COMPUTING IN CARDIOLOGY

September 8-11, 2019
Singapore

COMPUTING IN CARDIOLOGY 2019

Table of Contents

Sponsors **2**

Welcome to CinC@Singapore in 2019! **4**

Board of Directors **6**

Local Organizing Committee **7**

Letter from the President **8**

Welcome to Rimini for CinC 2020! **9**

Maps **10**

Transportation, Hotels and Practical Information **13**

Transportation 13

Practical Information 15

Meals **19**

Conference Information **20**

General Information 20

Sunday Symposium 20

Conference site 22

Monday Social Program 24

Tuesday Tech Showcase 26

For Authors and Speakers 27

Rosanna Degani Young Investigator Award 28

Clinical Needs Translational (CTA) Award 28

PhysioNet/Computing in Cardiology Challenge 2019 28

Maastricht Simulation Award (MSA) 29

A*STAR-STB Travel Grant 29

Manuscripts 29

Sponsors

Computing in Cardiology 2019 is supported by several companies and academic partnerships. The Local Organizing Committee would like to thank the following partners:

Platinum Sponsor

Semacare is a medical technology company with a value to lead medical innovation and a mission of "serving mankind through, with and within healthcare". Integrating clinical data with the artificial intelligence and machine learning technology is at the core of our operations. By applying top technology and ultimate design solutions to develop optimal user experiences, we aim to improve the efficiency of medical systems and optimize the value of life information engineering.

Website: www.semacare.com

Silver Sponsor

Cardiomatics™ is a AI-based software for automatic ECG analysis. Used with commercially available Holter recorders, Cardiomatics enables detection and analysis of many abnormalities and arrhythmias in ECG signal.

Website: www.cardiomatics.com

Hillrom™

EP Solutions SA

ZOLL

mindray
NORTH AMERICA

GORDON AND BETTY
MOORE
FOUNDATION

Physiological Measurement

Supported by:

Held in:

Welcome to CinC@Singapore in 2019!

Dear Colleagues & Friends,

It is my distinct pleasure to welcome you to Singapore for the International Conference in Computing in Cardiology 2019. This is the second time that CinC is held outside of Europe and the USA, and we are excited to host you at this year's meeting.

The Republic of Singapore is a city-state situated one-degree north of the equator. Packed into its 130 square kilometres of real estate is a bustling metropolis embedded in lush tropical greeneries. Due to its horticultural richness, Singapore is also known as a City in a Garden. As a nation that is home to a wide plurality of cultures, ethnicities, and religions, the diversity that you can experience in Singapore will be a unique experience in itself.

The conference venue is located at the one-north precinct which houses world-class research facilities and business park spaces to support the growth of Biomedical Sciences, Infocomm Technology, Media, Physical Sciences and Engineering. The line up to this year's programme includes a Sunday Symposium jointly organized with the National Heart Centre, Singapore to demonstrate the utility of computer- and computational-related research work in clinical practices.

To add to the vibrancy of the activities, we have planned for four social events. The three passivist social events include a visit to the Gardens by the Bay – a nature park spanning an awe-inspiring 101 hectares garden, set in the heart of the city; the Sungei Buloh Wetland Reserve – an ASEAN Heritage Park known for its global importance as a stop-over point for migratory birds; or take guided tours specially created by the Singapore National Heritage Board to explore the

beautiful architectural features of Singapore's National Monuments. The activist social event will be conducted at the Mega Adventure Park where participants will enjoy adrenaline-pumping thrills on a zipline at 75 metres high, 450 metres long and heart-pounding speed of 60 kph. To top it off, the Gala Dinner will feature unique cuisines which are as diverse as Singapore's culture.

Furthermore, we are incorporating a Technology Showcase on Tuesday for an evening of networking between local/overseas medtech start-ups and venture capitalists! We are very honoured to have Dr. Charles Taylor, Founder and Chief Technology Officer of HeartFlow, to give a keynote presentation at the event. Do not miss this chance to listen to business pitches from experienced medtech start-ups, and learn from the panel of venture capitalists.

