Meira Jr
- 189 - **Cardiac Abnormalities Recognition in 12-lead ECG Using a Convolutional Network with Binary Units Training Technique (R)**
Tomas Vicar*, Petra Novotna, Jakub Hejc, Marina Ronzhina and Oto Janousek
- 307 - **An Interpretable Model for the Classification of 12-lead ECG Signals Using Attention (R)**
Ibrahim Hammoud*, IV Ramakrishnan, Petar Djuric
- 349 - **A lightweight CNN-GRU for 12-lead ECG classification (P)**
Davide Borra*, Alice Andalò, Stefano Severi, Cristiana Corsi
- 363 - **Classification of 12-lead ECGs using gradient boosting on features acquired with domain-specific and domain-agnostic methods (P)**
Durmus Umutcan Uguz*, Felix Berief, Steffen Leonhardt, Christoph Hoog Antink
- 374 - **Classification of 12-Lead Electrocardiograms using Convolutional Autoencoders and Transfer Learning (R)**
Sardar Ansari*, Christopher Gillies, Kevin Ward, Hamid Ghanbari

S62 Understanding mechanisms of ventricular arrhythmias and defibrillation

Chairs: Willem Dassen (P) and Niels Otani (R)

Room: Tempio

489 - Electrocardiographic Assessment and Risk Stratification in Long QT syndrome and Brugada syndrome (R)

Carlo Napolitano*

471 - Personalized Low-Energy Smart-Defibrillators Through Feedback Based Re-synchronization Therapy in Langerdorff-perfused Rabbit Hearts (R)

Ilija Uzelac* and Flavio Fenton

443 - Maximizing the Capture of the Excitable Gap During Ventricular Arrhythmias for Low-energy Defibrillation (R)

Angel Moreno*, Richard Walton, Olivier Bernus, Edward Vigmond, Jason Bayer

397 - Supervised Classification of Ventricular Abnormal Potentials in Intracardiac Electrograms (R)

Giulia Baldazzi*, Marco Orrù, Mirko Matraxia, Graziana Viola, Danilo Pani

468 - Local Entropy as Determinant for Wavebreaks and Ventricular Arrhythmia in Langendorff-Perfused Guinea-Pig Hearts

Ilija Uzelac* and Flavio Fenton

S63 ECG and Signal Processing II

Chairs: Johannes de Bie (P) and Yesim Serinagaoglu (R)
Room: Borgo

- 67 - **Automated Identification of Paced Beats in Holter ECG (R)**
Filip Plesinger*, Ivo Viscor, Radovan Smisek, Josef Halamek, Veronika Bulkova, Petr Nejedly, Pavel Jurak

- 158 - **Model-Based Estimation of Electrocardiographic QT Interval from Phonocardiographic Heart Sounds in Healthy Subjects (R)**
Agnese Sbröllini*, Micaela Morettini, Ilaria Marcantoni, Laura Burattini

- 370 - **Comparative Study of Convolutional Neural Networks for ECG Quality Assessment (R)**
Alvaro Huerta Herraiz*, Arturo Martinez-Rodrigo, Alberto Puchol, Marta Inmaculada Pachon, José J Rieta, Raul Alcaraz

- 402 - **Sex Differences in the Morphology of RR-Matched T-waves Are Highly Heterogeneous Across Leads (R)**
Julia Ramírez*, Stefan van Duijvenboden, Andrew Tinker, Pier Lambiase, Patricia Munroe, Michele Orini

- 414 - **Comparison of the spatial QRS-T angle with Intra-cardiac Markers of Depolarisation and Repolarisation (R)**
William Young*, Neil Srinivasan, Andrew Tinker, Patricia Munroe, Pier Lambiase, Michele Orini

- 461 - **Characterization of T wave changes by Lyapunov Exponents in Chronic Kidney Disease Patients (R)**
Sabarathinam Srinivasan*, Syed Hassaan Ahmed Bukhari, Pablo Laguna, Carlos Sánchez, Esther Pueyo

S64 Afib mechanisms

Chairs: Javier Saiz (R) and Tiago Paggi de Almeida (P)
Room: Parco

121 - Phase Singularities in Cardiac Patch Model with Non-conductive Fibrotic Area during Atrial Fibrillation (P)

Tiago Paggi de Almeida*, Mark Nothstein, Xin Li, Michela Masè, Flavia Ravelli, Diogo C. Soriano, Arthur S. Bezerra, Fernando S. Schindwein, Takashi Yoneyama, Olaf Dössel, G. André Ng, Axel Loewe

261 - Influence of Gradient and Smoothness of Atrial Wall Thickness on Initiation and Maintenance of Atrial Fibrillation (P)

Luca Azzolin*, Giorgio Luongo, Sara Rocher, Javier Saiz, Olaf Doessel, Axel Loewe

303 - Oscillatory ACh Release Impact on f-Wave Frequency Modulation: an Experimentally-Based Computational Study (P)

Chiara Celotto*, Carlos Sánchez, Konstantinos Mountris, Mostafa Abdollahpur, Frida Sandberg, Pablo Laguna, Esther Pueyo

384 - Renewal Rate Constants of Phase Singularity Formation and Destruction in Atrial Fibrillation are Temporally Stable Measures of Fibrillatory Dynamics

Dhani Dharmapranani*, Jing Quah, Andrew McGavigan, Anand Ganesan

391 - Atrial Fibrosis Correlates with Slower Conduction in a Transgenic Goat Model (R)

Eugene Kwan*, Elyar Ghafoori, Wilson Good, Rob MacLeod, Edward Hsu, Boyce Moon, Jeffrey Fish, Misha Regouski, Irina Polejaeva, Derek Dossdall, Ravi Ranjan

420 - Simulation Study of the Arrhythmogenic Effects of two Missense Mutations in Human Atrial Fibrillation (R)

Rebecca Belletti*, Laura Martinez-Mateu, Lucía Romero, Javier Saiz

P7_3a ECG/Monitoring

- 77 - **Evaluation of the Changes in RR and QT Circadian Rhythms in Bedridden Subjects**
Sarah Solbiati, Alessia Paglialonga, Lorenzo Costantini, Enrico Caiani
(REMOTE PRESENTATION)
- 24 - **Optimization Strategies to Reduce Alarm Fatigue in Patient Monitors**
Mengxing Liu, Zehui Sun, Wenyu Ye, Xianliang He, Haoyu Jiang, Ye Li, Yiyu Zhuang
(REMOTE PRESENTATION)
- 191 - **Unobtrusive, Through-clothing ECG and Bioimpedance Monitoring in Sleep Apnea Patients**
Ivan Castro, Aakash Patel, Margot Deviaene, Dorien Huysmans, Pascal Borzee, Bertien Buyse, Dries Testelmans, Sabine Van Huffel, Carolina Varon, Tom Torfs
(REMOTE PRESENTATION)
- 193 - **Deep-Learning Premature Contraction Localization in 12-lead ECG from Whole Signal Annotations**
Petra Novotna, Tomas Vicar, Marina Ronzhina, Jakub Hejc, Jana Kolarova
(REMOTE PRESENTATION)
- 271 - **Quantitative Assessment of Respiratory Distress using Convolutional Neural Network for Multivariate Time Series Segmentation**
Rohit Pardasani, Rupanjali Chaudhuri, Navchetan Awasthi, Sheetal Chaurasia, Sushma Maya
(REMOTE PRESENTATION)
- 29 - **Unreadable Segment Recognition of Single-Lead ECG Signal Based on Morphological Algorithm**
Xie Hanshuang
(REMOTE PRESENTATION)
- 330 - **Regression or Pseudo-Inverse – Which Method Should be Preferred when Developing Inverse Linear ECG-Lead Transformations?**
Daniel Guldenring, Ali Rababah, Dewar Finlay, Raymond Bond, Alan Kennedy, Khaled Rjoob, Michael Jennings, James McLaughlin

P7_3a Device

201 - The Role of Cardiac Anatomy in Multipolar Lead Design Optimisation for Cardiac Resynchronization Therapy

Cristobal Rodero, Marina Strocchi, Angela Lee, Christopher Aldo Rinaldi, Edward Vigmond, Gernot Plank, Pablo Lamata, Steven Niederer
(REMOTE PRESENTATION)

P7_3a - Sudden death/Resuscitation

325 - An Impedance-based Algorithm to Detect Ventilations during Cardiopulmonary Resuscitation

Xabier Jaureguibeitia, Unai Irusta, Elisabete Aramendi, Henry Wang, Ahamed Idris

P7_3b - Afib Endocardiography

98 - Hidden Markov Models for Activity Detection in Atrial Fibrillation Electrograms

Gonzalo Ricardo Ríos-Muñoz, Fernando Moreno-Pino, Nina Soto, Pablo M. Olmos, Antonio Artés-Rodríguez, Francisco Fernández-Avilés, Ángel Arenal

(REMOTE PRESENTATION)

117 - Constructing Virtual Patient Cohorts for Simulating Atrial Fibrillation Ablation

Caroline Roney, Marianne Beach, Arihant Mehta, Iain Sim, Cesare Corrado, Rokas Bendikas, Jose Alonso Solis-Lemus, Orod Razeghi, John Whitaker, Louisa O'Neill, Gernot Plank, Edward Vigmond, Steven Williams, Mark O'Neill, Steven Niederer

(REMOTE PRESENTATION)

131 - Optimizing Atrial Electrogram Classification Based on Local Ablation Outcome in Human Atrial Fibrillation

Arthur Bezerra, Takashi Yoneyama, Diogo Soriano, Giorgio Luongo, Xin Li, Flavia Ravelli, Michela Masè, Gavin Chu, Peter Stafford, Fernando Schindwein, G. Andre Ng, Tiago Paggi de Almeida

(REMOTE PRESENTATION)

146 - Impact of Electrode Size on Electrogram Voltage in Healthy and Diseased Tissue

Deborah Nairn, Daniel Hunyar, Jorge Sánchez, Olaf Doessel, Axel Loewe

(IN PERSON PRESENTATION)

