COMPUTING IN CARDIOLOGY

September 12-15, 2021
Brno, Czech Republic

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Welcome to Brno in 2021!

Dear CinCers and CinCeresses (*try saying it out loud*),

Whether you're visiting us in Brno or reading this at the comfort of your home or office, let us welcome you at the Computing in Cardiology 2021 in Brno.

If you're sitting at the Reduta theatre, where the Sunday Symposium is happening, you probably already noticed that Brno is a great place to exchange ideas, discuss science and also enjoy yourselves. Let us remind you that Brno and the Czech Republic itself are vibrant places full of culture, education and great cuisine. It's no wonder that in the past, the local environment (*and perhaps the local wine*) inspired several well-known scientists to their discoveries. Among the best known ones are Johann Gregor Mendel, Jan Evangelista Purkyně or a Nobel Laureate Jaroslav Heyrovský.

And if those names don't ring a bell (*are you sure you're at the right conference??*) maybe the following ones will. The Czech Republic is also famous for its great sportsmen such as Jaromír Jágr (best known for ice hockey and his signature haircut) or Petr Čech (known for football/soccer and his signature helmet). We also pride ourselves as great musicians and culture lovers and among our best known names in this area belong a pop singer Karel Gott (nicknamed Kája the Divine), a film director Miloš Forman (Academy Award winner for his films *One Flew Over the Cuckoo's Nest* and *Amadeus*) or a writer Milan Kundera (best known for his *Unbearable Lightness of Being* novel).

Plus, if you enjoy your coffee or tea with a few lumps of sugar, you might want to know that sugar in cube shapes was invented here too. *Sweet, huh?*

For those of you reading this at home, this was a really useless wall of text with lots of yadda yadda.

We sincerely hope you'll enjoy yourselves here and savour all Brno and its surrounding areas have to offer. And if you're watching this conference online we wish you a steady internet connection and as few interruptions as possible. And say hi to your pets from us.

Best wishes,

Ivo Provazník and every member of our large LOC team

Board of Directors

Local Organizing Committee

Ivo Provazník
Brno University of Technology
Chairperson

Marie Nováková
Masaryk University

Pavel Jurák
The Czech Academy of Sciences

Pavel Leinveber
St. Anne's University Hospital

Vratislav Harabiš
Jakub Hejč
Roman Jakubíček
Oto Janoušek
Katka Jurečková
Jana Kolářová
Petra Novotná
Markéta Nykrýnová
Marina Ronzhina
Jiří Sekora

Letter from the President

Dear CinC 2021 Participant,

We all thought 2021 would be a return to normal after 2020 (the year we all want to forget), but, alas, the Corona virus, Delta variants, vaccine shortages, and some weird politics have left us mired in uncertainty once again. It is clearly true that we are better off than a year ago; we have vaccines working well enough that we can avoid serious lockdowns and we have begun to emerge into public life. For those who are vaccinated, the risks of serious illness are very low and we hope this reduced risk will allow me to welcome many of you in person to Brno!

As you all know, we have continued with the same hybrid format of CinC that we used with great success last year for Rimini/CinC2020, even the same company. We hope the familiar interface will allow us all to make even more use of the features that the hybrid format enables. We can see posters throughout the conference and comment on them, reach out to the authors, use the social-media aspects of this platform to connect, build community, and provide the contact with our fellow CinC geeks that we have been missing. Even for those of us who can attend in person, we will make use of the hybrid tools and try to convey some of excitement of being in Brno.

Many aspects of this program are, indeed, business as usual! We continue to highlight the features that make our conference like few others. The Sunday Symposium organized by the Local Organizing Committee on the topic of AI 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 Brno.

Just as last year, we owe special thanks to the Local Organizing Committee under the leadership of Ivo Provaznik at the Brno University of Technology. Ivo and his team have dealt with the constantly changing conditions and seen their own country emerge from being one of the most severely affected countries in Europe to become the closest thing to a safe haven against COVID. They have done everything possible to make CinC2021 both a safe and enjoyable event and please thank them when you can for their dedication to our community. And, as always, please extend your thanks — and your suggestions and ideas, to the members of the CinC Board of Directors, who perform endless hours of volunteer effort for our society.

More than ever before, I look forward to seeing you in Brno!

Rob MacLeod, President, Computing in Cardiology

Welcome to Tampere for CinC 2022

Dear CinC Friends,

We are thrilled to invite you to Tampere, Finland, for the 49th Computing in Cardiology conference on September 04-07th, 2022. It is the third time CinC is hosted in the Nordic Countries and the very first time in Finland!

The city of Tampere is dynamic, international, and easily accessible. It is located in the Pirkanmaa region, only 180 km from the Finnish capital Helsinki. The city hosts Tampere University (TAU), the new University born in 2019, merging the old Tampere University of Technology and the University of Tampere. With more than 20,000 students, TAU represents the most international university community in Finland. CinC2022 is hosted by the Faculty of Medicine and Health Technology, which combines Biomedical Engineering, Biotechnology, and Medicine, providing an excellent basis for most CinC scientific areas.

The Tampere location is quite evocative. Founded in 1775 by King Gustav III of Sweden between the two lakes Näsijärvi and Pyhäjärvi, Tampere has in its core the Tammerkoski rapids, which connect the two lakes and provided energy to one of the first industrial plants in Finland: the Finlayson textile factory, established in 1820. In 1882, the first electric bulbs were lit in Finlayson, making Tampere the first city in the Nordic Countries to have electric light. Nowadays, Tampere is the central hub for ICT companies in Finland.

The conference venue is Tampere Hall (Tampere-talo), the largest congress center in the Nordic Countries. Tampere Hall is located in the city center, only 500 meters from the railway and bus stations, and most of Tampere hotels are just a 5-15 minute walk away.

The organizing committee is working hard to organize an exciting and enjoyable meeting, and it welcomes you to one of the liveliest cities in Finland!

Jari Hyttinen, Michelangelo Paci, Jussi Koivumäki

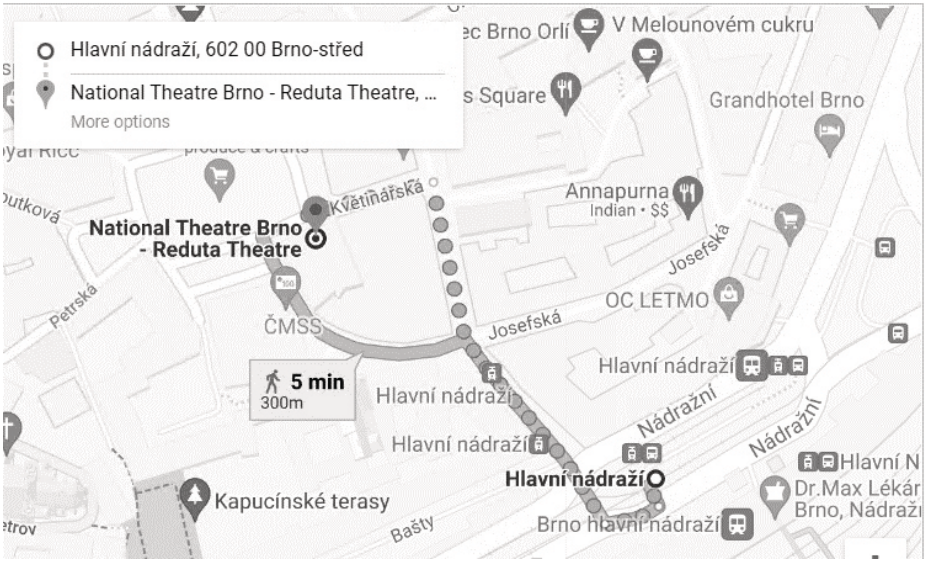
Co-chairs of CinC2022

Maps

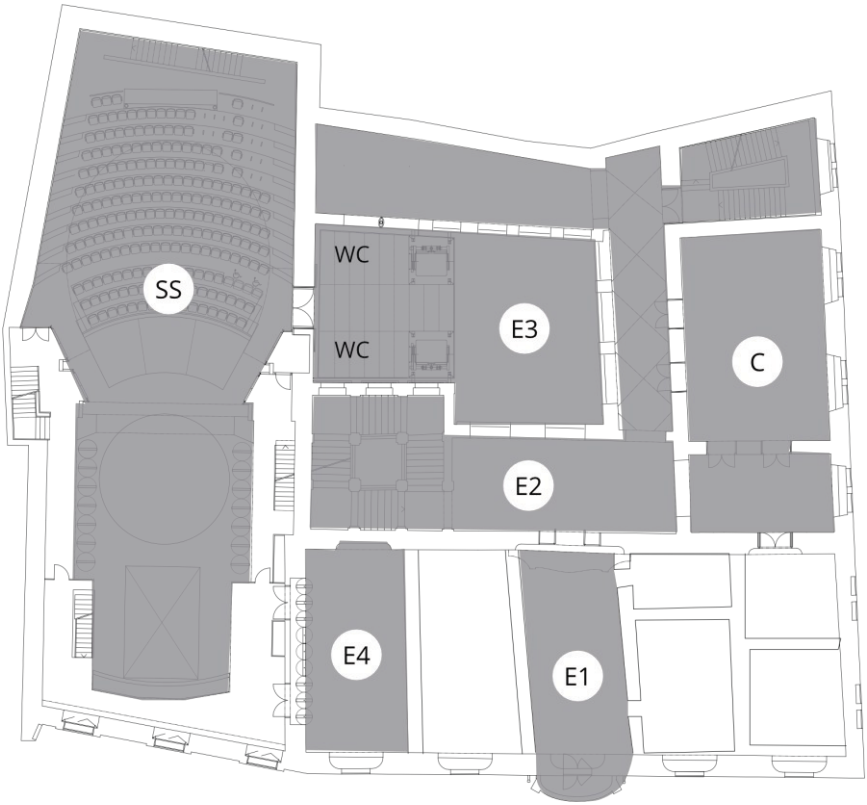
Maps of Reduta theatre (Sunday Symposium)

Address: Reduta theatre, Zelný trh 313/4, 60200 Brno

How to get there: From the main railway station, walk five minutes on foot through the city center to the Zelný trh, where the Reduta theater is situated.



Plan of Reduta theatre



SS – Sunday Symposium main hall

C – Coffee and restaurant

E1 – Entrance

E2 – Extended foyer

E3 – Foyer

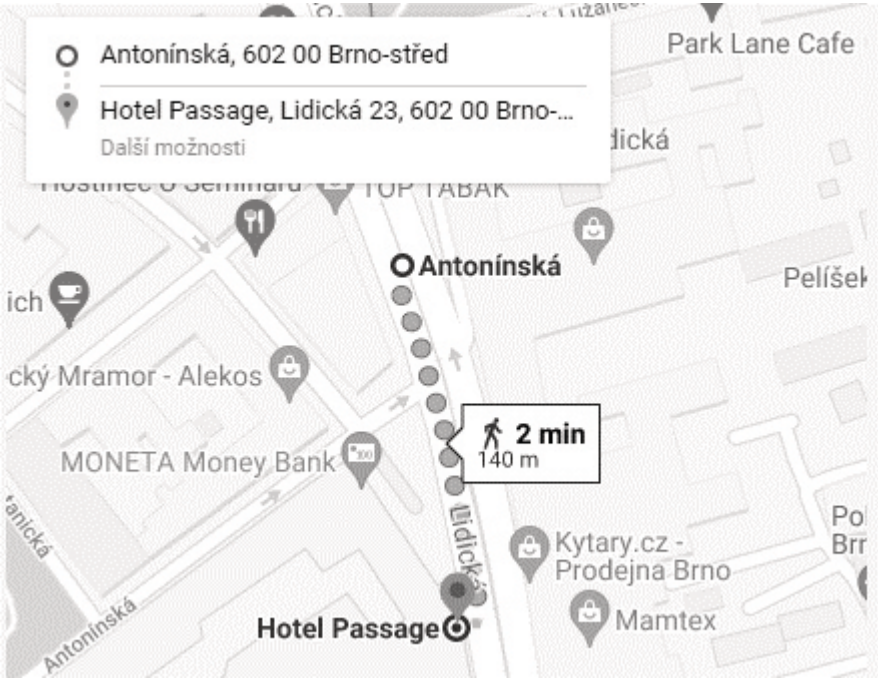
E4 – Cloakroom

Map of Hotel Passage (Conference Venue)

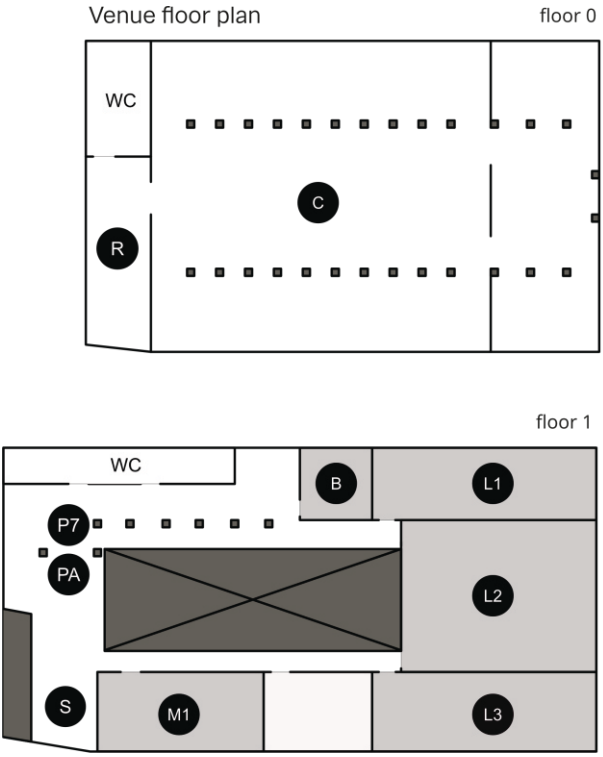
Address: Lidická 23, 602 00 Brno-center.

How to get there:

- **Public tramway lines** no. 1 and no. 6 will get you right to the Antonínská stop. The Passage hotel is 140 meters (2 minutes) away. Walk to the main street.
- **Taxi:** ask driver to Hotel Passage, Lidická 23.
- **Walk:** hotel Passage is located in the city center, you can walk through downtown to the Moravské náměstí close to hotel.



Plan of Hotel Passage



L1 – Large 1 room

L2 – Large 2 room

L3 – Large 3 room

C – Cardion ballroom

M1– Medium 1 room

B – Board room

S – coffee and snack spot

R – registration

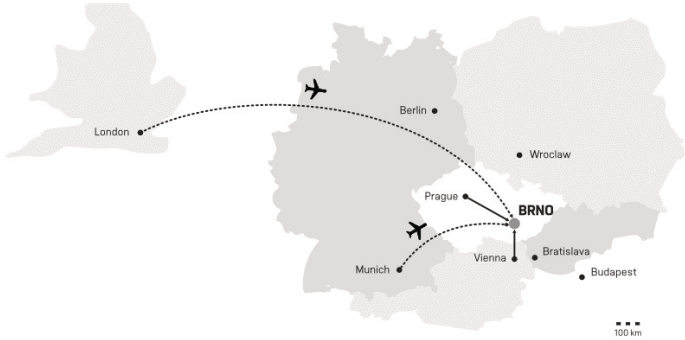
Transportation, Hotels and Practical Information

Transportation

Strategically located in Central Europe, Brno has excellent accessibility making travelling to the city a breeze for visitors from all over the world. Brno is the crossroad between four capital cities – Prague, Vienna, Bratislava and Budapest.