We hope that you will find this year's conference an exquisite and unique experience. On behalf of the Local Organizing Committee, I wish you a fruitful and exciting CinC 2019.

With warmest regards,
Yi Su
Chairman, Local Organizing Committee, CinC 2019

Soo Kng Teo
Dy. Chairman, Local Organizing Committee, CinC 2019

Board of Directors

President
Rob MacLeod, PhD
SCI Institute, University of Utah
Salt Lake City, Utah, USA

Secretary
Luca Mainardi, PhD
Politecnico di Milano,
Milano, Italy

Treasurer
J-P Couderc, PhD, MBA
University of Rochester
Rochester, NY, USA

Cristiana Corsi, PhD
University of Bologna
Bologna, Italy

Olaf Doessel, PhD
Karlsruhe Institute of Technology
Karlsruhe, Germany

Dewar Finlay, PhD
University of Ulster
Belfast, UK

María S Guillem, PhD
Universitat Politècnica de València
Valencia, Spain

Pyotr Platonov, MD, PhD
Lund University
Lund, Sweden

Ex-Officio

Chair of the ESC Working Group on e-Cardiology:
Joost Lumens, PhD
Maastricht University
Maastricht, The Netherlands

Past President
Pablo Laguna, PhD
University of Zaragosa
Zaragosa, Spain

The following positions are non-Elected:

Editor, Proceedings
Christine Pickett
SCI Institute, Univ. of Utah
Salt Lake City, UT, USA

Director, CinC Physionet Challenge
Gari Clifford, DPhil
Georgia Institute of Technology &
Emory University, Atlanta, Georgia, USA.

Local Organizing Committee

Yi Su, PhD; Chairman
Soo-Kng Teo, PhD; Dy. Chairman
Keng-Hui Lim, PhD; Honorary Chair
Ru-San Tan, MD
Liang Zhong, PhD
Wei-Min Huang, PhD

Letter from the President

Dear CinC 2019 Participant,

Welcome to the 46th Computing in Cardiology conference in the amazing and exotic city/state of Singapore! National Geographic identified Singapore as a prototype city of the future and as scientists and engineers, we always like to experience the future before everyone else. As you will see, this is a city embedded in a garden but that yells "Modern!" at every turn.

The conference itself will feature all the elements you have grown used to--the Clinical Translation and Rosanna Degani Young Investigator Awards, the Gary and Bill Sanders Poster Awards, the Mortara Fellowships, and the Special Sessions, now in their 4th year. This year, we added two new types of award, the Maastricht Simulation Award, a gift from the organizers of last year's CinC to recognize an outstanding submission in the area of simulation and modeling; and the Singapore Travel Awards, a gift from the Singapore Exhibition and Convention Bureau: 10 travel award prizes for highly scored submissions.

This year on the CinC Board has been one of settling in, refining tasks, finding items that got lost in the cracks, and adapting the organization, especially after our IT genius, Sheri Prucka, has stepped down. We are also sad to see the departure from the Board of our former President and amazing leader, someone who has contributed to the CinC Society for over 10 years and become my best friend, Pablo Laguna! He will always stay on my speed-dial list and we all should be grateful for his selfless and endless contributions. If you see him at the conference, please give him your thanks! To fill up the Board again with outstanding people, we have two new Board members, who we will announce and welcome during the closing ceremonies. I continue to be amazed at all the details your Board does to make this conference and society possible. When things run well, it is easy to forget how much is going on in the background. Each attendee should take a moment and thank any Board members they meet.

Finally, I want to think the fabulous local organizers from Singapore, Su Yi and Soo Kng. Over the past year, we have met many times (usually virtually) and I can assure you they have done everything possible to make this a very special edition of CinC. Our interactions over the year have been so rewarding for me, as I learn about Singapore and how science and technology (and food, the climate, and politics) work in a new place. And next year feels like we return home—to Italy for CinC 2020. Rimini will be a wonderful host!