166 - Reliability of Local Activation Waves Features to Characterize Paroxysmal Atrial Fibrillation Substrate During Sinus Rhythm

Aikaterini Vraka, Fernando Hornero, Aurelio Quesada, Luca Faes, Raul Alcaraz, José J Rieta

(REMOTE PRESENTATION)

257 - Machine Learning of Cardiac Computed Tomography Can Predict Success of Atrial Fibrillation Ablation

Daria Galkina, Orod Razeghi, Mahmood Alhuseini, AJ Rogers, Sanjiv Narayan, Steven Niederer, Tina Baykaner

(REMOTE PRESENTATION)

- 265 - **The influence of cardiac ablation on the electrophysiological characterization of rat isolated atrium: preliminary analysis**
Jimena Paredes, Stefan Pollnow, Olaf Doessel, João Salinet
(REMOTE PRESENTATION)
- 291 - **Prediction of Atrial Fibrillation Disease Progression with Endocardial Electrograms**
Bram Hunt, Eugene Kwan, Mark McMillan, Derek Dossdall, Rob MacLeod, Ravi Ranjan
(REMOTE PRESENTATION)
- 302 - **Simulation of the Hemodynamic Effects of the Left Atrial Appendage Occlusion in Atrial Fibrillation: Preliminary Results**
Nadia D'Alessandro, Alessandro Masci, Alice Andalò, Luca Dedè, Corrado Tomasi, Alfio Quarteroni, Cristiana Corsi
(IN PERSON PRESENTATION)
- 309 - **High-resolution Catheters for Arrhythmic Driver Detection: Preliminary Results in Atrial Fibrillation**
Alice Andalò, Giuseppe Calamia, Claudio Fabbri, Paolo Sabbatani, Michele Monaci, Stefano Severi, Cristiana Corsi
(IN PERSON PRESENTATION)
- 342 - **Atrial Fibrillation Arising from Impaired Pitx2: Insight from a 3D Human Atrial Model**
Jieyun Bai, Yijie Zhu, Yaosheng Lu, Andy Lo, Jichao Zhao
- 360 - **Discrimination Between CFAEs of Paroxysmal and Persistent Atrial Fibrillation with Simple Classification Models of Reduced Features**
Emanuela Finotti, Edward J Ciaccio, Hasan Garan, Vicente Bertomeu-González, Raul Alcaraz, José J Rieta
(REMOTE PRESENTATION)
- 434 - **Unipolar Electrogram Eigenvalue Distribution Analysis for the Identification of Atrial Fibrosis**
Jennifer Riccio, Sara Rocher, Laura Martinez, Alejandro Alcaine, Javier Saiz, Juan Pablo Martínez, Pablo Laguna
(REMOTE PRESENTATION)

P7_4a - ECG-Waveform Analysis 1

- 53 - **Relation of surface T-wave to vulnerability to ventricular fibrillation in explanted structurally normal hearts**
Marianna Meo, Pietro Bonizzi, Laura Bear, Matthijs Cluitmans, Emma Abell, Michel Haïssaguerre, Olivier Bernus, Remi Dubois
(REMOTE PRESENTATION)
- 89 - **Improvement in Automated STEMI Detection by Modeling and Classification of the ST Segment**
Reza Firoozabadi, Richard Gregg, Saeed Babaeizadeh
(REMOTE PRESENTATION)
- 91 - **Utility of In-silico Pace Mapping to Successfully Identify Simulated Ventricular Tachycardia Exit Sites Non-Invasively Using both 12-lead ECG Recordings and Electrograms from Implanted Devices**
Sofia Monaci, Cristobal Rodero, Marina Strocchi, John Whitaker, Ronak Rajani, Reza Razavi, Aldo Rinaldi, Mark O'Neill, Gernot Plank, Andrew King, Martin Bishop
(REMOTE PRESENTATION)
- 92 - **Automated Localization of Focal Ventricular Tachycardia from Implanted Devices Electrograms: A Combined Physics-AI approach**
Sofia Monaci, Cristobal Rodero, Marina Strocchi, Karli Gillette, Ronak Rajani, Gernot Plank, Andrew King, Martin Bishop
(REMOTE PRESENTATION)
- 96 - **The electro-anatomical pathway for normal and bundle branch block ECGs**
Peter van Dam, Emanuela Teresina Locati, Giuseppe Ciconte, Valeria Borrelli, Vincenzo Santinelli, Gabriele Vicedomini, Luigi Giannelli, Zarko Calovic, Carlo Pappone
(IN PERSON PRESENTATION)
- 100 - **Robust QRS Detection Using Combination of Three Independent Methods**
Lukas Smital, Lucie Marsanova, Radovan Smisek, Andrea Nemcova, Martin Vitek
(REMOTE PRESENTATION)

- 164 - **Feasibility of ECG Reconstruction from Minimal Lead Sets Using Convolutional Neural Networks**
Maksymilian Matyschik, Henry Mauranen, Joel Karel, Pietro Bonizzi
- 168 - **Quantification of Ventricular Repolarization Fluctuations in Patients with Myocardial Infarction**
Martin Schmidt, Robin Dunker, Hagen Malberg, Sebastian Zauseder
(IN PERSON PRESENTATION)
- 175 - **Knowledge-Based QRS Detection performed by a Cascade of Moving Average Filters**
Lorenzo Bachi, Lucia Billeci, Maurizio Varanini
(IN PERSON PRESENTATION)
- 272 - **Comparative analysis of morphological criteria for differential diagnostics of wide QRS complex arrhythmias with left bundle branch block morphology**
Mikhail Chmelevsky, Margarita Budanova, Tatjana Treshkur, Viktor Tikhonenko
- 284 - **Detection of ECG Fiducial Points Using Recursive Estimation and Kalman filtering**
Luis Enrique Avendaño, Jorge Ivan Padilla Buritica, Edilson Delgado-Trejos, David Cuesta Frau
(REMOTE PRESENTATION)
- 287 - **Computational Reconstruction of Electrocardiogram Lead Placement**
Alexander Wissner-Gross, Suraj Kapa, James Lee, Desmond Keenan, Natasha Drapeau, Kenneth Londoner
(REMOTE PRESENTATION)
- 344 - **Building normal ECG models to detect any arrhythmias using deep learning**
Keiji Gyohten, Shota Hori, Hidehiro Ohki, Toshiya Takami, Noboru Sato
(REMOTE PRESENTATION)
- 385 - **Automated Atrial Fibrillation Source Detection Using Shallow Convolutional Neural Networks**
Isac do Nascimento Lira, Pedro Marinho Ramos de Oliveira, Walter Freitas Jr., Vicente Zarzoso
(IN PERSON PRESENTATION)

P7_4b - ECGI Techniques and Application

- 354 - **Comparison of two equivalent dipole layer based inverse electrocardiography techniques for the non-invasive estimation of His-Purkinje mediated ventricular activation**
Machteld Boonstra, Rob Roudijk, Peter Loh, Peter van Dam
(REMOTE PRESENTATION)
- 256 - **Noninvasive beat-to-beat epi-endocardial panoramic mapping in patients with polymorphic ventricular arrhythmias**
Mikhail Chmelevsky, Stepan Zubarev, Margarita Budanova, Danila Potyagaylo, Tatjana Treshkur, Dmitry Lebedev
- 108 - **A Patchwork Inverse Method in Combination with the Activation Time Gradient to Detect Regions of Slow Conduction in Sinus Rhythm**
Oumayma Bouhamama, Mark Potse, Remi Dubois, Lisl Weynans, Laura Bear
(REMOTE PRESENTATION)
- 129 - **A wavelet-based method for non-invasive dominant frequency detection in atrial fibrillation**
Victor Gonçalves Marques, Miguel Rodrigo, Maria de la Salud Guillem Sánchez, João Salinet
(REMOTE PRESENTATION)
- 37 - **Impaired Body Surface Electrode Contact Reduces Accuracy of Non-Invasive Electrocardiographic Imaging**
Laura Bear, Jeanne van der Waal, Thom Oostendorp, Remi Dubois
(REMOTE PRESENTATION)

P7_5 - Membrane and Cellular Modelling

- 16 - **Calcium Bump as Indicator of the Mechano-Calcium Feedback in Cardiomyocytes and its Species-specificity in Mathematical Models**
Pavel Konovalov, Nathalie Balakina-Vikulova, Olga Solovyova, Leonid Katsnelson
- 23 - **Load-dependence in the Electromechanical Model of the Human Cardiomyocyte**
Nathalie Balakina-Vikulova, Olga Solovyova, Leonid Katsnelson
- 27 - **The Role of Oxidative CaMKII in Mouse Atria – a Simulation Study**
Wei Wang, Shanzhuo Zhang, Gongning Luo, Henggui Zhang, Kuanquan Wang, Yong Xu
- 28 - **Regulation of Electrical Coupling Between Bio-pacemaker and Ventricular Myocytes on Autonomous Signal Propagation: A Simulation Study**
Yacong Li, Kuanquan Wang, Qince Li, Henggui Zhang
(REMOTE PRESENTATION)
- 55 - **The comparison between two mathematical contractile elements Integrated to an hiPSC-CM in silico Model**
Mohamadamin Forouzandehmehr, Nicolò Cogno, Jussi Koivumäki, Jari Hyttinen, Michelangelo Paci
(REMOTE PRESENTATION)
- 223 - **Modelling the Effects of Conductive Polymers and Stem Cells Derived Myocytes on Scarred Heart Tissue**
Damiano Fassina, Caroline Mendonca Costa, Sian Harding, Steven Niederer
(REMOTE PRESENTATION)
- 301 - **A Computational Model of Human Ventricular Action Potentials Incorporating Experimental Variability Arising from CACNA1C mutations**
Jieyun Bai, Yaosheng Lu, Kuanquan Wang, Henggui Zhang
- 405 - **A novel model of acute myocardial ischemia in human ventricular cardiomyocytes**
Marta Girones-Sanguesa, Claudia Esteban, Ana González-Ascaso, Jose F Rodriguez-Matas, Jose M Ferrero
(REMOTE PRESENTATION)