By air

Direct flights to Brno Airport are currently possible from London/Stansted. We recommend taking a flight at one of the nearby traffic hubs, Prague Vaclav Havel Airport or Vienna International Airport. Prague and Vienna Airports are just over 200 and 150 kilometers from Brno. You can catch an express coach to Brno departing directly from Prague and Vienna airport. You can also travel by train from the main train station located in both central Prague and central Vienna.



By Express Coach from Vienna/Prague

If you are arriving either at Vienna or Prague Airport, the most comfortable option is to get the RegioJet express coach service which runs to and from Brno city centre. It will take just over 2 hours from Vienna and 3 hours from Prague.

After your arrival at Prague Vaclav Havel Airport you may go from one of both Terminal-Exits to the bus stop trough crosswalk. The bus stop is located under the overpass of the street. The bus stop is signed with the RegioJet logo.

If you choose to travel at Vienna Airport the RegioJet bus stop is situated in the bus terminal. After the exit from the new arrival hall go to the right. The buses depart from platform number 2.

The journey to Brno by an express coach should be between 6 to 12 Euros. We strongly recommend buying a ticket including seat reservation in advance. You can find the most suitable coach at RegioJet – Commercial bus operator.

By Express Train

From Prague Airport to Brno

The best way to get to Prague main train station is to use the Airport Express line. The Airport Express line operates daily at regular 30-minute intervals from 6:30 am to 9 pm. The Airport Express Line is a service of the Czech Railways and this bus goes from Terminal 1 directly to the main train station (Wilsonovo nadrazi) near the city centre. This kind of transport is not a part of the Prague Integral Transport System, so do not purchase a ticket using a ticket machine – pay directly to a bus driver. One-way journey costs 60 CZK.

If you want to take a Taxi or Uber the price should be about 400 CZK. The address of Prague main railway station is Wilsonova 300/8, 120 00 Vinohrady-Praha 2.

The journey from Prague by train starts approximately at 200 CZK. We strongly recommend buying a ticket including seat reservation in advance. You can find the most suitable train here:

- RegioJet – Commercial railway operator
- Ceske Drahy – Czech national railway operator

From Vienna Airport to Brno

The best way to get to Vienna main train station (Vienna Hauptbahnhof) is to use the OBB train line from Flughafen Wien Bahnhof (Airport train station) to Vienna Hauptbahnhof. The express train leaves the station every 30 minutes. You can buy a one-way ticket for about 4,2 Euro (it is possible to purchase a ticket directly at the airport or in advance here).

The journey from Vienna Hauptbahnhof by a train starts approximately at 10 Euros. We strongly recommend buying a ticket including seat reservation in advance. You can find the most suitable train here:

- Ceske Drahy – Czech national railway operator
- OBB – Austrian national railway operator

Local Transportation in Brno

Free three-day ticket for delegates

Enjoy Brno with free three-day ticket for public transportation system. Use the ticket for public transport not only at the conference, but also for trips to Brno's sights. For more info see transportation details below.

Public Transportation and Tickets in Brno

Visitors can purchase a ticket (by cash or in some cases by card) using a ticket machine in the departure hall or next to almost every bus/tram stop. You can also buy tickets in the information centers or (with higher price) by bus driver. You can also pay by a contactless credit/debit card on Brno public transport (trams and buses). The system automatically chooses the cheapest fare at the end of the day based on all your trips.

One way ticket

The most suitable ticket for travelling within Brno costs 25 CZK (approx 1 USD). It is valid in zones 100+101 (the only zones in Brno district) for 60 minutes and is interchangeable (valid for bus, tram and train).

1-day ticket

1-day ticket (24 hours) costs 190 CZK (approx 9 USD). It is interchangeable (valid for bus, tram and train) and you can use it to travell within Integrated Public Transport System across the entire South Moravia Region.

3 or 5 day ticket

3-day and 5-day ticket cost 380 CZK (approx. 17 USD) and 580 CZK (approx. 26 USD), respectively. It is interchangeable (valid for bus, tram and train) and you can use it to travell within Integrated Public Transport System across the entire South Moravia Region.

Practical Information

Climate

September in Brno is influenced by Marine - Mild Winter climate. When you travel to Brno in September you can expect both sun and rain, occasionally thunderstorm. The range of average daytime temperatures are around 16°C and 24°C. So what to wear in September? Bring a rain jacket just in case since it will be raining a few days during this period. Plan on layering your clothes. Some days or part of the day it will be nice and warm and some moments it can be a bit chilly.

Money/currency

In Czech Republic the currency is the Czech Crown (CZK). Expect 1 EUR ~ 25 CZK, 1 USD ~ 21 CZK.

You can withdraw Czech Crown from ATMs using your credit card or exchange currency at any money exchange (they are a lot of the close to railway station on Masarykova street) or bank branch. ATMs can be found throughout Brno. 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

The Pan-European Emergency Number: 112

Medical Emergency and Ambulance: 155

Police: 158

Fire Department: 150

Electric standards

In the Czech Republic the power plugs and sockets are of type E. This socket also works with plug C and with plug F if it has an additional pinhole.

Language

Official language in Czech Republic is Czech. English is widely spoken overall in Brno, especially in younger generation.

Time Zones

Czech Republic has only 1 time zone. Time in the Czech Republic is given by Central European Time (UTC+01:00) and Central European Summer Time (UTC+02:00).

Mobile Phones

Same as in other European countries, mobile phones operate on the frequencies of 900 MHz and 1800 MHz. There are several mobile operators in the Czech market, like O2, Vodafone, T-Mobile or U:fon, offering postpaid packages as well prepaid cards for those who want to use their phone without a contract.

The international telephone country code for Czech Republic is +42.

Safety and Security

Most visitors to the Czech Republic experience no difficulties but you should be aware of street crime and petty theft.

Every lamppost in Brno has a 6-digit number posted at eye-level. Should you need assistance from the police or emergency services, these codes will help pinpoint your location if you're unable to offer an exact address.

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.

Covid 19

Due to turbulent changes in government regulations, please follow the latest information at http://www.cinc2021.org/covid/.

Gala Dinner

The gala dinner will be held at the Hotel Passage. The hotel was initially built in 1928 as a metropolitan palace, designed by the famous architect Bohuslav Fuchs. The hotel provided the highest standard of accommodation and was equipped with the most modern facilities. The hotel had its own power plant, excellently equipped laundry, barber, hairdresser, tailor, florist, and more for maximum guest comfort. A total renovation of this property was completed in 2020. The visual transformation of the hotel is dominated by glass and wood. Thanks to the wooden materials you can enjoy a peaceful ambiance, where the outside busy street is replaced by a relaxing space. The name of the Bugatti restaurant on the second floor and the Chiron VIP suite refers to the famous racer Luis Chiron, who in 1931 won the Czechoslovak Grand Prix at the Masaryk Circuit in Brno with a Bugatti car. Boutique hotel Passage is welcoming you and offers you more than a hundred design rooms, a first-class restaurant, and an extensive congress center. The unique art installations will fascinate you already on the facade and further on inside the hotel.

Address: Lidická 23, Brno

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 17:30 at two places (parallel, please choose place at registration desk), the Labyrinth underneath Zelný trh (Vegetable Market) near Reduta Theatre (address: Zelný trh 21, Brno) and the Old Town Hall (Radnická 8, Brno – 150meters from Reduta Theatre)

• **on Monday**, a lunch box will be provided for all participants at the foyer at the 2nd floor of the Hotel Passage, before leaving for the social activities.

• after the social activities on Monday afternoon at 19:30, the conference **gala dinner** will be held at conference Hotel Passage

• **on Tuesday and Wednesday** the lunch will be served at Bugatti restaurant, the 2nd floor of Hotel Passage.

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 Hotel Passage;

• the closing plenary session.

Conference Information

General Information

The conference registration and information desk will be located at the main entrance of the Reduta theatre as well as in the Passage Hotel. The registration desk will be open during the following hours:

- Sun, 12. September, 13:00 – 17:00
- Mon, 13. September, 8:00 – 12:00
- Tue, 14. September, 8:00 – 16:00
- Wed, 15. September, 8:00 – 12:00

Sunday Symposium

The topic of this year will be “Artificial intelligence”, where three exciting talks by renowned experts in the field will present innovative ideas. Speaker Sessions will take place in the main Theater Auditorium.

Programme outline

13.00–14.00 Welcome in Brno meet-up

Afternoon coffee with networking and chit-chat. Open registration.

14.00–14.05 Sunday Symposium intro

Official opening of the Symposium with very brief ‚Hi‘ from the Local Organizing Committee.

14.05–14.55 Speaker session 1: Caroline Roney

Predicting atrial fibrillation recurrence: combining population data and patient-specific models.

14:55–15.45 Speaker session 2: Alan Kennedy

Artificial intelligence for electrocardiogram interpretation past and future.

15.45–16.00 Coffee break

16.00–16.50 Speaker session 3: Maxime Sermesant

Recent result on computational cardiology where the combination of AI and biophysics enables to make the best of the available clinical data.

17.30–22.00 Afterparty in the Labyrinth or Old City Hall

After the official programme of the Symposium, we invite you for Welcome Drink and to either explore the medieval Labyrinth under the Cabbage Market or to enjoy splendid view of Brno from Tower of Old City Hall. We have prepared for you private guided tours, rich catering and plenty space for networking in both location.

Monday Social Program

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

Participants can choose between activist or passivist activities during registration. All social program participants are required to wear their CinC badges.

Activist

Moravian Karst (physical activity ++)

Moravian Karst offers you a unique and beautiful natural scenery. Coming here, you can find a complex of eerie caves formed by the Devon limestone, spreading over an area of 100 km2. It is the most famous and best-developed karst area in the Czech Republic, and it is conveniently located just north of Brno.

The complex consists of 1100 caves but only a fraction of them are open to the public. Punkevní jeskyně (Punkva caves) are the most popular and frequently visited ones. You can descend to the bottom of the famous Macocha Abyss via a dry path, and from there sail back by motor boats on the underground Punkva river.

Activity description: Expect walking through the cave complex and occasional stairs climbing.

Recommendations: For this extraordinary experience, we strongly recommend dressing for cold weather (the temperature inside the caves can easily drop below 10 degrees Celsius) and full/trail shoes that are reliable in wet conditions (no flip-flops!).

Brno Treasure Hunt (physical activity +++)

Step into the shoes of Robert Langdon or Indiana Jones and get ready for some treasure hunting! Race your team through the city centre with nothing but a tablet to give you clues and uncover the well-hidden gems of Brno. The city is full of tales and mysteries so make sure to explore them as you go.

Hurry up and may the best one win!

Physical description: Long walk (run? ;-)) through the city center.

Recommendations: Reliable shoes, suitable for a long city walk

Passivist

Wine-tasting cruise (physical activity +)

How does a late summer afternoon cruise on a lovely boat across the Brno reservoir (nicknamed Prygl by the locals) sound to you? You'll be able to enjoy this Brno gem during a 20 km long cruise while marvelling at natural and historical wonders, such as the Veveří castle. During the wine-tasting itself, you will have a chance to experience the very best wines from the local wineries.

Guided walk through Brno city center (physical activity +)

Would you prefer to savour the beauty of the Brno city center without the hassle of the treasure hunt? Our guided tour through the city center is just the right option for you! Take a slow, calm walk with us and broaden your horizons during the interesting tour that will fill your afternoon with facts, tales, and history. All that while you'll be surrounded by amazing architecture, impressive buildings and cosy city corners.

Main city attractions to see during the guided tour:

- **Špilberk Castle** - the impressive city dominant
- **Old Town Hall** - courtyard, Brno dragon, portal
- **Cabbage Market** - Baroque fountain Parnas, The Holy Trinity Column, theatre Reduta, statue of W. A. Mozart, Dietrichstein Palace
- **St. Peter and Paul Cathedral** (Including the interior)
- **Denis Gardens** - obelisk, view of Špilberk Castle, Old Brno and the Church of Jan Amos Comenius (Red Church)
- **Freedom Square -** Kleins' Palace, House of Lords of Lipá, Plague Pillar, Moravian Bank building, clock sculpture
- **St. James' church**
- **Moravian Square** - St. Thomas Church, Governor's Palace, statues of the 4 Platonic Virtues

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 presentation – in person

Upload personal bio

- Please, provide a short bio information. Your bio will be uploaded to the CinC 2021 online platform
- Minimum length: **500 characters**
- Deadline: **5th of September**
- Please include your paper's **ID number** in the email subject.
- Please send your bio to support@cinc2021.org

Speech format

- Length: The time allocated for each oral presentation is **10 minutes**, followed by 5 minutes for discussion.
- The only exception to the 10-minute limit for oral presentations is for the four finalists in the **Rosanna Degani Young Investigator Award** competition, who are each allotted **15 minutes** for their talks, followed by 5 minutes for discussion.
- 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.
- Speakers are expected to adhere strictly to the event schedule, which will be enforced in order to finish sessions on time and to permit participants to move successfully from one parallel session to another.
- We highly recommend to prepare your presentation in **16:9 aspect ratio** with high quality pictures and as little text as possible. Your presentation will be viewed on small devices, where is very difficult to read a lot of text and equations.

On site check-in

- Onsite speakers must come to the conference room where they will be presenting **at least 15 minutes prior to the session**.
- The session chairpersons need to know who will be presenting each scheduled paper. Help them by introducing yourself and letting them know which paper you will be presenting.
- Load and check your presentation in the dedicated folder on the PC connected to the projector.
- There will also be a local person available to provide technical support.

Oral presentation – remote

Upload personal bio

- Please, provide a short bio information. Your bio will be uploaded to the CinC 2021 online platform
- Minimum length: **500 characters**
- Deadline: **5th of September**
- Please include your paper's **ID number** in the email subject.
- Please send your bio to support@cinc2021.org

Prepare video (online presentation)

- Your recorded presentation should have the maximum length of **10 minutes.**
- Discussion following your presentation will be live and will take 5 minutes.
- The only exception to the 10-minute limit for oral presentations is for the four finalists in the Rosanna Degani Young Investigator Award competition, who are each allotted 15 minutes for their talks, followed by 5 minutes for discussion.

Record video

- Maximum length: **10 minutes**
- Your presentation should be recorded in **16:9** aspect ratio.
- The video should be in **.mp4 format**
- Maximum size of the video file should not exceed **500 MB.**
- We believe most of you are already very skilled in preparing online presentations and have your favourite recording system. From our experience, these are the most suitable:

    - OBS studio – free, see tutorial
    - StreamYard - a very high-quality video conferencing platform that allows the speaker to record voice and screen and download their video file.
    - PowerPoint
    - ...any other recording system, that suits you :-)
- We recommend to record your presentation both with the presenter's face camera (every author of great work should be seen ;-))
- Tips and tricks:
    - As you prepare your slides and structure your presentation, **think strategically** about how your slides will visually engage your audience and support your speech.
    - **Have front lighting** (do not sit with a window behind you).
    - Wear non-distracting clothing. Keep the **background as neutral as possible** to reduce distractions.
    - Find a room that is **quiet** and does not have a lot of background noise. Smaller rooms capture sound better than larger ones.

Upload video

- Upload your video here: https://cinc2021.site.ibrida.io
- Attention! - Use supported **Chrome** or **Firefox** browser for uploading. Follow the instructions on the upload site and **keep the created credentials**, they will be valid later for the conference platform.
- Deadline: **Tuesday, 31st of August**
- Your content needs to be approved by organizers and will appear in the platform afterwards
- You will be able to re-upload, modify or add more content to the platform after the initial approval

Be live with us

- While online presentations will be video recorded (with the only exception of the oral presentations of the four finalists in the YIA competition), online speakers are required to be live to answer the **5 minutes Q&A** session at the end of their recorded presentation.
- To this aim, speakers have to **connect 15 minutes prior to the start of the session**.
- A staff will provide technical support for the connection check.