Best wishes,
Rob MacLeod
President, Computing in Cardiology

Welcome to Rimini for CinC 2020!

Dear Colleagues & Friends,

We warmly invite you to attend Computing in Cardiology 2020, to be held September 13-16, 2020 in Rimini, Italy. It will be the fourth time that the conference will be held in Italy, after Florence 1981, Venice 1991 and Bologna 2008, and we are excited to host you again next year.

The city of Rimini is a dynamic, open, and easily accessible city situated on the northeastern Italian coast facing the Adriatic Sea, 120 km SE from Bologna. The city hosts a Campus with more than 5000 students of the University of Bologna, the oldest University of the Western World. Rimini has an extraordinarily rich history: Ariminum was an important Roman city and crossroads of three main Consular roads in Italy. Today, being a famous European tourist locations and seaside resorts, Rimini also offers everything from top level establishments to traditional, small local restaurants and pubs, offering hospitality and quality food for every budget.

The conference venue is located at the Rimini Palacongressi, one of the largest and most innovative congress facilities in Italy. The Palacongressi is set in an extensive urban park, in a perfect eco-friendly context within walking distance from both the city center and the seaside.

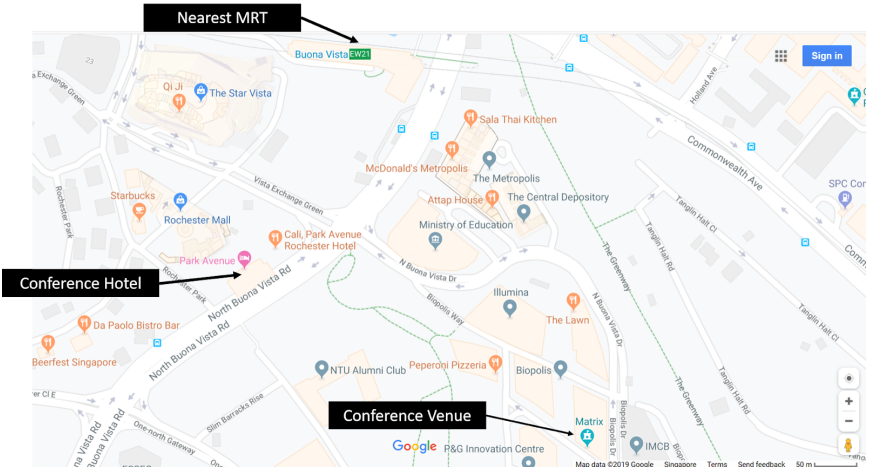
The organizing committee, which includes both academic and company representatives, is currently working to organize an exciting and enjoyable meeting. The focus of the Sunday Symposium will be on Technological Innovations in Cardiac Therapies. Social programs will be focused on activities characterizing Rimini and the seaside. The Gala Dinner will accompany our attendees in Federico Fellini's world.

On behalf of the Local Organizing Committee, we look forward to welcoming you to Rimini next year. Save the date and be there!

With warmest regards,
Cristiana Corsi and Stefano Severi
Co-Chairs, Organizing Committee, CinC 2020