- 465 - **State Estimation for Cardiac Action Potential Dynamics: A Comparison of Kalman Filter Designs**
Laura Munoz and Christopher Beam
- 274 - **Prediction of IKr blocker channel state preference based on voltage clamp simulations using machine learning techniques.**
Fernando Escobar Roperro, Julio Gomis-Tena Dolz, Javier Saiz, Lucía Romero
(REMOTE PRESENTATION)

P7_8 – Challenge

- 7 - **Automatic Detection of 12-Lead ECG Abnormalities Using Multi-Scale Deep Residual Network**
Shan Yang, Chunli Wang, Qingda Kong, Heng Xiang
(REMOTE PRESENTATION)

- 31 - **Multi-class Classification of 12-lead Electrocardiogram Recordings to Assist in the Diagnosis of Cardiac Abnormalities**
Jacob Kimball and Omer T. Inan

- 32 - **Utilization of Residual CNN-GRU with Attention Mechanism for Classification of 12-lead ECG**
Petr Nejedly, Adam Ivora, Ivo Viscor, Josef Halamek, Pavel Jurak, Filip Plesinger
(REMOTE PRESENTATION)

- 35 - **Arrhythmia Detection and Classification of 12-lead ECGs Using a Deep Neural Network**
Wenxiao Jia, Xiao Xu, Xian Xu, Yuyao Sun, Xiaoshuang Liu
(REMOTE PRESENTATION)

- 39 - **Automatic 12-lead ECG classification using deep neural networks**
Wenjie Cai, Shuaicong Hu, Jingying Yang, Jianjian Cao
(REMOTE PRESENTATION)

- 41 - **Deep Multi-branch Neural Network for Multi-label Classification of ECG Abnormalities**
Hongmei Wang, wei zha, Dongya Jia, Zhenqi Li, Cong Yan, jing hu, Jiansheng Fang, Ming Yang

- 44 - **Automatic classification of arrhythmias by residual network and BiGRU with attention mechanism**
Runnan He, Kuanquan Wang, Na Zhao, Qiang Sun, Yacong Li, Qince Li, Henggui Zhang
(REMOTE PRESENTATION)

- 48 - **The Multi-label Classification of 12 Channel ECG signals of Patients with Various Diseases**
András Bánhalmi, Vilmos Bilicki, Tamás Szépe

- 61 - **Alba's roadmap, where does she want to head...**
Marek Żyliński¹ and Gerard Cybulski
(REMOTE PRESENTATION)

- 63 - **ECG Classification Using Efficient Net based Architecture with RandAugment**
Naoki Nonaka and Jun Seita
(REMOTE PRESENTATION)
- 74 - **An Ensemble Approach to Classifying 12-lead ECGs**
David Kaftan and Richard Povinelli
(REMOTE PRESENTATION)
- 79 - **Multi-Label Classification for Automated Diagnosis of Cardiac Abnormalities in ECG Readings**
John Chauvin, Soufiane CHAMI, Rabie Fadil, Sandeep Singhal, Kouhyar Tavakolian
- 83 - **Multi-label Classification of ECG using 1-D ResNet**
Wei Zhao
- 84 - **ECG Classification Model Based on Multi-scale Network**
Wenqiang Cai and Lishen Qiu
- 85 - **SE-ECGNet: Multi-scale SE-Net for Multi-lead ECG Data**
Jiabo Chen, Bin Xiao, Xiuli Bi, Yongchao Wang, Weisheng Li, Duan Han, Junhui Zhang, Xu Ma
(REMOTE PRESENTATION)
- 86 - **Fusion of Convolutional Neural Network and Conventional Machine Learning for Classification of 12-Lead ECGs**
Reza Firoozabadi, Richard Gregg, Saeed Babaeizadeh
- 95 - **Deep Multi-label Multi-instance Classification on 12-Lead ECG**
Yingjing Feng and Edward Vigmond
(REMOTE PRESENTATION)
- 107 - **Cardiac Abnormalities Prediction using Ensemble of Diverse Sequence Labeling Models**
Yale Chang, Annamalai Natarajan, Asif Rahman, Gregory Boverman, Sara Mariani, Shruti Vij, Jonathan Rubin
(REMOTE PRESENTATION)
- 112 - **Adaptive lead weighted ResNet trained with different duration signals for classifying 12-lead ECGs**
Zhibin Zhao, Hui Fang, Samuel Relton, Jing Qin, Yuhong Liu, Zhijing Li, David Wong
(REMOTE PRESENTATION)

- 116 - **Rule-Based methods and Deep Learning Networks for Automatic Classification of ECG**
Giovanni Bortolan and Ivaylo Christov
(REMOTE PRESENTATION)
- 120 - **Detection of 12-Lead ECG arrhythmia using Combination of Squeeze-and-Excitation Module and residual U-Net**
Du Changping, Shen Tengfei, Li Yang, Zhou Ying, Chen Ziwei, Chen Yang
- 124 - **Machine Learning in Medicine: an Algorithm for Automatic 12-lead ECG Classification.**
Mateusz Soliński, Michał Łepek, Dorota Kokosińska, Judyta Salamon, Katarzyna Muter, Antonina Pater, Zuzanna Puzio, Przemysław Wiszniewski
- 127 - **Identification of Cardiac Arrhythmias from 12-lead ECG using Beat-wise QR-code Generation and Multi-channel Convolutional Neural Network**
Mohanad Alkhodari, Leontios J. Hadjileontiadis, Ahsan H. Khandoker
(REMOTE PRESENTATION)
- 134 - **Multi-label Arrhythmia Classification From 12-Lead Electrocardiograms**
Po-Ya Hsu, Po-Han Hsu, Tsung-Han Lee, Hsin-Li Liu
(REMOTE PRESENTATION)
- 135 - **Diagnosis of multiple cardiac disorders from 12-lead ECGs using a deep neural network**
Zheheng Jiang, Tiago Paggi de Almeida, Fernando Schindwein, G. André Ng, Huiyu Zhou, Xin Li
(REMOTE PRESENTATION)
- 136 - **Deep Learning Identification of Concurrent Cardiac Arrhythmias from Electrocardiogram Signals**
Jhih-Yu Chen, Tsai-Min Chen, Chih-Han Huang, Edward S.C. Shih, Justine Hsu, Yi-Ming Chen¹, Yu Tsao, Ming-Jing Hwang
- 138 - **Automated Classification of Electrocardiograms Using Wavelet Analysis and Deep Learning**
Andrew Demonbreun and Grace Mirsky
(REMOTE PRESENTATION)

- 139 - **Multi-label Classification of Abnormalities in 12-Lead ECG Using 1D ResNet34**
Ao Ran, Dongsheng Ruan, Yuan Zheng
(REMOTE PRESENTATION)
- 141 - **Cardiovascular Disease Classification from ECG signal through Variational Mode Decomposition and One-dimensional Convolutional Neural Network.**
Nahian Ibn Hasan
- 143 - **Deep Convolutional Neural Network for Imbalanced Multi-label ECG Classification**
Xiaoyu Li, Buyue Qian, Jishang Wei, Yuhua Wei, Haochen Han, Xiyang Li
- 144 - **ECG Arrhythmia Classification using Recurrent Neural Networks and Long Short-Term Memory Recurrent Neural Networks**
Sebastian Cajas, Pedro Astaiza, Santiago Garcia, Camilo Segura, Diego Lopez
(REMOTE PRESENTATION)
- 145 - **ECG-based Multi-Class Arrhythmia Detection Using 13-branch Convolutional Neural Network**
Jing Zhang, Junyuan Jing, Deng Liang, Xun Chen, Min Gao
- 148 - **Multi-Stream Deep Neural Network for 12-Lead ECG Abnormality Classification**
Martin Baumgartner, Dieter Hayn, Andreas Ziegl, Alphons Eggerth, Günter Schreier
(REMOTE PRESENTATION)
- 152 - **Arrhythmia Detection With Convolutional Neural Networks from 12-lead ECGs**
Qineng Cao
- 154 - **Automatic ECG Classification with Convolutional Neural Networks**
Guillermo Jimenez-Perez, Maxime Sermesant, Oscar Camar
- 161 - **Impact of neural architecture design on cardiac arrhythmia classification using 12-lead ECG signals**
Najmeh Fayyazifar
(REMOTE PRESENTATION)

- 162 - **A Real-Time ECG Classification Scheme Using Anti-Aliased Blocks with Low Sampling Rate**
Yunkai Yu, Zhicheng Yang, Peiyao Li
(REMOTE PRESENTATION)
- 163 - **Classification of Cardiac Abnormalities by An Ensemble Machine Learning Model**
Minfang Tang, Chenshuo Wang, Ruishi Zhou, Yicheng Yao, Pu Jian, Xiuying Mou, Zhen Fang
- 171 - **Cardiac Pathologies Detection and Classification in 12-lead ECG**
Radovan Smisek, Andrea Nemcova, Lucie Marsanova, Lukas Smital, Martin Vitek, Jiri Kozumplik
(REMOTE PRESENTATION)
- 180 - **Attention based models for ecg abnormalites detection**
Xi Li and Yongjun Xu
(REMOTE PRESENTATION)
- 183 - **Deep-learning based 12-lead ECG classification using convolutional neural networks with an attention layer and gated recurrent units**
Martin Kropf, Aravind-Kumar Radhakrishnan, Narayanaraj Dharmalingam
- 185 - **Explainable ECG Classification Using Information Theoretic Measures Derived From Neuroscience**
Max Falkenberg, Hardik Rajpal, Madalina Sas
(REMOTE PRESENTATION)
- 196 - **Automatic Arrhythmia Detection from 12-lead Electrocardiograms Based on Residual Convolutional Neural Network and Recurrent Neural Network Combination**
Zhengling He, Xianxiang Chen, Pengfei Zhang, Lirui Xu, Zhongrui Bai, Hao Zhang, Weisong Li, Pan Xia
(REMOTE PRESENTATION)
- 198 - **ECG Classification with a Convolutional Recurrent Neural Network**
Jérôme Van Zaen, Halla Sigurthorsdottir, Ricard Delgado-Gonzalo, Mathieu Lemay
(IN PERSON PRESENTATION)