- Soon, we will give you updates on the platform that will be used 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 greater than 3 MB
    - Your microphone
    - Your webcam

Poster session – in person

Prepare poster

- Your poster should be the usual size of **A0 (height 1189 x width 841 mm)** in portrait orientation.
- Print the poster prior to your arrival. If that is not possible for you, there are several printing services in Brno.
- Your digital poster needs to be in **PDF format.**

Prepare short video

- Alongside with the poster, please provide us with short video describing the poster itself.
- Length of the video should be **~ 3 minutes**
- Record your video in **16:9 aspect ratio**
- The video should be in **.mp4 format**
- Maximum size of the video file should not exceed **500 MB**

Upload short video and poster

- Upload your poster content here: https://cinc2021.site.ibrida.io
- Attention! - Use supported **Chrome** or **Firefox** browser for uploading. Follow the instructions on the upload site and **keep the created credentials**, they will be valid later for the conference platform.
- Deadline: **Tuesday, 31st of August**
- Your poster content needs to be approved by organizers and will appear in the platform afterwards
- You will be able to re-upload, modify or add more content to the platform after the initial approval

On site check-in

- Poster presenters are required to check-in at the poster session site **15-20 minutes prior to the start of session.**

Poster session – remote

Prepare poster

- Your poster should be the usual size of **A0 (height 1189 x width 841 mm)** in portrait orientation.
- Your digital poster needs to be in **PDF format.**

Prepare short video

- Alongside with the poster, please provide us with short video describing the poster itself.
- Length of the video should be **~ 3 minutes**
- Record your video in **16:9 aspect ratio**
- The video should be in **.mp4 format**
- Maximum size of the video file should not exceed **500 MB**

Upload short video and poster

- Upload your poster content here: https://cinc2021.site.ibrida.io
- Attention! - Use supported **Chrome** or **Firefox** browser for uploading. Follow the instructions on the upload site and **keep the created credentials**, they will be valid later for the conference platform.
- Deadline: **Tuesday, 31st of August**
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- You will be able to re-upload, modify or add more content to the platform after the initial approval

Be live with us

- Remote poster authors are required to be live to discuss during the time of the poster session.
- The discussion will be possible by personal chat or by setting a video meeting in the platform by choosing specified date and time

- Attention! - In case of no response to questions by the author during the poster session, it will be seen as no show up. So please, be live with us ;-)

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 research in session RDYIA, at 8:45am on Monday, 13th September in the Cardion ballroom (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, 15th September in the Cardion ballroom (see “Map of the Conference venue”).

PhysioNet/Computing in Cardiology Challenge 2021

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. In this year's Challenge, we ask the following question: 'Will two do?' The Challenge builds on the 2020 edition, which asked participants to classify cardiac abnormalities from twelve-lead ECGs. For this year, that task has been to build an algorithm that can classify cardiac abnormalities from either twelve-lead, six-lead, three-lead, and two-lead ECGs.

Please see https://physionetchallenges.github.io/2021/ for all information about this year's Challenge.

The challenge sessions (oral and poster) are on Tuesday afternoon:

- Oral sessions S53 (at 12:30) & S63 (at 14:15)
- Poster session P7_8 (at 15:45)

Maastricht Simulation Award (MSA)

We are once again grateful to the organizers of CinC 2018 in Maastricht for their initiation and support of the Maastricht Simulation Award (MSE). 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 winning submission as part of the Closing Plenary Session on Wednesday, 15th September in the Cardion ballroom (see "Map of the Conference venue").

Manuscripts

Computing in Cardiology will publish the conference proceedings containing the complete 4-page manuscripts of all presentations made at the conference. These will be freely available via the CinC Web site (http://www.cinc.org) and published by the IEEE in the IEEEXplore digital library.

We also make an interim version of the proceedings papers available through program website before the conference and the deadline to upload your 4-pages preprint of your paper is Friday, September 3rd, 2021. 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 Sunday, October 3rd, 2021.

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

Scientific Program Details

Monday, September 13, 2021

8:30 - 8:45 ***Welcome to CinC 2021***

Cardion ballroom

8:45 - 10:15 ***Session RDYIA - Rosanna Degani Young Investigator Finals***

Cardion ballroom

8:45 - 9:05 Session RDYIA, ID 251 - **An evaluation on the clinical outcome prediction of rotor detection in non-invasive phase maps.**
Carlos Fambuena Santos, Ismael Hernández-Romero, Rubén Molero Alabau, Andreu M. Climent, Maria de la Salud Guillem Sánchez

9:05 - 9:25 Session RDYIA, ID 266 - **Ventilatory Thresholds Estimation Based on ECG-derived Respiratory Rate**
Diego García, Spyridon Kontaxis, Adrián Hernández-Vicente, David Hernando, Javier Milagro, Esther Pueyo, Nuria Garatachea, Raquel Bailón, Jesus Lazaro

9:25 - 9:45 Session RDYIA, ID 235 - **Mavacamten Efficacy in Mutation-specific Hypertrophic Cardiomyopathy: an In-silico Approach to Inform Precision Medicine**
Francesca Margara, Blanca Rodriguez, Christopher Toepfer, Alfonso Bueno-Orovio

9:45 - 10:05 Session RDYIA, ID 148 - **Repolarization Gradients Alter Post-infarct Ventricular Tachycardia Dynamics in Patient-Specific Computational Heart Models**
Eric Sung, Adityo Prakosa, Natalia Trayanova

Monday, September 13, 2021

10:15 - 10:45 ***Coffee break***

Monday, September 13, 2021

10:45 - 12:15 ***Session S21 - Heart Rate Variability***

Room: Large 1

10:45 - 11:00 Session S21, ID 131 - **The Effects of Advancing Gestation on Maternal Autonomic Response**
Maretha Bester, Rohan Joshi, Massimo Mischi, Judith van Laar, Rik Vullings

11:00 - 11:15 Session S21, ID 60 - **Recurrent Neural Networks for Early Detection of Late Onset Sepsis in Premature Infants Using Heart Rate Variability**
Cristhyne LEON BORREGO, Patrick Pladys, Guy Carrault

11:15 - 11:30 Session S21, ID 180 - **A Generalization of Phase-Rectified Signal Averaging for Fetal Acidemia Identification**
Massimo W Rivolta, Marco Biraghi, Moira Barbieri, Tamara Stampalija, Roberto Sassi

11:30 - 11:45 Session S21, ID 247 - **Temporal Evolution of Intrapartum Fetal Heart-Rate Variability**
Johann Vargas-Calixto, Emily Hamilton, Michael Kuzniewicz, Yvonne Wu, Philip Warrick, Robert Kearney

11:45 - 12:00 Session S21, ID 61 - **Artificial Neural Network and Permutation Entropy in the Stratification of Patients with Chagas Disease**
Luz Diaz, Maria Rodriguez, Diego Cornejo, Antonio Ravelo-Garcia, Esteban Alvarez, Miguel Vizcardo

12:00 - 12:15 Session S21, ID 174 - **Bubble Entropy of fractional Gaussian noise and fractional Brownian motion**
George Manis, Matteo Bodini, Massimo W Rivolta, Roberto Sassi

Monday, September 13, 2021

10:45 - 12:15 ***Session S22 - ECG Analysis 1: Atrial Rhythms***

Room: Large 2

10:45 - 11::00 Session S22, ID 112 - **Semi-supervised vs. Supervised Learning for Discriminating Atrial Flutter Mechanisms Using the 12-lead ECG**
Giorgio Luongo, Steffen Schuler, Massimo W Rivolta, Olaf Doessel, Roberto Sassi, Axel Loewe

11:00 - 11:15 Session S22, ID 169 - **Data Augmentation for Discrimination of Atrial Flutter Mechanism Using 12-Lead Surface Electrocardiogram**
Muhammad Usman Gul, Muhammad Haziq Kamarul Azman, Kushsairy Kadir

11:15 - 11:30 Session S22, ID 189 - **2D image-based Atrial Fibrillation Classification**
Felipe Dias, Adele Ribeiro, Ramon Moreno, Jose Krieger, Marco Gutierrez

11:30 - 11:45 Session S22, ID 217 - **Effect of atrial anatomical and functional variability on P-wave morphology**
Aditi Roy, Julia Camps, Abhirup Banerjee, Albert Dasí, Vicente Grau, Alfonso Bueno-Orovio, Blanca Rodriguez

11:45 - 12:00 Session S22, ID 249 - **A Poincare Image Based detector of ECG Segments containing Atrial and Ventricular Beats**
Guadalupe García Isla, Luca Mainardi, Valentina Corino

12:00 - 12:15 Session S22, ID 314 - **ECGI Periodicity Unraveled: A Deep Learning approach for the Visualization of Periodic Spatiotemporal Patterns in Atrial Fibrillation**
Alexander Lacki, Ismael Hernández-Romero, Maria Guillem, Andreu M. Climent
Universitat Politècnica de València, Universidad Rey Juan Carlos

Monday, September 13, 2021

10:45 - 12:15 ***Session S23 - Photoplethysmography***

Room: Medium 1

10:45 - 11:00 Session S23, ID 30 - **Improved Discrimination Between Healthy and Hypertensive Individuals Combining Photoplethysmography and Electrocardiography**
Jesús Cano, Fernando Hornero, Aurelio Quesada, Arturo Martínez-Rodrigo, Raul Alcaraz, José J Rieta

11:00 - 11:15 Session S23, ID 31 - **Hypertension Risk Assessment from Photoplethysmographic Recordings Using Deep Learning Classificators**
Jesús Cano, Vicente Bertomeu-González, Lorenzo Fácila, Roberto Zangróniz, Raul Alcaraz, José J Rieta

11:15 - 11:30 Session S23, ID 53 - **Beat-to-beat Intervals of Speckle & Intensity-based Optical Plethysmograms compared to Electrocardiogram**
Jorge Herranz Olazabal, Fokko Wieringa, Evelien Hermeling, Christopher Van Hoof

11:30 - 11:45 Session S23, ID 88 - **Benchmarking Photoplethysmography Peak Detection AlgorithmsUsing the Electrocardiogram Signal as a Reference**
Kevin Kotzen, Peter Charlton, Amir Landesberg, Joachim A. Behar

11:45 - 12:00 Session S23, ID 138 - **Low-Exertion Testing of Autonomic Cardiovascular Integrity Through PPG Signal Analysis**
Mantas Rinkevičius and Vaidotas Marozas

12:00 - 12:15 Session S23, ID 275 - **Synthetic photoplethysmography signals to evaluate pulse detection algorithm**
Clementine Aguet, Loïc Jeanningros, Fabian Braun, Jérôme Van Zaen, Mathieu Lemay

Monday, September 13, 2021

10:45 - 12:15 ***Room: Large 3***	***Session S24 - SPECIAL SESSION: Right ventricular and pulmonary circulation in congenital heart disease: computational modeling and its applications***
10:45 - 11:15	Session S24, ID 66 - **COMPUTATIONAL MODELING OF THE CARDIOPULMONARY SYSTEM IN PEDIATRIC PULMONARY ARTERIAL HYPERTENSION PATIENTS** *Reza Pourmodheji, Sheikh Mohammad Shavik, Tossas-Betancourt Christopher, C Alberto Figueroa, Seungik Baek, Lik Chuan Lee*
11:15 - 11:30	Session S24, ID 300 - **Ventricular 4D flow components and energy in Tetralogy of Fallot: 4D flow MRI study** *Liang Zhong*
11:30 - 11:45	Session S24, ID 301 - **Image-Based Computational Assessment of the Fetal Aortic Stenosis and Evolving Hypoplastic Left Heart Syndrome and Associated Fetal Heart Intervention** *Chi Wei Ong, Gerald Tulzer, citra Mattar, Lik Chuan Lee, Choon Hwai Yap*
11:45 - 12:00	Session S24, ID 185 - **High Resolution Electrocardiography in Patients with Eisenmenger Syndrome** *Ana Tacer, Nejc Pavsic, Polona Koritnik, Katja Prokselj, Vito Starc*
12:00 - 12:15	Session S24, ID 345 - **Final discussion** *Liang Zhong and Lik Chuan Lee*

Monday, September 13, 2021

12:15 ***Social Event***

Tuesday, September 14, 2021

8:30 - 10:00 ***Session S31 - Heart Rate Variability: Applications***

Room: Large 1

8:30 - 8:45 Session S31, ID 110 - **Gender Differences in Short-Term Multiscale Complexity of the Heart Rate Variability**
Beatrice De Maria, Francesca Perego, Giuseppina Cassetti, Vlasta Bari, Beatrice Cairo, Francesca Gelpi, Monica Parati, Laura Dalla Vecchia, Alberto Porta

8:45 - 9:00 Session S31, ID 246 - **Intelligent Classification in Cardiology to Diagnose Congestive Heart Failure Patients**
Eduarda Pereira, Argentina Maria Leite, E. J. Solteiro Pires, Luís Pereira

9:00 - 9:15 Session S31, ID 69 - **Multilayer Perceptron and Approximation Entropy in the Stratification of Patients With Chagas Disease**
Maria Rodriguez, Luz Diaz, Diego Cornejo, Antonio Ravelo-Garcia, Esteban Alvarez, Miguel Vizcardo

9:15 - 9:30 Session S31, ID 84 - **Impact of Demographics on Short-term Heart Rate Variability for Detecting Hypertension**
Muhammad Usman, Pradeep Rajagopalan, Aryel Beck, Jennifer Nathania, Tony Li, Toon Lim

9:30 - 9:45 Session S31, ID 108 - **Working in the office and smart working differently impact on the cardiac autonomic control**
Francesca Perego, Beatrice De Maria, Giuseppina Cassetti, Monica Parati, Vlasta Bari, Beatrice Cairo, Francesca Gelpi, Alberto Porta, Laura Dalla Vecchia

9:45 - 10:00 Session S31, ID 1 - **Evaluation of HRV from Repeated Measurements of PPG and Arterial Blood Pressure Signals**
Andrejs Fedjajevs, Willemijn Groenendaal, Carlos Agell, Evelien Hermeling

Tuesday, September 14, 2021

8:30 - 10:00 ***Session S32 - ECG Analysis 2: QRS and Conduction***

Room: Large 2

8:30 - 8:45 Session S32, ID 25 - **PhysioZoo ECG: Digital electrocardiography biomarkers to assess cardiac conduction**
Sheina Gendelman, Shany Biton, Raphaël Derman, Alexandra Alexandrovich, Joachim A. Behar

8:45 - 9:00 Session S32, ID 91 - **A Fast Algorithm for Facilitating Heartbeat Annotation in Long-Term ECG Signals**
Ana Rodrigues, Mantas Lukoševičius, Vaidotas Marozas

9:00 - 9:15 Session S32, ID 96 - **QRS Complex Detection in Paced and Spontaneous Ultra-high-frequency ECG**
Zuzana Koscova, Adam Ivora, Petr Nejedly, Josef Halamek, Pavel Jurak, Magdalena Matejkova, Pavel Leinveber, Karol Curila, Lucie Znojilova, Filip Plesinger

9:15 - 9:30 Session S32, ID 140 - **Machine Learning Models Trained with Simulations Predict the Site of Origin of Outflow Tract Ventricular Arrhythmias from Multi-centic Databases**
Ruben Doste, Miguel Lozano, Guillermo Jimenez-Perez, Lluis Mont, Diego Penela, Oscar Camara, Rafael Sebastian

9:30 - 9:45 Session S32, ID 176 - **A Machine-Learning based Pulse Detection Algorithm for Use during Cardiopulmonary Resuscitation**
Iraia Isasi, Erik Alonso, Unai Irusta, Elisabete Aramendi, Morteza Zabihi, Ali Bahrami Rad, Trygve Eftestøl, Jo Kramer-Johansen, Lars Wik