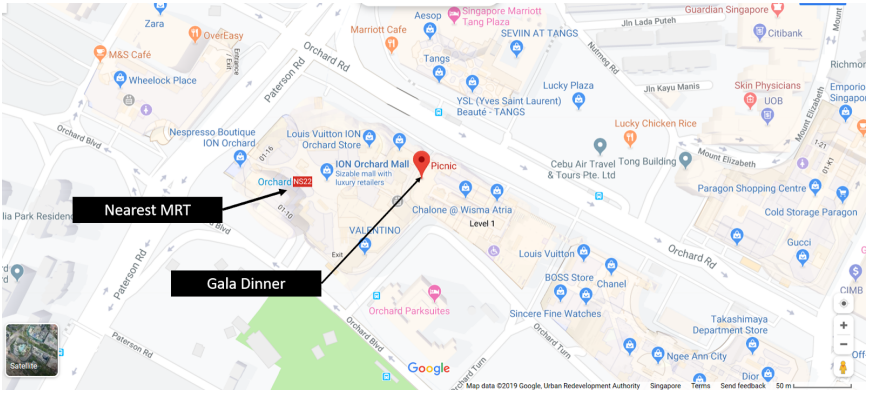
Maps

General Map of Biopolis, Singapore



The Sunday Symposium and CinC conference will be held at Matrix building in Biopolis.
Address: Matrix, 30 Biopolis St, Singapore 138671

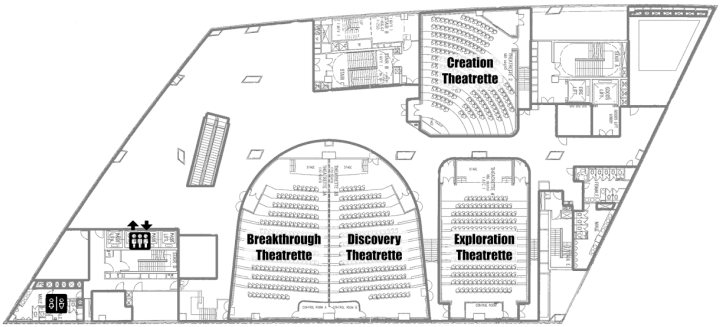
General Map of Orchard, Singapore



The gala dinner will be held at Picnic in Orchard.
Address: Level 3, Wisma Atria, 435 Orchard Rd, Singapore 238877

Map of the Conference Venue

Matrix Level 2



Matrix Level 4

Transportation, Hotels and Practical Information

Transportation

Getting to/from CHANGI AIRPORT on PUBLIC TRANSPORT

Taxis

At the Airport: Taxis are available at the designated taxi zones located outside of arrivals on all terminals. The estimated cost to go to the city center is between $18.00 SGD and $38.00 SGD and takes approximately 30 minutes. Please note that there is an additional airport surcharge at the airport.

$5 SGD airport surcharge – 5:00 P.M. to 12:00 A.M. (Fridays to Sundays)

$3 SGD airport surcharge – all other times

Midnight surcharge of 50% of final metered fare – 12:00 A.M. to 6:00 A.M. (daily)

At the City: Like most cities taxis in Singapore are available when the sign on top of the cab is illuminated and can be hailed on the street or in advance. Below are some major taxi companies in Singapore:

- Comfort or Citycab| Tel: +(65) 6552 1111
- Premier Taxis| Tel: +(65) 6363 6888
- SMRT| Tel: +(65) 6555 8888
- Transcab| Tel: +(65) 6555 3333

Shuttles

At the Airport: One of the more economical ways to go to Singapore city center is through the shuttle service and it also serves most hotels in Singapore. Please approach the Ground Transport Desk at arrival.

Rates:

- $9 SGD per Adult
- $6 SGD per Child (below 12 years of age)

Contact Numbers:

- *Terminal 1*| Tel: + (65) 6543 1985
- *Terminal 2*| Tel: + (65) 6546 1646
- *Terminal 3*| Tel: + (65) 6241 3818 (Main booking hotline)
- *Terminal 4*| Tel: +(65) 6581 6775

Buses

At the Airport: Public bus service 36 goes to the city. The first bus arrives at around 6:00 am and the last leaves at midnight. A single fare costs below $2.00 SGD and takes about an hour to go to the city. Bus stops are located at the basement bus bays of Terminals 1, 2 and 3. Please have the exact change as no change will be given.

At the City: Public buses will stop at Terminals 1, 2 and 3. A single fare from city via public bus service 36 costs below $2.00 SGD and takes about an hour.