- 213 - **Automatic 12-Lead Electrocardiogram Monitoring Using a Combination of Deep Neural Network Models**
Mohammad Abdizadeh
(REMOTE PRESENTATION)
- 217 - **Detecting Cardiac Abnormalities from 12-lead ECG Signals Using Feature Extraction, Dimensionality Reduction, and Machine Learning Classification**
Garrett Perkins, J. Chase McGlenn, Muhammad Rizwan, Bradley Whitaker
(REMOTE PRESENTATION)
- 225 - **A Bio-toolKit for Multi-cardiac Abnormality Diagnosis using 12-lead ECG Signal and Deep Learning**
Akash Kirodiwal, Apoorva Srivastava, Ashutosh Dash, Ayantika Saha, Gopi Vamsi Penaganti, Sazedul Alam, Sawon Pratiher, Amit Patra, Nirmalya Ghosh, Nilanjan Banerjee
(REMOTE PRESENTATION)
- 229 - **Automatic Cardiac Abnormality Detection in 12-lead ECGs with Deep Convolutional Neural Networks Using Data Augmentation**
Lucas Weber, Maksym Gaiduk, Ralf Seepold
(REMOTE PRESENTATION)
- 234 - **12-Lead ECG classification using non-linear feature-based learning**
Jieun Lee, Samuel Newell, Vasanth Ravikumar, Xiangzhen Kong, Yugene Guo, Alena Talkachova
- 240 - **Multi-label Classification of Abnormalities in 12-lead ECG Using Attention-based Multi-Scale Convolutional Neural Network**
Jianping Lin, Ping Zhang, Guijin Wang
- 248 - **CardioInceptionNet: A Novel CNN Architecture for ECG Abnormalities Detection**
Oles Dobosevych, Illia Kachko, Bohdan Petryshak
- 72 - **Explainable Deep Neural Network for Identifying Cardiac Abnormalities Using Class Activation Map**
Yu-Cheng Lin, Yun-Chieh Lee, Wen-Chiao Tsai, Win-Ken Beh, An-Yeu Wu
(REMOTE PRESENTATION)

- 277 - **Classification of 12 Lead ECG Signal using 1D-CNN with Class Dependent Threshold**
Rohit Pardasani and Navchetan Awasthi
(REMOTE PRESENTATION)
- 278 - **Hybrid Signature-based Approach to ECG Classification**
Hamid Khandahari and Adam Mahdi
- 281 - **Multi-Label Cardiac Arrhythmia Classification Using CNN with Self-Attention and LSTM**
Zhaowei Zhu, Tingting Zhao, Zhuo Liu, Zhuoyang Xu, Han Wang, Siqi Liu, Xiang Lan, Yangming Guo
(REMOTE PRESENTATION)
- 282 - **An Ensemble Classifier for Arrhythmia Classification based on ResNet, ResNeXt and ResNeSt**
Ran Duan, Xiaodong He, Ouyang Zhuoran
(REMOTE PRESENTATION)
- 285 - **Multi-Label Classification of 12-lead ECGs by Using Residual CNN and Class-Wise Attention**
Yang Liu, Kuanquan Wang, Qince Li, Yongfeng Yuan, Yacong Li, Henggui Zhang
(REMOTE PRESENTATION)
- 293 - **A robust CNN-based 12 lead ECG classifier for detecting cardiac abnormalities**
Ahsan Habib, Saifur Rahman, Chandan Karmakar
- 294 - **An Automatic 12-Lead ECG Interpreter Based on Neural Network Trained on Combination of Signal, Physiological and Encoded Features**
Dishant Beniwal, Divyansh Srivastava, Pooja Aggarwal, Ashish Sahani
- 297 - **A Topology Informed Random Forest Classifier for ECG Classification**
Paul Samuel Ignacio, Jay-Anne Bulauan, John Rick Manzanares
(REMOTE PRESENTATION)
- 300 - **LSTM Based Classification with ECG and Frequency**
Jannik Hamp and Andreas Dominik

- 305 - **A Deep Learning Solution for Automatized Interpretation of 12-Lead ECGs**
Alvaro Huerta Herraiz, Arturo Martinez-Rodrigo, José J Rieta, Raul Alcaraz
(REMOTE PRESENTATION)
- 327 - **Classifying multiple cardiac rhythms in 12-lead ECGs using a 1D convolutional neural network**
Marinka Oudkerk Pool, Bob de Vos, Fleur Tjong, Michiel Winter, Ivana Isgum
- 328 - **Bag of Tricks for Electrocardiogram Classification with Deep Neural Networks**
Seonwoo Min
(REMOTE PRESENTATION)
- 331 - **Combination of Ensemble Learning Based Models to Classify 12-Lead ECGs**
Mohammed Baydoun, Lise Safatly, Hassan Ghaziri, Ali Hajj
- 336 - **Automatic classification of healthy and disease conditions from digital standard 12-lead ECGs**
Vadim Gliner, Noam Keidar, Yael Yaniv, Assaf Schuster
- 339 - **Detection of Cardiac Arrhythmias from Varied Length Multichannel Electrocardiogram Recordings Using Deep Convolutional Neural Networks**
Marwen Sallem, Adnen Saadaoui, Amina Ghrissi, Vicente Zarzoso
(REMOTE PRESENTATION)
- 340 - **Prediction of Apnoea and Non-apnoea Arousals from the Polysomnogram using a Neural Network Classifier**
Philip de Chazal, John Du, Nadi Sadr
- 353 - **Rhythm classification of 12-lead ECGs using deep neural network and class-activation maps for improved explainability**
Sebastian Goodfellow, Dmitrii Shubin, Danny Eytan, Andrew Goodwin, Anusha Jega, Azadeh Assadi, Mjaye Mazwi, Robert Greer, Sujay Nagaraj, Christian Esposito, Peter Laussen, William Dixon
(REMOTE PRESENTATION)

- 356 - **ECG Segmentation using a Neural Network as theBasis for Detection of Cardiac Pathologies**
Philipp Sodmann and Marcus Vollmer
(REMOTE PRESENTATION)
- 406 - **Classification of 12-lead ECG with an Ensemble Machine Learning Approach**
Matteo Bodini, Massimo W Rivolta, Roberto Sassi
(IN PERSON)
- 412 - **Arrhythmia classification over 12-leads ECG using 1D Convolutional Neural Networks**
Muhammad Uzair Zahid and Mustafa Serkan Kiranyaz
- 417 - **Ensembling Features and Convolutional Recurrent Neural Networks for 12-lead ECG Classification**
Charilaos Zisou, Andreas Sochopoulos, Konstantinos Kitsios
(REMOTE PRESENTATION)
- 421 - **Fast Heart-Condition Classification with Lightweight Neural Network**
Péter Hajas, Görög Márton, Balint Varga, Csongor Szabo, Domonkos Kovacs-Kopp
- 424 - **Automatic Concurrent Arrhythmia Classification using Deep Residual Neural Networks**
Deepankar Nankani, Pallabi Saikia, Rashmi Dutta Baruah
(REMOTE PRESENTATION)
- 431 - **Classification of Cardiac Arrhythmias Using Fourier Series and Support Vector Machines**
Daniel Gazzoli Nunes
- 435 - **ECG Morphological Decomposition for Automatic Rhythm Identification**
Guadalupe García Isla, Rita Laureanti, Valentina Corino, Luca Mainardi
(IN PERSON PRESENTATION)
- 445 - **Cardiac Arrhythmia Detection through A Novel Hybrid Deep Neural Networks based on 1D CNNs and LSTMs**
Hosein Hasani, Adeleh Bitarafan, Mahdieh Soleymani
(REMOTE PRESENTATION)

- 455 - **Fractals and Surrogate Data Analysis for ECG Classification**
Manouane Caza-Szoka, François Nougrou, Daniel Massicotte
- 456 - **Time-Frequency Representation-Based Transfer Learning Model for Cardiac Arrhythmias Diagnosis (R)**
Jonathan Roberto Torres Castillo, Karen Patricia Gaitan de los Rios, Miguel Ángel Padilla Castañeda
- 462 - **Arrhythmia classification of 12-lead Electrocardiograms by Hybrid Scattering-LSTM networks**
Philip Warrick, Masun Nabhan Homsí, Vincent LOSTANLEN, Michael Eikenberg, Joakim Andén
- 474 - **Multi-channel Electrocardiogram Classification by semantic segmentation methods**
Lingfeng LIU, Nan Jiang, Qin Xia

Wednesday, September 16, 2020

8:30

S81 Special Session 3: Digital Twins

Chairs: Jordi Heijman (R) and Matthijs Cluitmans (R)

Room: Tempio

479 - **The 'Digital Twin' to enable the vision of precision cardiology (R)**

Blanca Rodriguez*

484 - **Personalization of Electromechanical Models for Improved Therapy Guidance (R)**

Steven Niederer*

480 - **Digital Twins from an Industry Perspective: Bridging from Academia to Application (R)**

Matthijs Cluitmans*

482 - **Use of Digital Twins in the daily clinical cardiology practice: revolution or utopia? (R)**

David Filgueiras-Rama*

Final Discussion

S82 Machine Learning, AI and Computation

Chairs: Lucia Billeci (P) and Pietro Bonizzi (R)