9:45 - 10:00 Session S32, ID 221 - **QRS Slopes for Potassium and Calcium Monitoring in End-Stage Renal Disease Patients**
Syed Hassaan Ahmed Bukhari, Pablo Laguna, Mark Potse, Carlos Sánchez, Esther Pueyo

Tuesday, September 14, 2021

8:30 - 10:00 ***Session S33 - Cardiac mechanograms and sensors***

Room: Medium 1

8:30 - 8:45 Session S33, ID 135 - **Detecting Aortic Stenosis using Seismocardiography and Gyrocardiography Combined with Convolutional Neural Networks**
Ismail Elnaggar, Tero Hurnanen, Olli Lahdenoja, Antti Airola, Tuija Vasankari, Jouni Pykäri, Mikko Savontaus, Tero Koivisto

8:45 - 9:00 Session S33, ID 165 - **Determination of Maximal Oxygen Uptake Using Seismocardiography at Rest**
Mikkel Hansen, Birk Mygind, Tue Rømer, Kasper Sørensen, Samuel Emil Schmidt, Jørn Helge

9:00 - 9:15 Session S33, ID 219 - **Hemodynamic Monitoring in Response to Valsalva and Muller Maneuvers by Accelerometer and Gyroscope**
Nosiba Khougali, Tuukka Panula, Matti Kaisti, Mikko Pänkäälä

9:15 - 9:30 Session S33, ID 20 - **Blood Pressure Estimation Based on Photoplethysmography: Finger versus Wrist**
Birutė Paliakaitė, Peter Charlton, Andrius Rapalis, Vilma Pluščiauskaitė, Povilas Piartli, Eugenijus Kaniusas, Vaidotas Marozas

9:30 - 9:45 Session S33, ID 224 - **Coefficients for the Derivation of an ST Monitoring Patch Based Lead System from the 12 Lead Electrocardiogram**
Michael Jennings, Ali Rababah, Daniel Guldenring, James McLaughlin, Dewar Finlay

Tuesday, September 14, 2021

8:30 - 10:00 ***Room: Large 3***	***Session S34 - SPECIAL SESSION: Ultra-high-frequency electrocardiography (UHF-ECG) - insight into the ventricular depolarization***
8:30 - 9:00	Session S34, ID 93 - **Ultra-high-frequency electrocardiography** *Pavel Jurak, Pavel Leinveber, Filip Plesinger, Karol Curila, Ivo Viscor, Vlastimil Vondra, Magdalena Matejkova, Lucie Znojilova, Radovan Smisek, Jolana Lipoldova, Frits Prinzen, Josef Halamek*[0]
9:00 - 9:15	Session S34, ID 94 - **Comparison of UHF-ECG with other noninvasive electrophysiological mapping tools for assessing ventricular dyssynchrony** *Frits Prinzen*
9:15 - 9:30	Session S34, ID 103 - **VDI vision - Analysis of Ventricular Electrical Dyssynchrony in Real-time** *Filip Plesinger, Ivo Viscor, Vlastimil Vondra, Josef Halamek, Zuzana Koscova, Pavel Leinveber, Karol Curila, Pavel Jurak*
9:30 - 9:45	Session S34, ID 85 - **Physiological vs. non-physiological heart pacing as assessed by Ultra-high-frequency ECG** *Karol Curila, Pavel Jurak, Filip Plesinger, Pavel Leinveber, Frits Prinzen*
9:45 - 10:00	Session S34, ID 346 - **Final discussion** *Pavel Jurak, Pavel Leinveber, Filip Plesinger*

Tuesday, September 14, 2021

10:00 - 10:15 ***Coffee break***

Tuesday, September 14, 2021

10:15 - 11:45 ***Session S41 - Modeling Sinus Node and Atrial Cells***

Room: Large 1

10:15 - 10:30 Session S41, ID 208 - **Effects of Density and Distribution of Non-spontaneous Myocytes and Scars Inside the Human Sinoatrial Node**
Eugenio Ricci, Chiara Bartolucci, Stefano Severi

10:30 - 10:45 Session S41, ID 225 - **Functional Role of the HCN4 Encoded 'Funny Current' in Human Sinus Node Cells**
Arie Verkerk and Ronald Wilders

10:45 - 11:00 Session S41, ID 338 - **Impacts of Cellular Electrophysiological Variability on Conduction Velocity Within Isolated Tissue and Depolarization and Repolarization Across the Completed Atrial Model.**
Jordan Elliott, Maria Belen, Luca Mainardi, Valentina Corino, Jose F Rodriguez Matas

11:00 - 11:15 Session S41, ID 177 - **Electro-Mechanical Coupling in Human Atrial Cardiomyocytes: Model Development and Analysis of Inotropic Interventions**
Fazeelat Mazhar, Francesco Regazzoni, Chiara Bartolucci, Luca Dedè, Cristiana Corsi, Alfio Quarteroni, Stefano Severi

11:15 - 11:45 Session S41, ID 348 - **Modeling atrial cells in their neighborhood - panel discussion**
Olaf Doessel, Axel Loewe, Stefano Severi, Ronald Wilders, Jose F Rodriguez Matas

Tuesday, September 14, 2021

10:15 - 11:45 ***Session S42 - ECG Analysis 3: Repolarization and Ischemia***

Room: Large 2

10:15 - 10:30 Session S42, ID 100 - **Weighted Time Warping T-wave Analysis Robust to Delineation Errors: Clinical Implications**
Flavio Palmieri, Pedro Gomis, José Esteban Ruiz, Dina Ferreira, Esther Pueyo, Juan Pablo Martínez, Pablo Laguna, Julia Ramírez

10:30 - 10:45 Session S42, ID 153 - **Evaluation of Ventricular Repolarization Variability in Patients With Nonischemic Dilated Cardiomyopathy From Vectorcardiography Signals**
Martin Schmidt, Filip Karisik, Sebastian Zaunseder, Axel Linke, Hagen Malberg, Mathias Baumert

10:45 - 11:00 Session S42, ID 269 - **Improving the Microvolt T-wave Alternans Peak by changing the T-Wave Search Window Duration**
Thaís Winkert, Paulo Roberto Benchimol-Barbosa, Jurandir Nadal

11:00 - 11:15 Session S42, ID 289 - **Advances in ECG-Based Cardiac Ischemia Monitoring – A Review**
John Wang

11:15 - 11:30 Session S42, ID 119 - **Optimal ECG Lead System for Automatic Myocardial Ischemia Detection**
Misha Glazunov, Alfonso Aranda, Carlo Galuzzi

11:30 - 11:45 Session S42, ID 181 - **Effect of ischemia on the spatial heterogeneity of ventricular repolarization: a simulation study**
Massimo W Rivolta, Roberto Sassi, Luca Mainardi, Valentina Corino

Tuesday, September 14, 2021

10:15 - 11:45 ***Session S43 - Medical Informatics and Technology***

Room: Medium 1

10:15 - 10:30 Session S43, ID 222 - **A Python Library with Fast Algorithms for Popular Entropy Definitions**
George Manis and Roberto Sassi

10:30 - 10:45 Session S43, ID 277 - **Domain - led time series analysis of cardiovascular disease using open data: does reduction in coronary disease increase heart failure prevalence?**
Alicja Jasinska-Piadlo, Pardis Biglarbeigi, Raymond Bond, David McEneaney

10:45 - 11:00 Session S43, ID 297 - **Unimapper: an Online Interactive Analyzer/Visualizer of Optical Mapping Experimental Data**
Shahriar Iravanian, Ilija Uzelac, Darby Caines, Elizabeth Cherry, Abouzar Kaboudian, Flavio Fenton

11:00 - 11:15 Session S43, ID 336 - **FAIRness for HL7 FHIR: supporting interoperability of health data sets**
Catherine Chronaki, Giorgio Cangioli, Alicia Martinez Garcia, Carlos Calderón

11:15 - 11:30 Session S43, ID 220 - **Controlled Breathing Effect on Respiration Quality Assessment Using Machine Learning Approaches**
Andrea Rozo, Jeroen Buil, Jonathan Moeyersons, John Morales, Roberto Garcia van der Westen, Lien Lijnen, Christophe Smeets, Sjors Jantzen, Valerie Monpellier, David Ruttens, Christopher Van Hoof, Sabine Van Huffel, Willemijn Groenendaal, Carolina Varon

11:30 - 11:45 Session S43, ID 154 - **Validation of A Novel Tattoo Electrode for ECG Monitoring**
Giulia Baldazzi, Andrea Spanu, Antonello Mascia, Graziana Viola, Annalisa Bonfiglio, Piero Cosseddu, Danilo Pani

Tuesday, September 14, 2021

10:15 - 11:45 ***Session S44 - ANS in Cardiovascular Regulation***

Room: Large 3

10:15 - 10:30 Session S44, ID 58 - **Time-courses of the Central Frequencies of Low-Frequency Components of RR Intervals, Systolic and Diastolic Pressure Variabilities in Response to Active Orthostatic Test**
S. Carrasco-Sosa, A. Guillén-Mandujano, A. M. Rodríguez

10:30 - 10:45 Session S44, ID 40 - **Transfer Function Gain between Heart Period and QT Variabilities Increases during Sympathetic Activation Induced by Head-up Tilt**
Vlasta Bari, Beatrice De Maria, Francesca Gelpi, Beatrice Cairo, Anielle Takahashi, Aparecida Catai, Alberto Porta

10:45 - 11:00 Session S44, ID 18 - **Correlation between Baroreflex Sensitivity and Cerebral Autoregulation Index in Healthy Subjects**
Francesca Gelpi, Vlasta Bari, Beatrice Cairo, B. De Maria, Davide Tonon, G. Rossato, Luca Faes, A.Porta

11:00 - 11:15 Session S44, ID 214 - **Cardiovascular Effects of Mental Stress in Healthy Volunteers**
Hannes Ernst, Sebastian Pannasch, Jens Helmert, Hagen Malberg, Martin Schmidt

11:15 - 11:30 Session S44, ID 274 - **Analysis of the effect of emotion elicitation on the cardiovascular system**
Edoardo Maria Polo, Maximiliano Mollura, Marco Zanet, Marta Lenatti, Alessia Paglialonga, R. Barbieri

11:30 - 11:45 Session S44, ID 293 - **Skeletal Muscle Pump Impairment in Parkinson's Disease: Preliminary Results**
Rabie Fadil, A. Huether, R. Brunnemer, A. Blaber, Jau-Shin Lou, K. Tavakolian

Tuesday, September 14, 2021

11:45 - 12:30 ***Lunch***

Tuesday, September 14, 2021

12:30 - 14:00 ***Session S51 - Modeling the Atria***

Room: Large 1

12:30 - 12:45 Session S51, ID 166 - **Rotor Termination in Cholinergic Paroxysmal Atrial Fibrillation by Small-Calcium-Activated K+ Channels Inhibition and Isoproterenol: a Computational Study**
Chiara Celotto, Carlos Sánchez, Konstantinos Mountris, Pablo Laguna, Esther Pueyo

12:45 - 13:00 Session S51, ID 294 - **A Network-based Cardiac Electrophysiology Simulator with Realistic Signal Generation and Response to Pacing Maneuvers**
Shahriar Iravanian, Ilija Uzelac, Abouzar Kaboudian, Jonathan Langberg, Flavio Fenton

13:00 - 13:15 Session S51, ID 305 - **Robust Graph-based Upscaling of Micro-scale Fibrotic Structures**
Megan Farquhar, Brodie Lawson, Kevin Burrage

13:15 - 13:30 Session S51, ID 242 - **Automated framework for the augmentation of missing anatomical structures and generation of personalized atrial models from clinical data**
Luca Azzolin, T. Zheng, C. Nagel, Olaf Doessel, Axel Loewe

13:30 - 13:45 Session S51, ID 241 - **Left Atrial Appendage Morphology Impacts Thrombus Formation Risks in Multi-Physics Atrial Models**
Ahmed Qureshi, M. Balmus, D. Nechipurenko, F. Ataullakhanov, S. Williams, G. Lip, D. Nordsletten, O. Aslanidi, A. de Vecchi

13:45 - 14:00 Session S51, ID 279 - **Does Mapping Catheter Geometry and Location Affect AF Driver Detection? A Simulation Study**
Claudio Fabbri, Chiara Bartolucci, Corrado Tomasi, Paolo Sabbatani, Stefano Severi, Cristiana Corsi

Tuesday, September 14, 2021

12:30 - 14:00 ***Session S52 - ECG Analysis 4: Techniques***

Room: Large 2

12:30 - 12:45 Session S52, ID 101 - **Investigating the Robustness of Deep Learning to Electrocardiogram Noise**
Jenny Venton and Philip Aston

12:45 - 13:00 Session S52, ID 123 - **Symmetric Projection Attractor Reconstruction: Inter-individual Differences in the ECG**
Jane Lyle, Manasi Nandi, Philip Aston

13:00 - 13:15 Session S52, ID 132 - **Detecting Cardiac Abnormalities with Multi-Lead ECG Signals: A Modular Network Approach**
Ryan Clark, Mohammadreza Heydarian, Mohammad Siddiqui, Sajjad Rashidiani, Md Asif Khan, Yi Lee, Thomas Doyle

13:15 - 13:30 Session S52, ID 162 - **First Steps Towards Self-Supervised Pretraining of the 12-Lead ECG**
Daniel Gedon, Antonio H. Ribeiro, Niklas Wahlström, Thomas Schön

13:30 - 13:45 Session S52, ID 167 - **Mobile App for the Digitalization and Deep Learning-Based Classification of Electrocardiogram Printing Records**
Alba Isabel, Guillermo Jiménez-Pérez, Oscar Camara

13:45 - 14:00 Session S52, ID 308 - **Towards Accurate and Model-Free QT Correction**
Esa Rasanen, Ilya Potapov, Janne Solanpää, Katriina Aalto-Setälä

Tuesday, September 14, 2021

12:30 - 14:00 ***Room: Medium 1***	***Session S53 - The PhysioNet/Computing in Cardiology Challenge 2021 - I***
12:30 - 12:45	Session S53, ID 134 - **Will Two Do? Varying Dimensions in Electrocardiography: the PhysioNet/Computing in Cardiology Challenge 2021** *M. Reyna, N. Sadr, E. P. Alday, A. Gu, A. Shah, Ch. Robichaux, Ali Rad, A. Elola, S. Seyedi, S. Ansari, Q. Li, A. Sharma, G. Clifford*
12:45 – 13:00	Session S53, ID 16 - **Pathologies Prediction on Short ECG Signals with Focus on Feature Extraction Based on Beat Morphology and Image Deformation** *Jeffrey Prehn, Georgi Nalbantov, Svetoslav Ivanov*
13:00 - 13:15	Session S53, ID 78 - **A Two-Phase Multilabel ECG Classification Using One-Dimensional Convolutional Neural Network and Modified Labels** *P. Bugata, P. Bugata Jr., V. Kmecova, M. Stankova, D. Gajdos, D. Hudak, R. Stana, S. Horvat, L. Antoni, G. Vozarikova, E. Bruoth, A. Szabari*
13:15 - 13:30	Session S53, ID 24 - **Two will do: Convolutional neural network with asymmetric loss and self-learning label correction for imbalanced multi-label ECG data classification** • *Cristina Gallego Vázquez, Alexander Breuss, Oriella Gnarra, Julian Portmann, Giulia Da Poian*
13:30 - 13:45	Session S53, ID 19 - **Learning ECG Representations with Self-supervised Learning** *Jangwon Suh, Eunjung Lee, Jimyeong Kim, Jaeill Kim, Wonjong Rhee*
13:45 - 14:00	Session S53, ID 34 - **Contrastive Learning of Unsupervised Representations for Automated ECG Classification** *Maximilian Oppelt, Maximilian Riehl, Felix Kemeth, Seung Hee Yang, Thomas Wittenberg*