Trains

At the Airport: To get to the city centre from Changi Airport MRT station (CG2), located at Terminals 2 & 3, take the train to Tanah Merah station (EW4) and transfer to the west bound train. Alternatively, you can take the train to Expo station (CG2) and transfer to the Downtown Line Expo Station (DT36). You will be able to reach the city centre in less than 30 mins. A single fare from the airport to the city centre will cost less than $3.00 SGD.

At the City: To get to Changi Airport MRT station (CG2), take the east bound train on the East-West Line to Tanah Merah station (EW4). Alternatively, you can also take the Downtown Line to Expo Station (DT36). For both options, you will need to transfer to another train going to the Airport.

Getting around Singapore

Mass Rapid Transit (MRT)

The efficient Mass Rapid Transit (MRT) subway system is the easiest, quickest and most comfortable way to get around Singapore. The system operates from 5.30am to midnight, with trains at peak times running every two to three minutes, and off-peak every five to seven minutes.

In the inner city, the MRT runs underground, emerging overground out towards the suburban housing estates. It consists of five colour-coded lines: North–South (red), North–East (purple), East–West (green), Circle Line (orange) and Downtown (blue). A sixth line, the Thomson–East Coast Line (brown), will open in five stages and is scheduled to begin in 2019.

You'll find a map of the network at www.smrt.com.sg.

Fares & Fare Cards

Single-trip tickets cost from S$1.40 to S$2.50 SGD, but if you're using the MRT a lot it can become a hassle buying and refunding tickets for every journey. A lot more convenient is the EZ-Link card. Alternatively, a Singapore Tourist Pass (www.thesingaporetouristpass.com.sg) offers unlimited train and bus travel (S$10 SGD plus a S$10 SGD refundable deposit) for one day.

Tickets & Passes

If you're staying in Singapore for more than a day or two, the easiest way to pay for travel on public transport is with the EZ-Link card (www.ezlink.com.sg). The card allows you to travel by train and bus by simply swiping it over sensors as you enter and leave a station or bus.

EZ-Link cards can be purchased from the customer service counters at MRT stations for S$12 SGD (this includes a S$5 SGD nonrefundable deposit).

The card can also be bought at 7-Elevens for S$10 SGD (including the S$5 SGD nonrefundable deposit).

Cards can be topped up with cash or by ATM cards at station ticket machines. The minimum top-up value is S$10 SGD while the maximum stored value allowed on your card is S$500 SGD.

Practical Information

Climate

Due to Singapore's location, the climate is hot and humid all year round with no distinct seasons. **Linen and lightweight cotton clothing is recommended.** Rain falls almost daily throughout the year; therefore, it is advisable to **carry an umbrella at all times** for the rain and sun.

Money/currency

Singapore's currency is the Singaporean Dollar. Singapore's currency denominations are:

Coins:	**Notes:**
5 cents	S$2
10 cents	S$5

20 cents	S$10
50 cents	S$50
$1 coins	S$100
	S$500
	S$1,000

You can withdraw Singaporean dollars from ATMs using your debit or credit card or exchange cash at any money exchange or bank branch.

Banks are usually open from 9:30 A.M. to 3:00 P.M., Monday through Friday and 9:30 A.M. to 11:30 A.M. during Saturday. Banks are closed on Sundays.

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

Eating and Drinking

Singapore offers the world's buffet at its table of eclectic food selections; from Chinese, Malay, Indian, Japanese to Thai, Singapore has a taste for every palate. Hawker centers are a staple in Singapore and are the best place to find the most economical and popular places to eat. Generally, most restaurants will include service charges into your final bill, so gratuities are not mandatory.

Alcohol and Tobacco

The minimum drinking age in Singapore is 18 years old for all alcoholic beverages. Alcohol can be purchased from supermarkets, convenience stores, etc.

Cigarettes can be purchased at supermarkets and convenience stores by individuals aged 18 or over. Beware that smoking is not allowed on public transportation and in certain public places.