Room: Borgo

- 275 - **Using UncertainSCI to Quantify Uncertainty in Cardiac Simulations** (R)
Lindsay Rupp*, Zexin Liu, Jake Bergquist, Sumientra Rampersad, Dan White, Jess Tate, Dana Brooks, Akil Narayan, Rob MacLeod
- 14 - **Quantification of the impact of Atrial Shape Uncertainty on Fibrosis Burden and Atrial Tachycardia**
Cesare Corrado*, Caroline Roney, Orod Razeghi, Sam Coveney, Iain Sim, Steven Williams, Mark O'Neill, Richard Wilkinson, Jeremy Oakley, Richard Clayton, Steven Niederer
- 416 - **Development, Implementation and Testing of a Multicellular Dynamic Action Potential Clamp Simulator for Drug Cardiac Safety Assessment** (P)
Maria Camporesi*, Chiara Bartolucci, Chon Lok Lei, Gary R. Mirams, Teun P. de Boer, Stefano Severi
- 186 - **Automated Extraction of Time References from Clinical Notes in a Heart Failure Telehealth Network** (R)
Fabian Wiesmueller*, Alphons Eggerth, Karl Kreiner, Dieter Hayn, Bernhard Pfeifer, Gerhard Pözl, Tim Egelseer-Bründl, Günter Schreier
- 337 - **Improving the detection of acute coronary syndrome using machine learning of blood biomarkers** (R)
Khaled Rjoob*, Victoria McGilligan, Raymond Bond, Steven Watterson, Melody Chemaly, Roisin McAlister, Tiago De Melo Malaquias, Stephen Leslie, Charles Knoery, Aleeha Iftikhar, Anne McShane, Anthony Bjourson, Aaron Peace
- 58 - **A Deep Learning Framework for Fast and Accurate Cardiac Motion Estimation** (R)
Orod Razeghi*, Daria Galkina, Baldeep Sidhu, Christopher Rinaldi, Steven Niederer

S83 Cardiorespiratory Applications

Chairs: Carolina Varon (R) and Riccardo Barbieri (P)
Room: Marina 1

- 93 - **Robust Estimator of the Cardiorespiratory Coupling (R)**
John Morales, Pascal Borzee, Dries Testelmans, Bertien Buyse, Sabine van Huffel, Raquel Bailón, Carolina Varon

- 105 - **Specializing CNN Models for Sleep Staging based on Heart Rate (P)**
Miriam Goldammer*, Sebastian Zaunseder, Hagen Malberg, Felix Gräßer

- 290 - **Multimodal vs Unimodal Estimation of Sympathetic-Driven Arousal States (R)**
Sandya Subramanian*, Emery Brown, Riccardo Barbieri

- 316 - **Cardiac comorbidities in COPD patients explained through HRV analysis and respiratory indices of disease severity (R)**
Daniel Romero*, Dolores Blanco-Almazán, Willemijn Groenendaal, Lien Lijnen, Francky Catthoor, Raimon Jané

- 323 - **Relationship between heart rate recovery and disease severity in COPD patients (R)**
Dolores Blanco-Almazán*, Daniel Romero, Willemijn Groenendaal, Lien Lijnen, Francky Catthoor, Raimon Jané

- 410 - **Phase Rectified Signal Averaging Technique Improves Characterization of Sleep State in Healthy Fetuses (R)**
Nicolò Pini*, Massimo W Rivolta, Margaret Shair, Amy J Elliott⁴, William P Fifer, Maristella Lucchini

S84 AFib therapy

Chairs: Marianna Meo (R) and Olivier Meste (P)
Room: Parco

490 - Device-based management of AF

To be confirmed

219 - Modelling Left Atrial Flow and Blood Coagulation for Risk of Thrombus Formation in Atrial Fibrillation (R)

Ahmed Qureshi*, Omar Darwish, Henry Chubb, Steven Williams, David Nordsletten, Oleg Aslanidi, Adelaide de Vecchi

252 - Study on the Stability of CFAEs to Characterize the Atrial Substrate in Atrial Fibrillation (R)

Emanuela Finotti*, Edward J Ciaccio, Hasan Garan, Fernando Hornero, Raul Alcaraz, José J Rieta

380 - Pulmonary vein isolation increases efficacy of antiarrhythmic drugs in a 3D computer model for atrial fibrillation.

Ali Gharaviri*, Simone Pezzuto, Mark Potse, Rolf Krause, Ulrich Schotten, Angelo Auricchio

S91 Whole Heart Modelling - Electrophysiology

Chairs: Beatriz Trenor (R) and Edward Vigmond (P)
Room: Tempio

438 - Changes in QRS and T-wave Loops Subsequent to an Increase in Left Ventricle Globularity as in Intrauterine Growth Restriction: a Simulation Study (R)

Freddy L Bueno-Palomeque*, Konstantinos Mountris, Ana Minchole, Nuria Ortigosa, Esther Pueyo, Pablo Laguna

126 - Feasibility of Whole-Heart Electrophysiological Models with Near-Cellular Resolution (R)

Mark Potse*, Emmanuelle Saillard, Denis Barthou, Yves Coudière

399 - Effect of Myocardial Fiber Direction on Epicardial Activation Patterns (R)

Lindsay Rupp*, Wilson Good, Jake Bergquist, Brian Zenger, Karli Gillette, Gernot Plank, Rob MacLeod

436 - An In-silico Study Into The Impact of Electrophysiological Variability at the Cellular Level on the Reentry Patterns in Atrial Fibrillation (R)

Jordan Elliott*, Olaf Doessel, Axel Loewe, Luca Mainardi, Valentina Corino, Jose F Rodriguez Matas

184 - Simulating Cardiac Cryoablation considering the Osmotic Virial Equation for Freezing and Thawing (R)

Michael Handler*, Gerald Fischer, Peter Johnston², Daniel Baumgarten

S92 Monitoring and Novel Signal Acquisition Techniques

Chairs: Alfredo Hernandez (P) and Dewar Finlay (R)

Room: Marina 1

- 245 - **Machine Learning Approach to Assess the Performance of Patch Based Leads in the Detection of Ischaemic Electrocardiogram Changes (R)**
Michael Jennings*, Pardis Biglarbeigi, Raymond Bond, Rob Brisk, Daniel Guldenring, Alan Kennedy, James McLaughlin, Dewar Finlay

- 51 - **In Bed Contactless Cardiorespiratory Signals Monitoring Using Optical Fiber Interferometry (R)**
Javier Milagro*, Mario Martínez, Spyridon Kontaxis, David Hernando, Eduardo Gil, Raquel Bailón, Iñigo Salinas, Carlos Heras, Pablo Laguna

- 49 - **Unobtrusive Monitoring of ECG and EEG During Mild Stress Stimuli**
Veronica Chiara Zuccalà*, Riccardo Favilla, Giuseppe Coppini

- 165 - **More Reliable Remote Heart Rate Measurement by Signal Quality Indexes (P)**
Hannes Ernst*, Hagen Malberg, Martin Schmidt

- 470 - **Wireless arm wearable sensor band for long-term heart rhythms surveillance using dual Arm-ECG bipolar leads (R)**
Omar Escalona*, Angel Villegas, David McEneaney

- 64 - **Comparative study of different breathing rate estimation methods from PPG signals, on CAPNOBASE database (R)**
Remo Lazazzera* and Guy Carrault

S93 Autonomic Nervous System in Cardiovascular Regulation

Chairs: Frida Sandberg (R) Riccardo Barbieri (P)
Room: Borgo

- 9 - **Complexity of Spontaneous QT Variability Unrelated to RR Variations and Respiration During Graded Orthostatic Challenge (R)**
Alberto Porta*, Beatrice Cairo, Beatrice De Maria, Vlasta Bari

- 25 - **Central Frequency of Low Frequency Component of RR Estimates Sympathetic Activity during Dynamic Exercise, Standing and Controlled Breathing Maneuvers (R)**
Salvador Carrasco-Sosa* and Alejandra Guillén-Mandujano

- 182 - **Respiratory Modulation in Permanent Atrial Fibrillation (R)**
Mostafa Abdollahpur*, Fredrik Holmqvist, Pyotr Platonov, Frida Sandberg

- 415 - **Parasympathetic Characterization Guided by Respiration from Wrist Peripheral Venous Pressure Waveform (R)**
Diego Cajal*, David Hernando, Jesus Lazaro, Eduardo Gil, Annie Alvis, Monica Polcz, Kyle Hocking, Colleen Brophy, Raquel Bailón

- 206 - **Recursive model identification for the analysis of cardiovascular autonomic modulation during epileptic seizures (P)**
Quentin Gillardin, Virginie Le Rolle, Anca Nica, Arnaud Biraben, Benoît Martin, Alfredo Hernandez*

- 220 - **Patients-Specific Analysis of Myocardial Strains in Left Bundle Branch Block Based on Computational Models (R)**
Kimi Owashi*, Elena Galli, Arnaud Hubert, Erwan Donal, Alfredo Hernandez, Virginie Le Rolle

S94 AFib and Signal Processing

Chairs: Nuria Ortigosa (R) and Tomas Teijeiro (P)
Room: Parco

- 239 - **Investigating Respiratory Rate Estimation During Paroxysmal Atrial Fibrillation Using an Improved ECG Simulation Model (R)**
Spyridon Kontaxis*, Alba Martin, Andrius Petrenas, Vaidotas Marozas, Raquel Bailón, Pablo Laguna, Leif Sornmo

- 366 - **Predicting Atrial Fibrillation Recurrence After Catheter Ablation Through Time Variability of P-wave Features (R)**
Antonio Ruiz Moreno*, Miguel Ángel Arias, Alberto Puchol, Marta Inmaculada Pachón, José J Rieta, Raul Alcaraz

- 369 - **Refined Multiscale Entropy Predicts Early Failure in Electrical Cardioversion of Atrial Fibrillation (R)**
Eva Cirugeda*, Sofía Calero, Víctor M Hidalgo, José Enero, José J Rieta, Raul Alcaraz

- 371 - **Use of Normalized Correlation Function to Discriminate Outcome of Persistent Patients Undergoing Electrical Cardioversion (P)**
Olivier Meste*, Stef Zeemering, Joel Karel, Theo Lankveld, Ulrich Schotten, Harry Crijns, Ralf Peeters, Pietro Bonizzi

- 379 - **Tensor-Based Noninvasive Atrial Fibrillation Complexity Index For Catheter Ablation (P)**
Lucas de Souza Abdalah*, Pedro Marinho Ramos de Oliveira, Vicente Zarzoso, Walter Freitas Jr.