Tuesday, September 14, 2021

12:30 - 14:00 ***Session S54 - Cardiorespiratory Applications***

Room: Large 3

12:30 - 13:00 Session S54, ID 349 - **Opening presentation**
Thomas Penzel

13:00 - 13:15 Session S54, ID 4 - **Causal Analysis Is Needed to Evaluate Cardiorespiratory Interaction Alterations in Postural Orthostatic Tachycardia Syndrome Patients**
Beatrice Cairo, Beatrice De Maria, Vlasta Bari, Francesca Gelpi, Maura Minonzio, Franca Barbic, Laura Dalla Vecchia, Raffaello Furlan, Alberto Porta

13:15 - 13:30 Session S54, ID 295 - **Respiratory Pump Contributions to Hemodynamic Responses in Lower-Body Negative Pressure: Preliminary Results**
Rabie Fadil, Andrew Blaber, Kouhyar Tavakolian

13:30 - 13:45 Session S54, ID 57 - **Sensitivity and Frequency Coupling Indexes of Respiratory Sinus Arrhythmia in Response to Continuously Increasing and Decreasing Tidal Volume**
Alejandra Guillén-Mandujano and Salvador Carrasco-Sosa

13:45 - 14:00 Session S54, ID 321 - **Predicting Cardiovascular Outcomes in Sleep Apnoea Patients Using the Oximetry Signal**
Philip de Chazal and Nadi Sadr

Tuesday, September 14, 2021

14:00 - 14:15 ***Coffee break***

Tuesday, September 14, 2021

14:15 - 15:45 ***Session S61 - Modeling the Ventricles***

Room: Large 1

14:15 - 14:30 Session S61, ID 215 - **Age-Associated Changes in Myocardial Fibrosis Amount and Distribution Quantified from Nonlinear Optical Microscopy Images**
Maria Pérez, Laura García, Konstantinos Mountris, Laura Ordovás, Esther Pueyo

14:30 - 14:45 Session S61, ID 2 - **Sensitivity of the human ventricular BPS2020 action potential model to the in silico mechanisms of ischemia**
Mohamadamin Forouzandehmehr, Chiara Bartolucci, Jari Hyttinen, Jussi Koivumäki, Michelangelo Paci

14:45 - 15:00 Session S61, ID 184 - **Hydroxychloroquine's influence on hypoxic and hypokalemic ventricule: An in-silico perspective**
Ponnuraj Kirthi Priya and Srinivasan Jayaraman

15:00 - 15:15 Session S61, ID 157 - **Investigation of the Arrhythmic Mechanisms in Hypertrophic Cardiomyopathy under Beta-adrenergic Stimulation**
Ruben Doste, Raffaele Coppini, Alfonso Bueno-Orovio

15:15 - 15:30 Session S61, ID 263 - **Adaptation mechanisms of the QT interval during stress test and its dependency with adrenergic stimulation: a simulation study**
Rubén Cebollada, Cristina Pérez, Konstantinos Mountris, Pablo Laguna, Juan Pablo Martínez, Esther Pueyo

Tuesday, September 14, 2021

14:15 - 15:45 ***Room: Large 2***	***Session S62 - SPECIAL SESSION: Cardiac autonomic nervous system, heart rate response, and recovery in response to activity: Implication of wearable sensors for frailty assessment***
14:15 - 14:45	Session S62, ID 323 - **Frailty Definition and Survey of Frailty Assessment Tools in Patients with Cardiovascular Disease** *Rostam Khoubyari, Nima Toosizadeh, Saman Parvaneh*
14:45 - 15:00	Session S62, ID 324 - **Impact of Frailty on Cardiac Autonomic System** *Saman Parvaneh, Nima Toosizadeh, Rostam Khoubyari*
15:00 - 15:15	Session S62, ID 325 - **Frailty among Older Adults with Heart Failure: Implications of Heart Rate Dynamic Assessment** *Nima Toosizadeh, Saman Parvaneh, Rostam Khoubyari*
15:15 - 15:30	Session S62, ID 327 - **Frailty Identification using Heart Rate Response to Walking and Machine Learning Approach** *Maryam Eskandari, Saman Parvaneh, Rostam Khoubyari, Nima Toosizadeh*
15:30 - 15:45	Session S62, ID 347 - **Final discussion** *Saman Parvaneh and Nima Toosizadeh*

Tuesday, September 14, 2021

14:15 - 15:45 ***Room: Medium 1***	***Session S63 - The PhysioNet/Computing in Cardiology Challenge 2021 - II***
14:15 - 14:30	Session S63, ID 26 - **Wide and Deep Transformer Neural Networks for Multi-Lead ECG Classification** *Gregory Boverman, Annamalai Natarajan, Yale Chang, Corneliu Antonescu, Jonathan Rubin*
14:30 - 14:45	Session S63, ID 14 - **Classification of ECG using Ensemble of Residual CNNs with Attention Mechanism** *Petr Nejedly, Adam Ivora, Ivo Viscor, Zuzana Koscova, Radovan Smisek, Pavel Jurak, Filip Plesinger*
14:45 - 15:00	Session S63, ID 245 - **Combining a ResNet Model with Handcrafted Temporal Features for ECG Classification with Varying Number of Leads** *Stefano Magni, Chiara Salvi, Andrea Sansonetti, Tiziana Tabiadon, Guadalupe García Isla*
15:00 - 15:15	Session S63, ID 39 - **MTFNet: A Morphological and Temporal Features Network for multiple leads ECG Classification** *mengxue li, weibai pan, lebing pan, yuxia guan, ying an*
15:15 - 15:30	Session S63, ID 212 - **Combining Locality with Globality in Attention-based Deep Neural Network for Electrocardiograph Classification** *Xiaoyu Li, Chen Li, Jishang Wei, Yuhua Wei, Buyue Qian, Yuyao Sun, Xiao Xu, Xian Xu*
15:30 - 15:45	Session S63, ID 79 - **Reduced-Lead ECG Classifier Model Trained with DivideMix and Model Ensemble** *Hiroshi Seki, Takashi Nakano, Koshiro Ikeda, Shinji Hirooka, Takaaki Kawasaki, Mitsutomo Yamada, Shumpei Saito, Toshitaka Yamakawa, Shimpei Ogawa*

Tuesday, September 14, 2021

14:15 - 15:45 ***Session S64 - Atrial Arrhythmias - Electrocardiography***

Room: Large 3

14:15 - 14:30 Session S64, ID 44 - **Atrial Fibrillation Episode Patterns and Their Influence on Detection Performance**
Monika Butkuvienė, Andrius Petrėnas, Andrius Sološenko, Alba Martin, Vaidotas Marozas, Leif Sornmo

14:30 - 14:45 Session S64, ID 99 - **Body-Surface Atrial Signals Analysis Based on Spatial Frequency Distribution: Comparison Between Different Signal Transformations**
olivier Meste, Stef Zeemering, Joel Karel, Theo Lankveld, Ulrich Schotten, Harry Crijns, Ralf Peeters, Pietro Bonizzi

14:45 - 15:00 Session S64, ID 133 - **Body-Surface Atrial Vector Similarity as a New Way to Investigate Atrial Fibrillation Propagation Dynamics**
Pietro Bonizzi, Stef Zeemering, Joel Karel, Theo Lankveld, Ulrich Schotten, H. Crijns, Ralf Peeters, O. Meste

15:00 - 15:15 Session S64, ID 175 - **Windowed Cross-Correlation to Assess the Interatrial Coupling During Persistent Atrial Fibrillation**
Adrian Luca, Anna McCann, Etienne Pruvot, Jean-Marc Vesin

15:15 - 15:30 Session S64, ID 200 - **Multilead QT Interval Adaptation to Heart Rate Changes in Atrial Fibrillation: Dealing with the Presence of f-Waves**
Alba Martin, Leif Sornmo, Pablo Laguna

15:30 - 15:45 Session S64, ID 207 - **Atrial Fibrillatory Rate Characterization Extracted from Implanted Cardiac Monitor Data**
Javier Saiz-Vivo, Mostafa Abdollahpur, Luca Mainardi, Valentina Corino, Mirko de Melis, Frida Sandberg

Tuesday, September 14, 2021

15:45 - 17:45 ***Coffee break***

Tuesday, September 14, 2021

15:45 - 17:45 ***Session P7_1&2 - Cardiovascular Imaging and Mechanics***

Foyer 2.NP

15:45 - 17:45 Session P7_1&2, ID 195 - **Skin Segmentation for Imaging Photoplethysmography Using a Specialized Deep Learning Approach**
Matthieu Scherpf, Hannes Ernst, Leo Misera, Hagen Malberg, Martin Schmidt

15:45 - 17:45 Session P7_1&2, ID 322 - **Evaluation of Diastolic Heart Function using Echocardiography and Pulse Wave Analysis in patients after anthracycline therapy.**
Magdaléna Šudáková, Ksenia Budinskaya, Zuzana Nováková
Masarykova univerzita

15:45 - 17:45 Session P7_1&2, ID 152 - **Full, Three-Dimensional Imaging of Action Potential Wave Propagation in the Heart Using Mechanical Deformation as Input**
Niels Otani, Vignesh Venkataramani, Cristian Linte

15:45 - 17:45 Session P7_1&2, ID 250 - **A method for predicting natriuretic peptides in congenital heart disease using support vector machine**
Atul Tyagi, Sudeep Roy, Ivo Provaznik

Tuesday, September 14, 2021

15:45 - 17:45 ***Session P7_3a - Ventricular Arrhythmias***

Foyer 2.NP

15:45 - 17:45 Session P7_3a, ID 183 - **Recurrent Neural Networks to Predict the Outcome of Subsequent Defibrillation Shocks in Cardiac Arrest**
Xabier Jaureguibeitia, Unai Irusta, Elisabete Aramendi, Gorka Zubia Garea, Giuseppe Ristagno

15:45 - 17:45 Session P7_3a, ID 304 - **Local Entropy as Determinant for Wavebreaks and Ventricular Arrhythmia**
Ilija Uzelac and Flavio Fenton

15:45 - 17:45 Session P7_3a, ID 320 - **Late Activation and Local Conduction Velocity Using Optical Mapping for Identification of Delayed Zones for Catheter Ablation**
Jimena Siles Paredes and Ilija Uzelac

Tuesday, September 14, 2021

15:45 - 17:45 ***Session P7_3b - Atrial Arrhythmias***

Foyer 2.NP

15:45 - 17:45 Session P7_3b, ID 29 - **Linear and Nonlinear Correlations Between Surface and Invasive Atrial Activation Features in Catheter Ablation of Paroxysmal Atrial Fibrillation**
Aikaterini Vraka, Vicente Bertomeu-González, Fernando Hornero, Luca Faes, Raul Alcaraz, José J Rieta

15:45 - 17:45 Session P7_3b, ID 329 - **Alternans and 2-D Spiral Wave Dynamics in Human Atria with Short QT Syndrome Variant 3: A Simulation Study**
Yizhou Liu, Yacong Li, Henggui Zhang
University of Manchester, Harbin Institute of Technology

Tuesday, September 14, 2021

15:45 - 17:45 ***Session P7_4a - ECG-Waveform Analysis***

Foyer 2.NP

15:45 - 17:45 Session P7_4a, ID 5 - **Deep Learning Based Classification of True/False Arrhythmia Alarms in the Intensive Care Unit**
Jack Boynton and Byung Suk Lee

15:45 - 17:45 Session P7_4a, ID 10 - **Deep Neural Network Trained on Surface ECG Improves Diagnostic Accuracy of Prior Myocardial Infarction Over Q Wave Analysis.**
Ozal Yildirim, Ulas Baloglu, Muhammed Talo, Jagteshwar Tung, Guson Kang, Mahmood Alhusseini, Tina Baykaner, Paul Wang, Marco Perez, Larissa Tereshchencko, Albert Rogers

15:45 - 17:45 Session P7_4a, ID 22 - **Impact of baseline drift removal on ECG beat classification and alignment**
Laura Bear, Jana Svehlikova, Jake Bergquist, Wilson Good, Ali Rababah, Jaume Coll-Font, Rob MacLeod, Eelco van Dam, Remi Dubois

15:45 - 17:45 Session P7_4a, ID 71 - **A Real-time Digital Pacemaker Pulse Detection Algorithm**
Haoyu Jiang, Mimi Hu, Junbiao Hong, Yijing Li, Xianliang He
Shenzhen Mindray Bio-Medical Electronics Co., Ltd.

15:45 - 17:45 Session P7_4a, ID 107 - **Evaluating Pauses in Holter ECG Signals**
Filip Plesinger, Adam Ivora, Josef Halamek, Ivo Viscor, Radovan Smisek, Veronika Bulkova, Pavel Jurak

15:45 - 17:45 Session P7_4a, ID 118 - **Cardiac Electrical Alternans in Pregnancy: An Observational Study**
Ilaria Marcantoni, Raffaella Assogna, Agnese Sbrollini, Micaela Morettini, Laura Burattini
Università Politecnica delle Marche

15:45 - 17:45 Session P7_4a, ID 168 - **Wavelet Transform Based Detection of First-degree Atrioventricular Block**

Radovan Smisek, Adam Ivora, Veronika Bulkova, Petr Nejedly, Ivo Viscor, Lucie Marsanova, Zuzana Koscova, Josef Halamek, Pavel Jurak, Filip Plesinger

15:45 - 17:45 Session P7_4a, ID 240 - **Unsupervised Fetal Behavioral State Classification Using Non-Invasive Electrocardiographic Recordings**
Amna Samjeed, Maisam Wahbah, Ahsan Khandoker, Leontios Hadjileontiadis

15:45 - 17:45 Session P7_4a, ID 243 - **ECG Quality Assessment via Deep Learning and Data Augmentation**
Alvaro Huerta Herraiz, Arturo Martínez-Rodrigo, José J Rieta, Raul Alcaraz

15:45 - 17:45 Session P7_4a, ID 267 - **On the Accuracy Evaluation of QRS Detection Algorithms**
Katarzyna Heryan, Wojciech Reklewski, Andrzej Szaflarski, Marek Miśkowicz, Piotr Augustyniak

15:45 - 17:45 Session P7_4a, ID 271 - **Cardiac arrhythmias classification in Kardiovize population study**
Martin Pesl, Jakub Hejc, Tomas Kulik, Tomas Vicar, Petra Novotna, Marina Ronzhina, Juan Pablo Gonzalez Rivas, Juraj Jakubik, Zdenek Starek

15:45 - 17:45 Session P7_4a, ID 273 - **Validation of the Spatial Ventricular Gradient by Intra-Individual Comparison of Sinus Beats and Ectopic Beats**
Resi Schoonderwoerd, Marielle Dik, Sumche Man, Arie Maan, Cees A. Swenne

15:45 - 17:45 Session P7_4a, ID 286 - **Myocardial Ischemia Detection Using Body Surface ECG Recordings and Machine Learning**
Vai Suliafu, Jake Bergquist, James Brundage, Brian Zenger, Lindsay Rupp, Jess Tate, Rob MacLeod3, Bao Wang

15:45 - 17:45 Session P7_4a, ID 331 - **Guinea Pig ECG Changes Under the Effect of New Drug Candidate TP-1**

Anna Bartáková, Tibor Stračina, Eva Opatřilová, Marie Nováková

15:45 - 17:45 Session P7_4a, ID 333 - **Automatic detection of QRS complex from a sequence of octant numbers from VCG**
Jaroslav Vondrak, Martin Černý, František Jurek

15:45 - 17:45 Session P7_4a, ID 342 - **Estimating the Minimal Size of Training Datasets Required for the Development of Linear ECG-Lead Transformations**
Daniel Guldenring, Ali Rababah, Dewar Finlay, Raymond Bond, Alan Kennedy, Michael Jennings, Khaled Rjoob, James McLaughlin

Tuesday, September 14, 2021

15:45 - 17:45 ***Session P7_4b - BSPM and ECGI***

Foyer 2.NP

15:45 - 17:45 Session P7_4b, ID 178 - **Ellipsoid-Bounded Volume Conductor Model for Determination of Moving Dipoles**
Vito Starc

15:45 - 17:45 Session P7_4b, ID 257 - **ECGI with a Deep Neural Network and 2D normalized Body Surface Potential Maps**
Tiantian Wang, Pietro Bonizzi, Joel Karel, Ralf Peeters

Tuesday, September 14, 2021

15:45 - 17:45 ***Session P7_5a - Modeling Atria and Atrial Arrhythmias***

Foyer 2.NP

15:45 - 17:45 Session P7_5a, ID 270 - **Normal and Reentrant Propagation in a 3D Atrial Model with Nonlinear Gap Junctions**
Ariane Saliani and Vincent Jacquemet
Univesity of Montreal, Université de Montréal

15:45 - 17:45 Session P7_5a, ID 239 - **Multiparameter Optimization of Nonuniform Conduction Properties for Creating Continuous Equivalent Models**
Éric IRAKOZE and Vincent Jacquemet
University of Montreal, Université de Montréal

15:45 - 17:45 Session P7_5a, ID 252 - **Evolution of Epicardial Rotors into Breakthrough Waves during Atrial Fibrillation in 3D Canine Biatrial Model with Detailed Fibre Orientation**
Ataollah Tajabadi, Aditi Roy, Marta Varela, Oleg Aslanidi
University of Glasgow, University of Oxford, King's College London

15:45 - 17:45 Session P7_5a, ID 237 - **Computer Simulations Outcomes of Left Atrial Arrhythmia Induction are Highly Sensitive to Scar and Fibrosis Determination**
Matthias Lange, Eugene Kwan, Rob MacLeod, Ravi Ranjan
Universtiy of Utah, University of Utah

15:45 - 17:45 Session P7_5a, ID 340 - **Empirical Gramian Based Controllability of Alternans in a Cardiac Map Model**
Laura Munoz
Rochester Institute of Technology

Tuesday, September 14, 2021

15:45 - 17:45 ***Session P7_8 - Challenge***

Foyer 2.NP

15:45 - 17:45 Session P7_8, ID 9 - **Deep Learning Approach for Identification of Cardiac Abnormalities from a Variable Number of Leads**
giovanni bortolan

15:45 - 17:45 Session P7_8, ID 12 - **Multi-model fusion for automated detection of abnormalities from reduced-lead electrocardiograms**
Kiran Bhattacharyya

15:45 - 17:45 Session P7_8, ID 13 - **A Branched Deep Neural Network for End-to-end Classification from ECGs with Varying Dimensions**
Han Duan, Bin Xiao, Xiuli Bi, Shuai Hu, Junhui Zhang, Xu Ma

15:45 - 17:45 Session P7_8, ID 17 - **Hybrid Arrhythmia Detection on Varying-Dimensional Electrocardiography: Combining Deep Neural Networks and Clinical Rules**
Jingsu KANG and Hao WEN

15:45 - 17:45 Session P7_8, ID 21 - **Using mel-frequency cepstrum and amplitude-time heart variability as XGBoost handcrafted features for heart disease detection**
Sergey Krivenko, Anatolii Pulavskyi, Liudmyla Kryvenko, Olha Krylova, Stanislav Krivenko

15:45 - 17:45 Session P7_8, ID 33 - **Two Might Do: A Beat-by-Beat Classification of Cardiac Abnormalities using Deep Learning and Domain-Specific Features**
Berken Utku Demirel, Adnan Harun Dogan, Mohammad Abdullah Al Faruque

15:45 - 17:45 Session P7_8, ID 35 - **Multi-label Classification of Electrocardiogram using a Deep Neural Network**
Hanshuang Xie, Qineng cao, Jiayi Yan, hong z

15:45 - 17:45 Session P7_8, ID 38 - **Swarm Decomposition Enhances the Discrimination of Cardiac Arrhythmias in Varied-lead ECG Using ResNet-BiLSTM Network Activations**
Mohanad Alkhodari, Leontios Hadjileontiadis, Ahsan Khandoker

15:45 - 17:45 Session P7_8, ID 46 - **Cardiac Abnormality Detection based on an Ensemble Voting of Single-Lead Classifier Predictions.**
Pierre Aublin, Julien Oster, Jérémy Fix, Mouin Ben Ammar

15:45 - 17:45 Session P7_8, ID 47 - **Cardiac Abnormalities Recognition in ECG Using a Convolutional Network with Attention and Input with an Adaptable Number of Leads**
Tomas Vicar, Petra Novotna, Jakub Hejc, Oto Janousek, Marina Ronzhina

15:45 - 17:45 Session P7_8, ID 50 - **Detection of Cardiac Complications from Multi-Lead ECGs via Deep Learning**
Michael Larionov and Brian Kreeger

15:45 - 17:45 Session P7_8, ID 51 - **Semi-supervised Learning for ECG Classification**
Rui Rodrigues

15:45 - 17:45 Session P7_8, ID 54 - **N-BEATS for Heart Disfunction Classification**
Bartosz Puszkarski, Krzysztof Hryniów, Grzegorz Sarwas

15:45 - 17:45 Session P7_8, ID 55 - **Improving Machine Learning Education during the COVID-Pandemic using past Computing in Cardiology Challenges**
Christoph Hoog Antink

15:45 - 17:45 Session P7_8, ID 59 - **Automatic Diagnosis of Cardiac Disease from Twelve-lead and Reduced-lead ECGs using Multi-label Classification**
Saman Parvaneh and Prathic Sundararajan

15:45 - 17:45 Session P7_8, ID 63 - **Multi-Label Cardiac Abnormalities Classification Using SE_ResNet with Sign Loss Function**
Zhuoyang Xu, Zhuo Liu, Tingting Zhao, Xingzhi Sun

15:45 - 17:45 Session P7_8, ID 64 - **Classifying Cardiac Rhythms using Multi-Task Representation Learning with Data Augmentation**
Niranjan Sridhar, Sohrab Saeb, Li-Fang Cheng

15:45 - 17:45 Session P7_8, ID 67 - **Cardiac Anomalies Detection Through 2D-CNN and ECG Spectrograms**
Jonathan Roberto Torres Castillo and Miguel Padilla Castañeda

15:45 - 17:45 Session P7_8, ID 75 - **12, 6, 3 and 2-Lead ECG Multi-label Classification using Ensemble Learning**
Bjørn-Jostein Singstad and Pål Brekke

15:45 - 17:45 Session P7_8, ID 76 - **A Self-attentional Network for Multilabel Cardiac Irregularity Detection using Reduced-lead Electrocardiogram**
Hao-Chun Yang and Wan-Ting Hsieh

15:45 - 17:45 Session P7_8, ID 80 - **Multifaceted Transfer Learning for Reduced-Lead Electrocardiogram Classification**
Seonwoo Min

15:45 - 17:45 Session P7_8, ID 90 - **Combining Adaptive Boosting and Sparse Transformer for Multi-channel ECG Signal Classification**
Pengfei Fan, Yonghao Gao, Lihong Qiao

15:45 - 17:45 Session P7_8, ID 95 - **Deep Discriminative Domain Generalization with Adversarial Feature Learning for Classifying 12-lead ECGs**
Zuogang Shang, Zhibin Zhao, Hui Fang, Samuel Relton, Ruqiang Yan, David Wong

15:45 - 17:45 Session P7_8, ID 98 - **Cardiac Pathologies Classification in Reduced-lead ECGs Based on Multi-Source Features**
Pan Xia, Peng Wang, Yusi Zhu, Zhongrui Bai, Pengfei Zhang, Yuqi Wang, Fanglin Geng, Xianya Yu, Zhen Fang

15:45 - 17:45 Session P7_8, ID 102 - **ECG Classification Model Based on Medical Knowledge for Different Lead Configurations**
Lorenzo Bachi, Lucia Billeci, Maurizio Varanini

15:45 - 17:45 Session P7_8, ID 105 - **Classifying different dimensional ECGs using deep residual convolutional neural networks**
Wenjie Cai, Fanli Liu, Xuan Wang, Bolin Xu, Yaohui Wang

15:45 - 17:45 Session P7_8, ID 109 - **Multiple Cardiac Disease Detection from Minimal-Lead ECG Combining Feedforward Neural Networks with a One-vs-Rest Approach**
Santiago Jiménez-Serrano, Miguel Rodrigo, Conrado J. Calvo, José Millet Roig, Francisco Castells

15:45 - 17:45 Session P7_8, ID 114 - **A Combined Approach of Wavelet Transform and Convolutional Neural Networks for Electrocardiogram Classification Using Adjustable Number of Leads**
Enrico Emaldi, Agnese Sbrollini, Ilaria Marcantoni, Micaela Morettini, Laura Burattini

15:45 - 17:45 Session P7_8, ID 122 - **Robust and Task-Aware Training of Deep Residual Networks for Varying-Lead ECG Classification**
Hansheng Ren, Miao Xiong, Bryan Hooi

15:45 - 17:45 Session P7_8, ID 129 - **Rethinking ECG Classification with Neural Networks as a Sequence-to-Sequence Task**
Philipp Sodmann, Lars Kaderali, Marcus Vollmer

15:45 - 17:45 Session P7_8, ID 130 - **Multi-label Classification on 12, 6, 3 and 2 Lead ECG Signals using Convolutional Recurrent Neural Networks**
Niels Osnabrugge, Felix Rustemeyer, Francesca Battipaglia, Christos Kaparakis, Kata Keresztesi, Joel Karel, Pietro Bonizzi

Wednesday, September 15, 2021

8:30 - 10:00 ***Session S81 - Modeling Myocardial Cells***

Room: Large 1

8:30 - 8:45 Session S81, ID 45 - **In silico Electrophysiological Evaluation of Scaffold Geometries for Cardiac Tissue Engineering**
Ricardo Rosales, Konstantinos Mountris, Manuel Doblaré, Esther Pueyo

8:45 - 9:00 Session S81, ID 248 - **In-Silico Human Induced Pluripotent Stem Cell Derived Cardiomyocyte Electro-Mechanical Modelling and Simulation**
Milda Folkmanaite, Xin Zhou, Francesca Margara, Manuela Zaccolo, Blanca Rodriguez

9:00 - 9:15 Session S81, ID 328 - **An Electrophysiologic Computational Model of the Zebrafish Heart**
Ludovica Cestariolo, Giulia Luraghi, Pierre L'Eplattenier, Jose Rodriguez Matas

9:15 - 9:30 Session S81, ID 223 - **Evaluation and Preliminary Integration of the Most Recent Human Ventricular Action Potential Models**
Lorenzo Gorgolini, Chiara Bartolucci, Stefano Severi

9:30 - 9:45 Session S81, ID 86 - **Computationally Efficient Model for Human Ventricular Epicardial Cells**
Niccolò Biasi and Alessandro Tognetti

9:45 - 10:00 Session S81, ID 211 - **Quantifying distributions of parameters for cardiac action potential models using the Hamiltonian Monte Carlo method**
Alejandro Nieto Ramos, Conner Herndon, Flavio Fenton, Elizabeth Cherry

Wednesday, September 15, 2021

8:30 - 10:00 ***Session S82 - BPSM Applications***

Room: Large 2

8:30 - 8:45 Session S82, ID 56 - **Uncovering electrocardiographic characteristics in subclinical pathogenic mutation carriers and arrhythmogenic cardiomyopathy patients**
Manon Kloosterman, Machteld Boonstra, Peter van Dam, Feddo Kirkels, Peter Loh, Cees Slump

8:45 - 9:00 Session S82, ID 6 - **A colour-coded 4D heart visualising the electrical activity**
Roger Abächerli, Daniel Rohrer, Peter van Dam, C. Haack

9:00 - 9:15 Session S82, ID 256 - **Detection of Atrial Fibrillation Driver Locations using CNN and Body Surface Potentials**
Miguel Ángel Cámara-Vázquez, Ismael Hernández-Romero, Eduardo Morgado-Reyes, Maria de la Salud Guillem Sánchez, Andreu M. Climent, Óscar Barquero-Pérez

9:15 - 9:30 Session S82, ID 272 - **In-Silico Data Based Machine Learning Technique Predicts Premature Ventricular Contraction Origin Coordinates**
Andony Arrieula, Hubert Cochet, Pierre Jaïs, Michel Haïssaguerre, Nejib Zemzemi, Mark Potse

9:30 - 9:45 Session S82, ID 307 - **Interactive simulation of the ECG; Effects of cell types, distributions, shapes and duration.**
Abouzar Kaboudian, Elizabeth Cherry, Ilija Uzelac, Shahriar Iravanian, Flavio Fenton

9:45 - 10:00 Session S82, ID 147 - **Inference of ventricular activation properties from twelve-lead electrocardiogram**
Julia Camps, Brodie Lawson, Christopher Drovandi, Ana Minchole, Zhinuo Jenny Wang, Vicente Grau, Kevin Burrage, Blanca Rodriguez

Wednesday, September 15, 2021

8:30 - 10:00 ***Session S83 - Ventricular Arrhythmias***

Room: Medium 1

8:30 - 8:45 Session S83, ID 72 - **Pairwise Feature Interactions to Predict Arrhythmic Risk of Brugada Syndrome**
Sharen Lee, Jiandong Zhou, K. Letsas, Christien Li, Tong Liu, Sven Zumhagen, Eric Schulze-Bahr, Gary Tse, Q. Zhang

8:45 - 9:00 Session S83, ID 83 - **Machine Learning to predict defibrillation Shock Success in Out-of-Hospital Cardiac Arrest**
Gorka Zubia Garea, Xabier Jaureguibeitia, Unai Irusta, Elisabete Aramendi, Giuseppe Ristagno

9:00 - 9:15 Session S83, ID 120 - **Cardiac EGM Automatic Screening of egms transmitted by Implantable Electronic Devices**
Narimane Gassa, Benjamin Sacristan, Nejib Zemzemi, Maxime Laborde, Garrido Oliver Juan, Clara Perabla, Guillermo Pérez, Oscar Camara, Sylvain Ploux, Mark Strik, Pierre Bordachar, Remi Dubois

9:15 - 9:30 Session S83, ID 125 - **Arrhythmic3D: A Fast Automata-based Tool to Simulate and Assess Arrhythmia Risk in 3D Ventricular Models**
Dolors Serra, Pau Romero, Miguel Lozano, Ignacio Garcia-Fernandez, Alejandro Liberos, Miguel Rodrigo, Antonio Berruezo, Alfonso Bueno-Orovio, Rafael Sebastian

9:30 - 9:45 Session S83, ID 179 - **Deep-Learning Premature Ventricular Contraction Localization Using Gaussian Based Predicted Data**
Petra Novotna, Tomas Vicar, Jakub Hejc, Marina Ronzhina

9:45 - 10:00 Session S83, ID 291 - **Not all Long-QTs Are The Same, Proarrhytmic Quantification with Action Potential Triangulation and Alternans**
Ilija Uzelac, Shahriar Iravanian, Flavio Fenton