- 396 - **Catheter Ablation Outcome Prediction with Advanced Time-Frequency Features of the Fibrillatory Waves from Patients in Persistent Atrial Fibrillation (R)**
Pilar Escribano*, Juan Ródenas, Miguel A Ari

PA_1 Cardiovascular Imaging

258 - Automatic measurement of myocardial reperfusion following percutaneous coronary intervention (PCI)

Pardis Biglarbeigi, Dewar Finlay, Raymond Bond, Mohammad Alkhalil, Donal McLaughlin, Niamh McCallan, Min Jing, James McLaughlin

288 - Fully Automatic Segmentation of Left Atrium Based on UNet-LSTM

Ze Zhang, Yacong Li, Yashu Liu, Qince Li, Kuanquan Wang, Henggui Zhang
(REMOTE PRESENTATION)

PA_2 Cardiovascular Mechanics

- 56 - **Reduced Myofilament Contraction in Human Heart Failure. Insights from Electromechanical Simulations**
Maria T Mora, Sofia Gutierrez, Juan F Gomez, Beatriz Trenor
(REMOTE PRESENTATION)
- 118 - **Supporting Real World Decision Making in Coronary Diseases Using Machine Learning**
Peter Kokol, Jan Jurman, Tajda Bogovič, Tadej Završnik, Jernej Završnik, Helena Blažun
- 216 - **Reconstructing Cardiac Wave Dynamics from Myocardial Motion Data**
Christopher Beam, Cristian Linte, Niels Otani
(REMOTE PRESENTATION)
- 218 - **Feature Extraction and Classification of Heart Sounds Signals Based on Time-Dependent Entropy and Spectral Entropy Estimation**
Rosario Ríos-Prado, Blanca Tovar-Corona, Alvaro Anzueto-Ríos
(REMOTE PRESENTATION)
- 376 - **Non-invasive Predicted Electrical and Measured Mechanical Indices Predict Response to Cardiac Resynchronization Therapy**
Angela Lee, Orod Razeghi, Jose Alonso Solis Lemus, Marina Strocchi, Baldeep Sidhu, Justin Gould, Jonathan Behar, Mark Elliott, Vishal Mehta, Gernot Plank, Christopher Rinaldi, Steven Niederer
(REMOTE PRESENTATION)
- 426 - **Changes in the Shape of the Photoplethysmographic Signal in Response to the Active Orthostatic Test**
Mateusz Pałasz, Marek Żyliński, Gerard Cybulski
(REMOTE PRESENTATION)

PA_3a Arrhythmia mechanisms

358 - **A Numerical Study of the Electrophysiological Substrate Triggering Ventricular Tachycardia**

Stefano Pagani, Antonio Frontera, Luca Dede', Andrea Manzoni, Luca Limite, Paolo Della Bella, Alfio Quarteroni
(REMOTE PRESENTATION)

142 - **Simulation of ectopic activity onset in border zones between normal and damaged myocardium with minimal ionic models**

Maxim Ryzhii and Elena Ryzhii
(REMOTE PRESENTATION)

114 - **A Computational Investigation into Rate-Dependant Vectorcardiogram Changes due to Specific Fibrosis Patterns in Non-Ischæmic Dilated Cardiomyopathy**

Philip Gemmell, Karli Gillette, Gabriel Balaban, Ronak Rajani, Edward Vigmond, Gernot Plank, Martin Bishop

441 - **Analysis of a case of Brugada Syndrome through Numerical Simulation of Ventricular Action Potential**

Giulia Guidi, Chiara Bartolucci, Anthony Frosio, Procolo Marchese, Annalisa Bucchi, Mirko Baruscotti, Stefano Severi
(IN PERSON PRESENTATION)

432 - **Proarrhythmia in KCNJ2 E299V-linked Short QT Syndrome: A Simulation Study**

Cunjin Luo, Tong Liu, Ying He, Kuanquan Wang, Henggui Zhang

PA_3b AFib Surface ECG

- 6 - **Pulmonary Vein Isolation Induces Changes in Vectorcardiogram P-wave Loops**
Nuria Ortigosa, Óscar Cano, Frida Sandberg
(REMOTE PRESENTATION)
- 76 - **Shapelet Discovery for Atrial Fibrillation Detection**
Saman Parvaneh and Yale Chang
- 106 - **An End-to-end Deep Learning Scheme for Atrial Fibrillation Detection**
Yingjie Jia, Haoyu Jiang, Ping Yang, Xianliang He
(REMOTE PRESENTATION)
- 170 - **Automatic Detection of Atrial Fibrillation Using Electrocardiomatrix and Convolutional Neural Network**
Ricardo Salinas-Martínez, Johannes de Bie, Nicoletta Marzocchi, Frida Sandberg
(IN PERSON PRESENTATION)
- 205 - **Beat-to-beat P-wave Variability Increases from Paroxysmal to Persistent Atrial Fibrillation**
Rita Laureanti, Stef Zeemering, Matthias Zink, Valentina Corino, Angelo Auricchio, Luca Mainardi, Ulrich Schotten
(IN PERSON PRESENTATION)
- 232 - **Model-Based Characterization of Atrial Fibrillation Episodes and its Clinical Association**
Alba Martin, Mikael Henriksson, Monika Butkuvienė, Vaidotas Marozas, Andrius Petrėnas, Aleksei Savelev, Pyotr Platonov, Leif Sornmo
(REMOTE PRESENTATION)
- 299 - **Optimal ECG leads for atrial fibrillation characterization and prediction of ablation outcome**
Francesco Acquati, Anna McCann, Etienne Pruvot, Jean-Marc Vesin, Adrian Luca
(REMOTE PRESENTATION)
- 335 - **Single-Feature Method for Fast Atrial Fibrillation Detection in ECG Signals**
Lucie Marsanova, Lukas Smital, Radovan Smisek, Andrea Nemcova, Martin Vitek
(REMOTE PRESENTATION)

- 373 - **Limb Versus Precordial ECG Leads as Improved Predictors of Electrical Cardioversion Outcome in Persistent Atrial Fibrillation**
Eva Cirugeda, Sofía Calero, Aurelio Quesada, Victor M Hidalgo, José J Rieta, Raul Alcaraz
(REMOTE PRESENTATION)
- 377 - **Multidimensional Characterization of the Atrial Activity to Predict Electrical Cardioversion Outcome of Persistent Atrial Fibrillation**
Eva Cirugeda, Sofía Calero, Eva Plancha, José Enero, José J Rieta, Raul Alcaraz
(REMOTE PRESENTATION)
- 393 - **Time Variability of Fibrillatory Waves Energy Predicts Long-Term Outcome of Atrial Fibrillation Concomitant Surgical Ablation**
Juan Ródenas, Pilar Escribano, Miguel Martínez, Manuel García, Fernando Hornero, José J Rieta, Raul Alcaraz
(REMOTE PRESENTATION)
- 442 - **Slow conduction regions as a valuable vectorcardiographic parameter for the non-invasive identification of atrial flutter types**
Samuel Ruipérez Campillo, José Millet, Sergio Castrejón, Raquel Cervigón, José Luis Merino, Francisco Castells
(REMOTE PRESENTATION)
- 449 - **Fusion of Multiple Univariate Data Analysis based Detectors to Build a Specific Fingerprint of Atrial Fibrillation**
Zouhair Haddi, Bouchra Ananou, Youssef Trardi, Mustapha Ouladsine

PA_4a ECG Waveform Analysis 2

- 82 - **A Comparison of Supervised Learning Algorithms for Ventricular and Supraventricular Arrhythmia Detection**
Yun Kwan Kim and Hee Seok Song
(REMOTE PRESENTATION)
- 123 - **Predicting Left Ventricular Mass Using ECG, Demographic and DXA Features**
Jonathan Moeyersons, Ruben De Bosscher, Christophe Dausin, Guido Claessen, André La Gerche, Jan Bogaert, Rik Willems, Sabine Van Huffel, Carolina Varon
(REMOTE PRESENTATION)
- 137 - **Arrhythmia detection based on patient-specific normal ECGs using deep learning**
Shota Hori, Toru Shono, Keiji Gyohten, Hidehiro Ohki, Toshiya Takami, Noboru Sato
(REMOTE PRESENTATION)
- 140 - **Multi-level Information for Non-invasive Identification of Exit Site of Ventricular Tachycardia**
Qiupeng Feng, Huafeng Liu, Hongjie Hu
(REMOTE PRESENTATION)
- 151 - **Fragmented QRS dynamics towards electrical storm in ICD patients**
Amalia Villa Gómez, Sebastian Ingelaere, Sabine Van Huffel, Rik Willems, Carolina Varon
(REMOTE PRESENTATION)
- 174 - **Automatic Detection of Characteristic Waves in Electrocardiogram**
Lucia Billeci, Lorenzo Bachi, Maurizio Varanini
(IN PERSON PRESENTATION)
- 199 - **Potassium Monitoring from Multilead T-wave Morphology Changes during Hemodialysis: Periodic versus Principal Component Analysis**
Flavio Palmieri, Pedro Gomis, José Esteban Ruiz, Dina Ferreira, Alba Martín5, Esther Pueyo, Pablo Laguna, Juan Pablo Martínez, Julia Ramírez
(REMOTE PRESENTATION)
- 203 - **Gender related modification in ECG and VCG in elderly people**
Giovanni Bortolan, Ivaylo Christov, Iana Simova
(REMOTE PRESENTATION)