Wednesday, September 15, 2021

8:30 - 10:00 ***Session S84 - Atrial Arrhythmias - Endocardiography 1***

Room: Large 3

8:30 - 9:00 Session S84, ID 351 - **Unmet Needs in Clinical Cardiology - Innovations**
Petr Kala

9:00 - 9:15 Session S84, ID 42 - **Electrogram Signatures of Atrial Fibrillation identified by Deep Learning**
Miguel Rodrigo, Albert Rogers, Prasanth Ganesan, Mahmood Alhusseini, Alejandro Liberos, Rafael Sebastián, Sanjiv Narayan

9:15 - 9:30 Session S84, ID 172 - **Spatiotemporal Behaviour of Human Persistent Atrial Fibrillation from Long-duration Recordings**
Mahmoud Ehnesh, Xin Li, Tiago Paggi de Almeida, Sidhu Bharat, Ibrahim Antoun, Nawshin Dastagir, Peter Stafford,, G. Andre Ng, Fernando Schlindwein

9:30 - 9:45 Session S84, ID 199 - **A New Approach for Mapping Slow Electrical Conduction Areas in Atypical Atrial Flutter**
Rosalia Martino, Laura Volpe, Simone Attala, Stefano Severi, Nicola Trevisi, Cristiana Corsi

9:45 - 10:00 Session S84, ID 299 - **Estimation of the Ablated Area size based on Local Conduction Velocity: Simulations and animal experiments**
Jimena Siles Paredes, João Salinet, Stefan Pollnow, Olaf Doessel, Ilija Uzelac

Wednesday, September 15, 2021

10:00 - 10:30 ***Coffee break***

Wednesday, September 15, 2021

10:30 - 12:00 ***Session S91 - Whole Heart Modeling***

Room: Large 1

10:30 - 10:45 Session S91, ID 302 - **Real-Time Interactive Simulations of Complex Ionic Cardiac Cell Models in 2D and 3D Heart Structures with GPUs on Personal Computers**
Abouzar Kaboudian, Elizabeth Cherry, Flavio Fenton

10:45 - 11:00 Session S91, ID 268 - **The Role of Myocardial Fiber Direction in Epicardial Activation Patterns via Uncertainty Quantification**
Lindsay Rupp, Jake Bergquist, Brian Zenger, Karli Gillette, Akil Narayan, Gernot Plank, Rob MacLeod

11:00 - 11:15 Session S91, ID 7 - **Influence of Electrode Placement on the Morphology of In-Silico 12 Lead ECGs**
Karli Gillette, Matthias Gsell, Gernot Plank

11:15 - 11:30 Session S91, ID 201 - **Personalization of Ventricular Cardiac Conduction System Models to Reproduce Patient Electrocardiogram**
Fernando Barber, Peter Langfield, Miguel Lozano, Ignacio Garcia-Fernandez, Josselin Duchateau, Meleze Hocini, Michel Haissaguerre, Edward Vigmond, Rafael Sebastian

11:30 - 11:45 Session S91, ID 281 - **Uncertainty Quantification in Simulations of Myocardial Ischemia**
Jake Bergquist, Brian Zenger, Lindsay Rupp, Akil Narayan, Rob MacLeod

Wednesday, September 15, 2021

10:30 - 12:00 ***Session S92 - ECGI Techniques***

Room: Large 2

10:30 - 10:45 Session S92, ID 36 - **Evaluation of the ECGI Patchwork Method Using Experimental Data in Sinus Rhythm**
Oumayma Bouhamama, Lisl Weynans, Laura Bear

10:45 - 11:00 Session S92, ID 62 - **Relationship Between Cardiac Isochrones and its Mean Anatomical Position in the Heart: the CineECG Method**
Machteld Boonstra, Dana Brooks, Peter Loh, Peter van Dam

11:00 - 11:15 Session S92, ID 77 - **Model Based Relevance of Measuring Electrodes for the Inverse Solution with a Single Dipole**
Beata Ondrusova, Jana Svehlikova, Jan Zelinka, Milan Tysler, Peter Tino

11:15 - 11:30 Session S92, ID 146 - **A Cardiac Shape Model for Segmentation Uncertainty Quantification**
Jess Tate, Shireen Elhabian, Nejib Zemzemi, Wilson Good, Machteld Boonstra, Peter van Dam, Dana Brooks, Akil Narayan, Rob MacLeod

11:30 - 11:45 Session S92, ID 227 - **Compensation of Model Errors in Electrocardiographic Imaging using Bayesian Estimation**
Furkan Aldemir and Yesim Serinagaoglu Dogrusoz

11:45 - 12:00 Session S92, ID 255 - **Electrocardiographic Imaging of Sinus Rhythm in Pig Hearts using Bayesian Maximum A Posteriori Estimation**
Yesim Serinagaoglu Dogrusoz, Remi Dubois, Emma Abell, Matthijs Cluitmans, Laura Bear

Wednesday, September 15, 2021

10:30 - 12:00 ***Session S93 - Blood Pressure Regulation and Variability***

Room: Medium 1

10:30 - 10:45 Session S93, ID 3 - **The Magnitude of the Postural Challenge Impacts on the Exponential Decay of the Baroreflex Impulse Response**
Alberto Porta, Francesca Gelpi, Vlasta Bari, Beatrice Cairo, Beatrice De Maria, Anielle Takahashi, Aparecida Catai

10:45 - 11:00 Session S93, ID 244 - **Sensitivity Analysis and Parameter Identification of a Cardiovascular Model in Aortic Stenosis**
Marion Taconné, Virginie Le Rolle, Kimi Owashi, Vasileios Panis, Arnaud Hubert, Vincent Auffret, Elena Galli, Alfredo Hernandez, erwan donal

11:00 - 11:15 Session S93, ID 65 - **Influence of finger movement on the stability of the oscillometric pulse waveform for blood pressure measurement**
Jian Liu, Alan Murray, Jianqing Li, Chengyu Liu

11:15 - 11:30 Session S93, ID 182 - **Automated detection of pulse using continuous invasive arterial blood pressure in patients during cardiopulmonary resuscitation**
Jon Urteaga, Andoni Elola, Elisabete Aramendi, Unai Irusta, Per Olav Berve, Lars Wik

Wednesday, September 15, 2021

10:30 - 12:00 ***Session S94 - Atrial Arrhythmias - Endocardiography 2***

Room: Large 3

10:30 - 10:45 Session S94, ID 41 - **Accuracy of Classic Features versus Deep Learning to Detect Atrial Fibrillation on Intracardiac Electrograms**
Miguel Rodrigo, Albert Rogers, Prasanth Ganesan, Mahmood Alhusseini, Alejandro Liberos, Rafael Sebastián, Sanjiv Narayan

10:45 - 11:00 Session S94, ID 81 - **Dominant Frequency and Organization Index for Substrate Identification of Persistent Atrial Fibrillation**
Tiago Paggi de Almeida, Xin Li, Bharat Sidhu, Arthur Bezerra, Mahmoud Ehnesh, Ibrahim Anton, Ibrahim Nasser, Gavin Chu, Peter Stafford, Takashi Yoneyama, G. André Ng, Fernando Schlindwein

11:00 - 11:15 Session S94, ID 111 - **Spatial Relationship Between Atrial Fibrillation Drivers and the Presence of Repetitive Conduction Patterns Using Recurrence Analysis on In-Silico Models**
Victor Marques, Ali Gharaviri, Simone Pezzuto, Pietro Bonizzi, Stef Zeemering, Ulrich Schotten

11:15 - 11:30 Session S94, ID 141 - **High Coverage and High-Resolution Mapping of Repetitive Patterns During Atrial Fibrillation**
O. Özgül, A. v. Hunnik, U. Schotten, P. Bonizzi, S. Zeemering

11:30 - 11:45 Session S94, ID 233 - **Segmentation of Atrial Electrical Activity in Intracardiac Electrograms (IEGs) using Convolutional Neural Network (CNN) Trained on Small Imbalanced Dataset**
Jakub Hejc, David Pospisil, Petra Novotna, Martin Pesl, Oto Janousek, Marina Ronzhina, Zdenek Starek

11:45 - 12:00 Session S94, ID 288 - **Siamese Neural Networks for Small Dataset Classification of Electrograms**
Bram Hunt, Eugene Kwan, Derek Dosdall, Rob MacLeod, Ravi Ranjan

Wednesday, September 15, 2021

12:00 - 14:00 ***Lunch***

Wednesday, September 15, 2021

12:00 - 14:00 ***Session PA_5b - Modeling Genetic Diseases and Drug Effects***

Foyer 2.NP

12:00 - 14:00 Session PA_5b, ID 173 - **In silico Identification of the Key Ionic Currents modulating Human Pluripotent Stem Cells towards an Adult Cardiomyocyte Phenotype**
Leto Riebel, Elisa Passini, Francesca Margara, Michelangelo Paci, Jacopo Biasetti, Blanca Rodriguez

12:00 - 14:00 Session PA_5b, ID 197 - **Influence of Hydroxychloroquine Dosage on the Occurrence of Arrhythmia in COVID-19 Infected Ventricle**
Ponnuraj Kirthi Priya and Srinivasan Jayaraman

12:00 - 14:00 Session PA_5b, ID 339 - **Computational Analysis of the Effects of KCNJ2-linked E299V Mutation Short QT Syndrome and Its Potential Therapeutic Targets**
Cunjin Luo, Ying He, Kuanquan Wang, Henggui Zhang

12:00 - 14:00 Session PA_5b, ID 319 - **Computational Analysis of the Effect of Quinidine on KCNH2 N588K and L532P linked Short QT Syndrome at Different Heart Rates**
Cunjin Luo, Ying He, Kuanquan Wang, Henggui Zhang

12:00 - 14:00 Session PA_5b, ID 326 - **Modeling the chronotropic effect of isoprenaline on bio-pacemaker**
Yacong Li, Kuanquan Wang, Qince Li, Henggui Zhang

12:00 - 14:00 Session PA_5b, ID 254 - **Prediction of Drug-Induced Arrhythmogenic Risk Using In Silico Populations of Models**
Jordi Llopis-Lorente, Beatriz Trenor, Javier Saiz

Wednesday, September 15, 2021

12:00 - 14:00 ***Foyer 2.NP***	***Session PA_5c - Modeling Whole Heart and Ventricula Arrhythmias***
12:00 - 14:00	Session PA_5c, ID 261 - **Interactive 3D Human Heart Simulations on Segmented Human MRI Hearts** *John Berman, Flavio Fenton, Elizabeth Cherry, Tinen Iles, Paul Iaizzo, Abouzar Kaboudian*
12:00 - 14:00	Session PA_5c, ID 260 - **Investigation of low-voltage defibrillation by standing waves in human ventricular tissue models** *Nikolay Georgiev, Adam Connolly, Martin Bishop, Oleg Aslanidi*
12:00 - 14:00	Session PA_5c, ID 89 - **Comparison of the effect of different infarct regions on vulnerability to reentry in two different stages of myocardial infarction** *Cuiping Liang, Kuanquan Wang, Qince Li, Henggui Zhang*
12:00 - 14:00	Session PA_5c, ID 116 - **Differential Response of Hypertrophic Cardiomyopathy to Ischemia Caused by Remodelling of Late Sodium and Rapidly Delayed Rectifier Channels** *James Coleman, Alfonso Bueno-Orovio, Ruben Doste*
12:00 - 14:00	Session PA_5c, ID 205 - **A study of Ca2+ -induced Delayed afterdepolarizations in Human Ventricular Myocyte Models.** *Navneet Roshan and Rahul Pandit*

Wednesday, September 15, 2021

12:00 - 14:00 ***Session PA_6 - Medical Informatics and Technology***

Foyer 2.NP

12:00 - 14:00 Session PA_6, ID 15 - **Respiratory Rate Estimation Using the Photoplethysmogram: Towards the Implementation in Wearables**
Jiri Kozumplik, Lukas Smital, Andrea Nemcova, Marina Ronzhina, Radovan Smisek, Lucie Marsanova, Martin Kralik, Martin Vitek

12:00 - 14:00 Session PA_6, ID 48 - **Evaluation of coronary artery disease in asymptomatic persons with type 2 diabetes using a non-invasive acoustic detection system**
Tine W. Hansen Hansen, Ida Rasmussen, Mathias Sørgaard, Bernt von Scholten, Samuel Emil Schmidt, Peter Rossing, Klaus Kofoed

12:00 - 14:00 Session PA_6, ID 49 - **Joint Training of Hidden Markov Model and Deep Neural Network for Heart Sound Segmentation**
Francesco Renna, Miguel Martins, Miguel Coimbra

12:00 - 14:00 Session PA_6, ID 52 - **Source Separation of the Second Heart Sound via Alternating Optimization**
Francesco Renna, Mark Plumbley, Miguel Coimbra

12:00 - 14:00 Session PA_6, ID 82 - **Cardiovascular Risk Detection in Sleep Apnea Patients from Pulse Photoplethysmography Waveform**
Dorien Huysmans, Pascal Borzée, Bertien Buyse, Dries Testelmans, Sabine Van Huffel, Carolina Varon

12:00 - 14:00 Session PA_6, ID 92 - **Monitoring Driver's Heart Rate and Respiratory Frequency using a mm-Wave Radar: preliminary results**
Claudia Floris, Guido Gatti, Irene De Rose, Massimiliano Sala, Alessandro Veglio, Enrico Caiani

12:00 - 14:00	Session PA_6, ID 190 - **The Effects of External Pressure on Multi-Wavelength Photoplethysmography Signals** *Jukka-Pekka Sirkiä, Tuukka Panula, Matti Kaisti*
12:00 - 14:00	Session PA_6, ID 191 - **Assessing Cardiac Electro-Mechanical Deconditioning During Bed Rest Using Smartphone's Inertial Sensors** *Sarah Solbiati, Alessia Paglialonga, Lorenzo Costantini, Boštjan Šimunič, Rado Pišot, Marco Narici, Enrico Caiani*
12:00 - 14:00	Session PA_6, ID 228 - **A Data Pipeline for Extraction and Processing of Electrocardiogram Recordings** *Joshua Prim, Tim Uhlemann, Nils Gumpfer, Dimitri Grün, Sebastian Wegener, Sabrina Krug, Jennifer Hannig, Till Keller, Michael Guckert*
12:00 - 14:00	Session PA_6, ID 229 - **Icentia11K: An Unsupervised Representation Learning Dataset for Arrhythmia Subtype Discovery** *Shawn Tan, Guillaume Androz, Satya Ortiz-Gagné, Ahmad Chamseddine, Pierre Fecteau, Aaron Courville, Yoshua Bengio, Joseph Paul Cohen*
12:00 - 14:00	Session PA_6, ID 230 - **Control Method for Continuous Non-Invasive Arterial Pressure Monitoring using the Non-Pulsatile Component of the PPG Signal** *Tuukka Panula, Jukka-Pekka Sirkiä, Matti Kaisti*
12:00 - 14:00	Session PA_6, ID 265 - **A Prediction Model of In-Patient Deteriorations Based on Passive Vital Signs Monitoring Technology** *Veronica Maidel, Maayan Lia Yizraeli Davidovich, tal klap, Zvika Shinar*
12:00 - 14:00	Session PA_6, ID 316 - **AI-Based Penetration and Prevention of the Cardiac Medical Diagnosis Systems** *Ying He and Cunjin Luo*

Wednesday, September 15, 2021

12:00 - 14:00 ***Session PA_7a - System Studies***

Foyer 2.NP

12:00 - 14:00 Session PA_7a, ID 158 - **Automated quiet sleep detection for premature newborns based on video and cardio-respiratory analyses**
Sandie Cabon, Raphael Weber, Léa Cailleau, guy carrault, Patrick Pladys, Fabienne Poree