- 227 - **Classifying 12-Lead ECG Using Convolutional Recurrent Neural Network**
Bjørn-Jostein Singstad and Christian Tronstad
(REMOTE PRESENTATION)
- 262 - **Dry Composite Electrodes with Carbon Nanotubes Additive for Biopotentials Measurements: ECG use case**
Dominik Grochala, Marcin Kajor, Paweł Smoleń, Piotr Augustyniak, Krystian Gruszka
(IN PERSON PRESENTATION)
- 311 - **Classification of Premature Ventricular Contraction using Deep Learning**
Fabiola De Marco, Dewar Finlay, Raymond Bond
(REMOTE PRESENTATION)
- 321 - **Biometric Authentication of Persons Using the Unique Characteristics of the ECG Signal**
Tomas Repcik, Veronika Polakova, Vojtech Waloszek, Michal Nohel, Lukas Smital, Vitek Martin, Radim Kolar
(REMOTE PRESENTATION)
- 382 - **A Quaternion-based Approach to Estimate Respiratory Rate from the Vectorcardiogram**
Daniel Romero, Jesus Lazaro, Raquel Bailón
(REMOTE PRESENTATION)
- 452 - **Explaining black-box automatic electrocardiogram classification to cardiologists**
Derick Oliveira, Antonio H. Ribeiro, Joao Pedrosa, Gabriela Paixão, Antonio Luiz Ribeiro, Wagner Meira Jr.
(REMOTE PRESENTATION)

PA_4b BSPM, Mapping, and ECG

- 242 - **Classification and Location of Atrial Arrhythmic Mechanisms with Body Surface Potential Mapping**
Victor Gonçalves Marques, Miguel Rodrigo, Maria de la Salud Guillem Sánchez, João Salinet
(REMOTE PRESENTATION)
- 115 - **Moving Dipole Determination from 12-Lead ECGs Can Improve Detection of Acute Myocardial Ischemia**
Vito Starc
(REMOTE PRESENTATION)
- 334 - **Disease-specific Electrocardiographic Lead Positioning for Early Detection of Arrhythmogenic Right Ventricular Cardiomyopathy**
Janna Ruisch, Machteld Boonstra, Rob Roudijk, Peter Loh, Peter van Dam, Cornelis Herman Slump
(REMOTE PRESENTATION)
- 473 - **Robust Noninvasive Atrial Ectopic Beat Classification from Surface ECG using Second-order Statistics Blind Source Separation**
Yingjing Feng, Caroline Roney, Méléze Hocini, Steven Niederer, Edward Vigmond
(REMOTE PRESENTATION)
- 160 - **An Open-Source Algorithm for Standardized Bullseye Visualization of High-Resolution Cardiac Ventricular Data**
Job Stoks, Uyen Chau Nguyen, Ralf Peeters, Paul Volders, Matthijs Cluitmans
(REMOTE PRESENTATION)
- 90 - **Impact of Body Composition and Lead Placement On ECG-based Clinical Algorithm for Localizing Ventricular Tachycardia Origin**
Sofia Monaci, Cristobal Roderó, Marina Strocchi, John Whitaker, Ronak Rajani, Reza Razavi, Mark O'Neill, Andrew King, Martin Bishop
(REMOTE PRESENTATION)
- 266 - **Modeling Arrhythmia Vulnerability due to Perivascular Excitation Tunneling in Ischemia-Reperfusion**
Teo Puig Walz, Enaam Chleilat, Peter Kohl, Callum Zgierski-Johnston, Gunnar Seemann
(REMOTE PRESENTATION)

PA_5 Whole Heart Modelling

- 33 - **Synthetic ECG produced by 2D reaction-diffusion model to fit real time electrocardiographic signals**
Shane Loeffler and Joseph Starobin
(REMOTE PRESENTATION)
- 195 - **A human-based biventricular strongly coupled electromechanics model for post myocardial infarction**
Zhinuo Jenny Wang, Lei Wang, Xin Zhou, Francesca Margara, Alfonso Santiago, Francesc Levrero-Florencio, Mariano Vazquez, Blanca Rodriguez
(REMOTE PRESENTATION)
- 226 - **3D Model of the Heart Electrical Activity with Heterogeneous Ventricular Action Potentials**
Niccolò Biasi and Alessandro Tognetti
(REMOTE PRESENTATION)
- 70 - **Constructing Realistic Canine Bilayer Biatrial Mesh for Atria Fibrillation Simulations**
Mirabeau Saha, Caroline Roney, Feng Xiong, Hubert Cochet, Stephanie Tan, Edward Vigmond, Stanley Nattel
(REMOTE PRESENTATION)
- 450 - **Diffuse and Stringy Fibrosis in a Bilayer Interconnected Cable Model of the Left Atrium**
Ariane Salianni and Vincent Jacquemet
(REMOTE PRESENTATION)
- 425 - **Breakthrough Wave Detection in a 3D Computer Model of Atrial Endo-Epicardial Dissociation**
Éric IRAKOZE and Vincent Jacquemet
(REMOTE PRESENTATION)
- 259 - **Double Gaussian Propagation Model to Assess Local Pulse Wave Velocity**
Evelien Hermeling, Fabian Beutel, Chris van Hoof

PA_6 Health Informatics and Technology

- 52 - **Software Framework to Quantify Pulmonary Vein Isolation Atrium Scar Tissue**
Jose Alonso Solis-Lemus, Orod Razeghi, Caroline Roney, Iain Sim, Rahul Mukherjee, Steven Williams, Mark O'Neill, Steven Niederer
(REMOTE PRESENTATION)
- 150 - **Telehealth Services for Home-Based Rehabilitation of Cardiac Patients**
Dieter Hayn, Mahdi Sareban, Alphons Eggerth, Markus Falgenhauer, Angelika Rzepka, Heimo Traninger, Karl Mayr, Marco Philippi, Michael Porodko, Christoph Puelacher, Stefan Höfer, Josef Niebauer
(REMOTE PRESENTATION)
- 153 - **Effects in Accuracy and Computation Cost of Design Parameters of Remote Photoplethysmography System**
Edwin Arkel Rios, Chih-Chieh Lai, Bo-Rong Yan, Bo-Cheng Lai
- 177 - **A Noninvasive Cardiac Output Trend Monitor Targeting Telemedicine Applications**
Rafael Maestre, Andrés Lorenzo Bleda, Ovidio López, Ricardo Ruiz, Javier Corral
(REMOTE PRESENTATION)
- 179 - **Multi-Wavelength Photoplethysmography System for the Measurement of Pulse Wave Velocity**
Jukka-Pekka Sirkiä, Tuukka Panula, Jasmiina Kantelus, Juho Koskinen, Matti Kaisti
(REMOTE PRESENTATION)
- 208 - **Coefficients for the Derivation of Posterior and Right Sided Chest Leads from the 12-lead Electrocardiogram**
Michael Jennings, Ali Rababah, Pardis Biglarbeigi, Rob Brisk, Daniel Guldenring, Raymond Bond, James McLaughlin, Dewar Finlay
(REMOTE PRESENTATION)
- 359 - **The Effect of Measurement Uncertainty on the Outcome of Blood Pressure Measurement Validation Protocol Based on the ISO81060-2:2018 Guideline**
Janos Palhalmi
(REMOTE PRESENTATION)

- 388 - **Identification of Most Suitable Regions in Imaging Photoplethysmography by Reference Signal Information**
Matthieu Scherpf, Hannes Ernst, Hagen Malberg, Martin Schmidt
(IN PERSON PRESENTATION)
- 389 - **Machine learning to predict 30 days and 1-year mortality in STEMI and turnaround patients**
Aleeha Iftikhar, Raymond Bond, Victoria McGilligan, Stephen J Leslie, Charles Konery, Khaled Rjooon, Anne McShane, Aaron Peace
(REMOTE PRESENTATION)
- 392 - **Analysis of Cardiovascular Deconditioning Due to Long-term Bedrest as Observed on Seismocardiogram Morphology (R)**
Kouhyar Tavakolian
- 422 - **Elements Read GUI: a Versatile Tool to Display and Analyse Electrophysiological Experimental Data**
Eugenio Ricci, Filippo Cona, Stefano Severi
(IN PERSON PRESENTATION)
- 439 - **AI Based Security Defense Pathway for Medical Diagnosis Systems (CMDS)**
Ying He, Kuanquan Wang, Henggui Zhang, Cunjin Luo
(REMOTE PRESENTATION)

PA_7a System Study

- 8 - **Vital-Sign Synchrony as a Marker for Patient Circadian Rhythms in an Intensive Care Unit**
Shaun Davidson, Mauricio Villarroel, Eoin Finnegan, Mirae Harford, Joao Jorge, Lionel Tarassenko
(IN PERSON PRESENTATION)
- 26 - **Frequency Coupling and Sensitivity Spectral Measures of the Respiratory Sinus Arrhythmia System in Response to Increasing Respiratory Frequency**
Alejandra Guillén-Mandujano, Salvador Carrasco-Sosa, Paola Coello-Caballero
REMOTE PRESENTATION)
- 94 - **Safety Ranges for Heart Rate Variability Parameters in Hyperbaric Environments**
Carlos Sánchez, Alberto Hernando, Juan Bolea, David Izquierdo, María Teresa Lozano Albalate, María Dolores Pelaez Coca
(REMOTE PRESENTATION)
- 147 - **Sleep-Wake Classification for Home Monitoring of Sleep Apnea Patients**
Dorien Huysmans, Ivan Castro, Eva Heffinck, Margot Deviaene, Pascal Borzée, Bertien Buyse, Dries Testelmans, Sabine Van Huffel, Carolina Varon
(REMOTE PRESENTATION)
- 197 - **Effect of Anesthesia on Fetal-Maternal Heart Rate Variability and Coupling in Pregnant Mice and Fetuses**
Ahsan Khandoker, Maisam Wahbah, Chihiro Yoshida, Yoshitaka Kimura, Yoshiyuki Kasahara
(REMOTE PRESENTATION)
- 231 - **Detection Quality Indices for Improved Heart Beat Assessment in Non-Invasive Fetal ECG**
Jonas Weiß, Hagen Malberg, Martin Schmidt
(IN PERSON PRESENTATION)
- 400 - **Obstructive Sleep Apnea Detection Methods Based on Heart Rate Variability Analysis: Opportunities for a Future Cinc Challenge**
Daniele Padovano, Arturo Martinez-Rodrigo, José Manuel Pastor, José J Rieta, Raul Alcaraz
(REMOTE PRESENTATION)