12:00 - 14:00 Session PA_7a, ID 330 - **Interaction between beat-to-beat variability of pulse wave velocity and blood pressure in healthy young subjects: fighter pilots and non-sporting controls.**
Jana Svacinova, Lucie Vasikova, Radek Ligursky, Magdalena Sudakova, Anna Vravcova, Michaela Bittnerova, Tomas Fordinal, Frantisek Garncarz, Jan Boril, Zuzana Nováková

Wednesday, September 15, 2021

12:00 - 14:00 ***Session PA_7b - Heart Rate Variability***

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12:00 - 14:00 Session PA_7b, ID 117 - **Fast and Accurate Power Spectral Analysis of Heart Rate Variability using Fast Gaussian Gridding**
Charalampos Eleftheriadis and Georgios Karakonstantis

12:00 - 14:00 Session PA_7b, ID 144 - **Sleep Apnea Detection using Multi-lag PoincarePlot**
Shahab Rezaei, Sadaf Moharreri, Nader Jafarnia Dabanloo, Saman Parvaneh

12:00 - 14:00 Session PA_7b, ID 193 - **Asymmetric Characteristic in Variability of Heart Rate and Blood Pressure and its Diagnostic Potential for Autonomic Nervous System Disorders in Females**
Rafał Pawłowski, Katarzyna Buszko, Paweł Zalewski, Agnieszka Piątkowska, Edward Koźluk

12:00 - 14:00 Session PA_7b, ID 238 - **Dynamical Heart Beat Correlations during Complex Tasks -- A Case Study in Automobile Driving**
Matti Molkkari, Teemu Pukkila, Esa Räsänen

12:00 - 14:00 Session PA_7b, ID 310 - **Generation of Artificial Heart Rate Variability Signal in Different Stages of Sleep Using Developed Zeeman Model**
Nader Jafarnia Dabanloo and Gholamreza Attarodi

12:00 - 14:00 Session PA_7b, ID 287 - **Heart Rate Variability Analysis of Pilot In-Flight Workload**
Bradley Hoffmann, Jessica VanBree, Thomas Petros, Nicholas Wilson, Kouhyar Tavakolian

Wednesday, September 15, 2021

12:00 - 14:00 ***Session PA_8 - Challenge***

Foyer 2.NP

12:00 - 14:00 Session PA_8, ID 136 - **An InceptionTime-Inspired Convolutional Neural Network to Detect Cardiac Abnormalities in Reduced-Lead ECG Data**
Harry Crocker and Aaron Costall

12:00 - 14:00 Session PA_8, ID 137 - **ACQuA: Arrhythmia Classification with Quasi-Attractors**
William Rudman, Jack Merullo, Laura Mercurio, Carsten Eickhoff

12:00 - 14:00 Session PA_8, ID 142 - **An Ensemble Learning Approach to Detect Cardiac Abnormalities in ECG Data Irrespective of Lead Availability**
Tim Uhlemann, Sebastian Wegener, Joshua Prim, Nils Gumpfer, Dimitri Grün, Jennifer Hannig, Till Keller, Michael Guckert

12:00 - 14:00 Session PA_8, ID 143 - **Ensemble Learning of Modified Residual Networks for Classifying ECG with Different Set of Leads**
Federico Muscato, Luca Mainardi, Valentina Corino

12:00 - 14:00 Session PA_8, ID 151 - **Classification of Cardiac Abnormalities Based on Vary-ing Dimensions in ECGs by An Ensemble Machine Learning Model**
Pu Jian, Yicheng Yao, Minfang Tang

12:00 - 14:00 Session PA_8, ID 155 - **Diagnosis of Cardiac Abnormalities Applying Fourier-Bessel Expansion on ECG Signals**
Nidhi Sawant and Shivnarayan Patidar

12:00 - 14:00 Session PA_8, ID 156 - **Classification of Heart Diseases Based On ECG Signals Using Median Complex and XGBoost**
Rui Yu, Guanghong Bin, Guangyu Bin

12:00 - 14:00 Session PA_8, ID 163 - **Reduced-Lead Electrocardiogram Classification using Wavelet Analysis and Deep Learning**
Adrian Cornely, Alondra Carrillo, Grace Mirsky

12:00 - 14:00 Session PA_8, ID 170 - **Generative Pre-Trained Transformer for Cardiac Abnormality Detection**
Halla Sigurthorsdottir, Jérôme Van Zaen, Clementine Aguet, Mathieu Lemay, Ricard Delgado-Gonzalo

12:00 - 14:00 Session PA_8, ID 171 - **Diagnosis of Reduced-lead Electrocardiograms using Autoencoders with a Shared Latent Space**
Hidde Jessen, Rutger van de Leur, Rene van Es

12:00 - 14:00 Session PA_8, ID 186 - **Adaptive Long Short-Term Memory networks for classifying 12 and reduced-lead ECG arrhythmia**
Sebastian Cajas, Talha Bilal, Hassan Ansari, Santiago Garcia, Pedro Astaiza, Diego Lopez

12:00 - 14:00 Session PA_8, ID 192 - **Classification of ECG Signals with Different Lead Systems using AutoML**
Matteo Bodini, Massimo W Rivolta, Roberto Sassi

12:00 - 14:00 Session PA_8, ID 194 - **Graph Attention and Convolutional Networks for Detecting Inter-class Cardiac Disorders from Multi-lead ECGs**
Long Chen, Zheheng Jiang, Tiago P. Almeida, Marcus O. Panchal, Jakevir S. Shoker, Fernando S. Schlindwein, G. Andre Ng, Huiyu Zhou, Xin Li

12:00 - 14:00 Session PA_8, ID 196 - **Multi-Label Classification of Cardiac Abnormalities for Multi-Lead ECG Recordings Based on Auto-Encoder Features and a Neural Network Classifier**
Onno Linschmann, Maurice Rohr, Theresa Nolte, Klaus Leonhardt, Christoph Hoog Antink

12:00 - 14:00 Session PA_8, ID 198 - **ECG classification combining conventional signal analysis and tree-based machine learning algorithms**
Martin Kropf, Martin Baumgartner, Sai Pavan Kumar Veeranki, Lukas Haider, Dieter Hayn, Günter Schreier

12:00 - 14:00 Session PA_8, ID 202 - **MoCo-ECG: Contrastive learning for improved representation and generalization of ECG models**
Marco Pimentel and Shadab Khan

12:00 - 14:00 Session PA_8, ID 210 - **Arrhythmia Classification of Reduced-Lead Electrocardiograms by Scattering-Recurrent Networks**
Philip Warrick, Vincent Lostanlen, Michael Eickenberg, Masun Nabhan Homsi, Adrian Rodriguez, Joakim Anden

12:00 - 14:00 Session PA_8, ID 213 - **Automatic Classification of 12-, 6-, 3-, and 2-Lead ECGs Using Morphological Feature Extraction**
Alexander Hammer, Matthieu Scherpf, Hannes Ernst, Jonas Weiß, Daniel Schwensow, Martin Schmidt

12:00 - 14:00 Session PA_8, ID 218 - **Safe and Explainable Variable-Lead ECG Classification by Learning Multivariate Time-Series Shapelets**
Muhammad Bilal and Nazeer Basha Shaik

12:00 - 14:00 Session PA_8, ID 231 - **Multichannel ECG Classification using Parallel CNN and GAP with Patient Specific Features**
Deepankar Nankani and Rashmi Baruah

12:00 - 14:00 Session PA_8, ID 234 - **Channel self-Attention Deep Learning Framework for Multi-Cardiac Abnormality Diagnosis from Varied-lead ECG Signals**
Apoorva Srivastava, Ajith Hari, Sawon Pratiher, sazedul alam, Nirmalya Ghosh, Nilanjan Banerjee, Amit Patra

12:00 - 14:00	Session PA_8, ID 262 - **Cardiac Arrhythmia Classification through an End-to-end Ensemble Network with Specialized Modules** *Hosein Hasani and Mahdieh Soleymani Baghshah*
12:00 - 14:00	Session PA_8, ID 278 - **CookieMonster: BERT's Pre-Training Cousin for ECG Sensor Data** *Maxwell Xu, Alexander Moreno, Varol Aydemir, Supriya Nagesh, James Rehg*
12:00 - 14:00	Session PA_8, ID 285 - **Leveraging Period-specific Variations in ECG topology for Classification Tasks** *Paul Samuel Ignacio*
12:00 - 14:00	Session PA_8, ID 290 - **Detecting Cardiac Abnormalities from 2-lead, 6-lead and 12-lead ECG Signals Using Feature Extraction, Dimensionality Reduction, and Machine Learning Classification** *Garrett Perkins and Bradley Whitaker*
12:00 - 14:00	Session PA_8, ID 296 - **An Interpretable Classification of ECGs with Varying Dimensions using Graph Convolutional Network and Deep Wavelet Decomposition Network** *Xiang Wang, Zehao Lei, Xiao Han, Jie Yang*
12:00 - 14:00	Session PA_8, ID 317 - **Classification of cardiac abnormalities using hand crafted features and convolutional neural networks** *Hamed Taheri Gorji*
12:00 - 14:00	Session PA_8, ID 335 - **Multi-Label ECG Classification by Exploiting Prior Label Correlations** *Yang Liu, Qince Li, Runnan He, Henggui Zhang*
12:00 - 14:00	Session PA_8, ID 343 - **Deep CNN structure design for cardiac abnormality classification from ECG signals using neural architecture search** *Najmeh Fayyazifar*

Wednesday, September 15, 2021

14:00 - 15:00 ***Session SB1 - Cardiovascular Mechanics***

Room: Large 1

14:00 - 14:15 Session SB1, ID 139 - **Generation of High-Order Tetrahedral Cardiac Meshes Using an Advancing Front Technique**
Fariba Mohammadi, Suzanne Shontz, Cristian Linte

14:15 - 14:30 Session SB1, ID 188 - **Analyzing the Effects of Left Ventricular Overload on Cardiac Stress using In Silico Rat Models Fitted to Experimental Data**
Hector Martinez-Navarro, Emil Espe, Oscar Odeigah, Ivar Sjaastad, Joakim Sundnes

14:30 - 14:45 Session SB1, ID 236 - **Demystifying Heart Failure with Mid-Range Ejection Fraction using Machine Learning**
Achal Dixit and Soumi Chattopadhyay

14:45 - 15:00 Session SB1, ID 303 - **Spatiotemporal Quantification of In Vitro Cardiomyocyte Contraction Dynamics Using Video Microscopy-based Software Tool**
Antti Ahola and Jari Hyttinen

Wednesday, September 15, 2021

14:00 - 15:00 ***Session SB2 - ECGI Applications***

Room: Large 2

14:00 - 14:15 Session SB2, ID 206 - **Dynamics of Ventricular Electrophysiology are Unmasked through Noninvasive Electrocardiographic Imaging**
Job Stoks, Bianca Van Rees, Uyen Chau Nguyen, Ralf Peeters, Paul Volders, Matthijs Cluitmans

14:15 - 14:30 Session SB2, ID 216 - **Electrocardiographic Imaging in Atrial Fibrillation: Selection of the Optimal Tikhonov-Regularization Parameter**
Rubén Molero Alabau, Carlos Fambuena Santos, Andreu M. Climent, Maria de la Salud Guillem Sánchez

14:30 - 14:45 Session SB2, ID 226 - **Non-invasive Mechanism Classification and Localization in Supraventricular Cardiac Arrhythmias**
Ítalo Sandoval, Victor Marques, John Sims, Miguel Rodrigo, Maria de la Salud Guillem Sánchez, João Salinet

14:45 - 15:00 Session SB2, ID 306 - **ECG Imaging of Biventricular Paced Ventricular Sequences**
Danila Potyagaylo

Wednesday, September 15, 2021

14:00 - 15:00 ***Session SB3 - Cardiac Imaging***

Room: Medium 1

14:00 - 14:15 Session SB3, ID 106 - **An Unsupervised Deep Learning Framework for Image Super-Resolution for Late Gadolinium Enhanced Cardiac MRI**
Roshan Reddy Upendra, Richard Simon, Cristian Linte

14:15 - 14:30 Session SB3, ID 115 - **A Multi-Task Cross-Task Learning Architecture for Ad-hoc Uncertainty Estimation in 3D Cardiac MRI Image Segmentation**
S. M. Kamrul Hasan and Cristian A. Linte

14:30 - 14:45 Session SB3, ID 127 - **U-Net neural network for insertion zone midpoint location of transcatheter aortic valves in CTA images**
Eduardo Mineo, Antonildes Assunção-Jr, Thamara Morais, Henrique Ribeiro, Sérgio Câmara, John Sims, Cesar Nomura

14:45 - 15:00 Session SB3, ID 284 - **Assessment of Thrombotic Risk following Transchatheter Mitral Valve Replacement**
Sam Hill, Alistair Young, Ronak Rajani, Adelaide De Vecchi

Wednesday, September 15, 2021

14:00 - 15:00 ***Session SB4 - Atrial Arrhythmias***

Room: Large 3

14:00 - 14:15 Session SB4, ID 43 - **Left Atrium Haemodynamic in Atrial Fibrillation and Normal Subjects**
Alessandro Masci, Matteo Falanga, Antonio Chiaravalloti, Fabio Ansaloni, Alessandro Dal Monte, Corrado Tomasi, Cristiana Corsi

14:15 - 14:30 Session SB4, ID 126 - **Atrial Fibrillation in the Absence of Structural Inhomogeneities: Role of ionic current up-/down-regulation on fibrillation inducibility**
Albert Dasí, Aditi Roy, Rafael Sachetto Oliveira, Alfonso Bueno-Orovio, Blanca Rodriguez

14:30 - 14:45 Session SB4, ID 159 - **Changes in RR Series Characteristics during Atrial Fibrillation: An AV Node Simulation Study**
Felix Plappert, mikael wallman, Pyotr Platonov, Frida Sandberg

14:45 - 15:00 Session SB4, ID 187 - **Non-Invasive Characterization of Atrio-Ventricular Properties During Atrial Fibrillation**
Mattias Karlsson, mikael wallman, Sara Ulimoen, Frida Sandberg

Wednesday, September 15, 2021

15:00 - 16:00 ***Session CP - Closing Plenary***

Cardion ballroom

15:00 - 15:15 Session CP, ID 209 - **A Novel Computational Model of Pacemaker Activity in the Mouse Atrioventricular Node Cell**
Chiara Bartolucci, Pietro Mesirca, Clara Sales Belles, Eugenio Ricci, Eleonora Torre, Julien Louraour, Matteo Mangoni, Stefano Severi

15:15 - 15:30 Session CP, ID 104 - **Optimal Regional Voltage Thresholds for Identifying Ablation Targets in Patients with Atrial Fibrillation**
Deborah Nairn, Claudia Nagel, Björn Müller-Edenborn, Heiko Lehrmann, Thomas Arentz, Olaf Doessel, Amir Jadidi, Axel Loewe

15:30 - 16:00 Session CP, ID 350 - **High definition soluble cardiac biointerfaces for diagnostics and therapy of arrhythmia**
Igor Efimov

16:00 - 16:30 ***Awards and Closing Remarks***

Cardion ballroom

Computing in Cardiology 2021 is supported by several institutions, companies and academic partnerships. The Local Organizing Committee would like to thank the following partners: Cardion s.r.o., Kontrolujeme s.r.o., Institut biostatistiky a analýz, s.r.o., M&I, s.r.o., Dräger Medical s.r.o., Medisap, Philips Czech Republic, Technicare, BTL, LHL s.r.o., National theatre Brno and Brno University of Technology.

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