PA_7b Heart Rate Variability

- 88 - **Effects of ECG Sampling Frequency on the Multiscale Entropy of Heart Rate Variability**
Paolo Castiglioni and Andrea Faini
(REMOTE PRESENTATION)
- 125 - **Are Inter-Beat Intervals from Blood Pressure a Valid Alternative to R-R Intervals for the Multiscale Entropy Analysis of Heart Rate Variability?**
Andrea Faini, Gianfranco Parati, Paolo Castiglioni
(REMOTE PRESENTATION)
- 68 - **QT-RR Relation Is Different in Humans and Rats**
Beatrice De Maria, Vlasta Bari, Beatrice Cairo, Aparecida Maria Catai, Anielle Cristhine de Medeiros Takahashi, Luca Carnevali, Andrea Sgoifo, Francesca Perego, Laura Adelaide Dalla Vecchia, Alberto Porta
(REMOTE PRESENTATION)
- 222 - **Blood Pressure Classification by Analyzing the behavior of Heart Rate Variability in Poincare Plot**
Shahab Rezaei and Keivan Maghooli
(REMOTE PRESENTATION)
- 286 - **Analysis of cardiac dynamics in patients with Chagas disease using the PCA**
Miguel Vizcardo, Diego Cornejo Luque, Esteban Segundo Alvarez
(REMOTE PRESENTATION)

Wednesday, September 16, 2020

14:00

SB1 Whole Heart Modelling – Electromechanics & Infarction

Chairs: Mark Potse (R) and Alan Fabbri (P)

Room: Tempio

- 238 - **Creating a Digital Twin to Investigate AV Block: In-sights from a Validated Electromechanical Full-Heart Model (R)**
Kevin Sack*, Joshua Blauer, Mike Campbell, Darrell Swenson
- 210 - **Gaussian Process Emulation Enables a Quantitative Link between Cellular Mechanical Myocardial Properties and Left Ventricular Contractile Function in Aortic Banded Rats (R)**
Stefano Longobardi*, Alexandre Lewalle, Sam Coveney, Ivar Sjaastad, Emil K. S. Espe, William E. Louch, Cynthia J. Musante, Anna Sher, Steven A. Niederer
- 338 - **Investigation of the Electrophysiological Remodelling in Acute and Chronic Post-Myocardial Infarction (R)**
Xin Zhou*, Jakub Tomek, Blanca Rodriguez
- 315 - **Simulated activation sequences fitted to ECG improve model accuracy in porcine models of chronic infarct (R)**
Caroline Mendonca Costa*, Phillip Gemmel, Aurel Neic, Gernot Plank, Mark O'Neill, John Whitaker, Martin Bishop

SB2 Seismo/Ballistocardiography

Chairs: Richard Gregg (R) and Christoph Hoog Antink (P)

Room: Marina 1

- 4 - **Seismocardiography On Infants and Kids (R)**
Nico Jähne-Raden, Henrike Gütschleg, Marie Cathrine Wolf*, Stephan Sigg, Ulf Kulau

- 60 - **Quantification of Posture-Induced Changes in Bed-Based Ballistocardiogram (R)**
Hewon Jung*, Jacob Kimball, Timothy Receveur, Eric Agdeppa, Omer Inan

- 394 - **Morphological Changes of Seismocardiogram Due to Different Sensor Placements on the Sternum (R)**
Kouhyar Tavakolian

- 250 - **Pulse Transit Time from Seismocardiography as an Estimation of Blood Pressure**
James Skoric, Yannick D'Mello, Siddiqui Hakim, Ezz Aboulez, Nathan Clairmonte, Michel Lortie, David V. Plant

SB3 Blood Pressure Regulation and Variability

Chairs: Vlasta Bari (P) and Massimo Rivolta (P)

Room: Borgo

444 - Comparison Between Bivariate Phase-Rectified Signal Averaging and Sequence Method in Assessing the Baroreflex Sensitivity (P)

Massimo W Rivolta* and Roberto Sassi

110 - Comparing Trends in Blood Pressure Computed from the Arterial Line and Sphygmomanometer in the ICU (R)

Eoin Finnegan*, Mauricio Christian Montoya Villarroel, Shaun Davidson, Joao Jorge, Mirae Harford, Lionel Tarassenko

109 - Aortic Pressure Forecasting with Deep Sequence Learning (R)

Rui Wang*, Eliza Huang, Uma Chandrasekaran, Rose Yu

235 - Baroreflex Sensitivity Evolution before Weaning From Mechanical Ventilation (R)

Pablo Armañac*, David Hernando, Jesus Lazaro, Candelaria de Haro, Rudys Magrans, Leonardo Sarlabous, Josefina López-Aguilar, Pablo Laguna, Eduardo Gil, Lluís Blanch, Raquel Bailón

Wednesday, September 16, 2020

14:00

SB4 Arrhythmogenesis in acute ischemia and post-infarction substrate

Chairs: Hermenegild Arevalo (R) and Olivier Meste (P)

Room: Parco

- 264 - **Potential Roles of Purkinje Fibers in Ischemia-Induced Arrhythmias (R)**
Teo Puig Walz*, Luca Azzolin, Lucas Berg, Enaam Chleilat, Hermenegild Arevalo
- 101 - **Assessing the Ability of Substrate Mapping Techniques to Identify Scar-related Arrhythmia Circuits Through Computational Modelling (R)**
Fernando Campos*, Michele Orini, Robert Arnold, John Whitaker, Mark O'Neill, Reza Razavi, Gernot Plank, Ben Hanson, Pier Lambiase, Bradley Porter, Christopher Aldo Rinaldi, Jaswinder Singh Gill, Peter Taggart, Martin Bishop
- 102 - **Calcium-mediated Delayed Afterdepolarizations form a Substrate for Conduction Block in the Post-infarction Heart (R)**
Fernando Campos*, Yohannes Shiferaw, John Whitaker, Mark O'Neill, Reza Razavi, Gernot Plank, Martin Bishop
- 241 - **Computational analysis of vulnerability to reentry in acute myocardial ischemia (R)**
Edison F. Carpio*, Juan F. Gomez, José F. Rodríguez, Beatriz Trenor, Jose M Ferrero

Wednesday, September 16, 2020

15:00

MC Closing Plenary

Chairs: Stefano Severi (P) and Rob MacLeod (R)

Room: Tempio

254 - Next-generation in-silico Cardiac Electrophysiology through Immersed Grid Meshfree Modelling. Application to Simulation of Myocardial Infarction (R)

Konstantinos Mountris* and Esther Pueyo

50 - A Novel Approach based on Spatio-temporal Features and Random Forest for Scar Detection using Cine Cardiac Magnetic Resonance Images (P)

Sara Moccia*, Alessandro Cagnoli, Chiara Martini, Giuseppe Moscogiuri, Mauro Pepi, Emanuele Frontoni, Gianluca Pontone, Enrico Caiani

491 - Novel Echocardiographic Modalities (R)

Prof. Roberto Lang

NOTES

Program Overview

Monday, September 14, 2020

8:30	Welcome to CinC 2020	Tempio
8:45	RDYI: Rosanna Degani Young Investigator Finals	Tempio
10:15	Coffee Break	
10:45	S21: Membrane and Cellular Modelling	Tempio
	S22: Advances in ECGI	Marina 1
	S23: Cardiovascular Mechanics	Borgo
	S24: Heart Rate Variability: Methods	Parco
12:15	Social Event	

Tuesday, September 15, 2020

8:30	S31: Special Session 1: Role of Statistical Genetics in Assessing Cardiovascular Risk	Tempio
	S32: Experimental and Clinical ECGI	Marina 1
	S33: ECG processing and classification	Borgo
	S34: Heart Rate variability: Applications	Parco
10:00	Coffee break	
10:15	S41: Modelling Drug Effects and Mutations	Tempio
	S42: Cardiovascular Imaging	Marina 1
	S43: ECG and Signal Processing I	Borgo
	S44: Special Session 2: Machine Learning in Atrial Fibrillation	Parco
11:45	Lunch	
12:30	S51: Challenge I	Tempio
	S52: Signal-processing for optimisation of cardio-pulmonary resuscitation	Marina 1
	S53: ECG analysis and rhythm annotation	Borgo
	S54: AFib mapping and learning	Parco
14:00	Coffee break	
14:15	S61: Challenge II	Marina 1
	S62: Understanding mechanisms of ventricular arrhythmias and defibrillation	Tempio
	S63: ECG and Signal Processing II	Borgo
	S64: Afib mechanisms	Parco
15:45	Poster Session P7 with Coffee	

Wednesday, September 16, 2020

8:30	S81: Special Session 3: Digital Twins	Tempio
	S82: Machine Learning, AI and Computation	Borgo
	S83: Cardiorespiratory Applications	Marina 1
	S84: AFib therapy	Parco
10:00	Coffee break	
10:30	S91: Whole Heart Modelling – Electrophysiology	Tempio
	S92: Monitoring and Novel Signal Acquisition Techniques	Marina 1
	S93: Autonomic Nervous System in Cardiovascular Regulation	Borgo
	S94: AFib Signal processing	Parco
12:00	Lunch and Poster Session PA	
14:00	SB1: Whole Heart Modelling – Electromechanics & Infarction	Tempio
	SB2: Seismo/Ballicardiography	Marina 1
	SB3: Blood Pressure Regulation and Variability	Borgo
	SB4: Arrhythmogenesis in acute ischemia and post-infarction substrate	Parco
15:00	MC: Closing Plenary	Tempio