Emergency phone numbers

Emergency Ambulance & Fire: 995
Non-emergency Ambulance: 1777
Police (Main number for Emergency Services): 999
Police Hotline: 6225 0000
Singapore General Hospital: 6222 3322

Electric standards

Voltage
The standard voltage in Singapore is 220V/240V, 50 Hz. If you have equipment that runs on a higher voltage, you should not connect it to Singaporean power unless you have the correct transformer (voltage adaptor).

Power Plugs
Singapore uses the British BS 1363 three-pronged square pin type socket. **Plugs from the US, Western and Eastern Europe, and Asia will not fit into a Singapore power plug.** If you need a plug adaptor or transformer, we advise buying one before your arrival. Some hotels will be able to lend you an adaptor, but not all.

Language
There are four official languages in Singapore: Malay, Tamil, Mandarin, and English. However, English is the language that is universally spoken and understood.

Singlish: Singlish is truly unique to Singapore. It is a mash-up of slang words, phrases, and grammar from the major languages in Singapore, including various Chinese dialects.

Time Zones
Singapore Time (SGT) is 8 hours ahead of Coordinated Universal Time (UTC).

Mobile Phones
In Singapore, mobile phones operate on 3G and 4G LTE. If you are not sure whether your phone operates on these bands, check with your provider before bringing it along.

To avoid high roaming fees you can buy a local pre-paid SIM card once you are in Singapore. Before doing this, however, please check with your provider that your phone has not been locked for use on a particular network. If it has, a local SIM card will not work.

The international telephone country code for Singapore is 65 and there are three major telecommunication providers in Singapore: SingTel, StarHub, and MobileOne.

Safety and Security
Singapore is one of the safest major cities in the world. Violent crimes against tourists are rare. However, petty crime such as pick-pocketing and street theft

occurs at the airport, tourist destinations, hotels and on public transport. Remember that as in any other big city, it is important to take responsibility for your personal safety, be familiar with local laws and customs and exercise good judgment.

Before You Travel – Some Tips

Think preventively when packing for your trip; consider leaving behind expensive jewelry, watches, and items of sentimental value. A smaller, inexpensive camera may be a better choice than larger, expensive models. You may not need to take an ATM card if your credit card and a limited amount of cash will suffice.

Make a Xerox copy of your passport to carry in your luggage separately from your actual passport. Consider storing a digital scan of your passport (and/or other critical documents) with family, friends, or your employer so that it could be emailed to you in an emergency.

Internet Access

Every participant will receive login information when registering on-site that can also be used to access the WiFi at the conference site. For those using **Eduroam**, this network is also available at the conference site. The only device you need is a WiFi-enabled laptop or smartphone. Should you need assistance in getting connected, please ask the nearest volunteer for help.

Meals

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

- The **Sunday** symposium concludes with a reception at **17:30** at Matrix Level 2 (foyer area outside the auditorium).
- On **Monday**, a buffer lunch will be provided for all participants at Matrix Level 2 (foyer area outside the auditorium) and Level 4 (foyer area outside the theatrettes)
- After the social activities on **Monday** afternoon, the conference gala dinner will be held at **Picnic**, a multi-cuisine communal dining restaurant that combines the buzz and energy of a food truck park with an immersive outdoor park experience.
- On **Tuesday,** a buffet lunch will be provided at the conference site. Before the start of the Tech Showcase, an evening reception will be provided at Matrix Level 4 at **17:45** at Matrix Level 4.
- On **Wednesday**, a buffet lunch will be served at the conference site after the morning sessions and in parallel with the Poster session.

Accompanying Persons (Guests)

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

- The reception on Sunday evening (after the symposium).
- The Monday buffer lunch and social event, starting at 12:15, participation in one of the activities and in the evening gala dinner at Picnic.

Conference Information

General Information

The conference registration and information desk will be located at Matrix Level 2 on Sunday and Monday. The registration desk will be labelled with the CinC sign and will be open during the following hours:

- Sun, 8th September 13:00 – 18:00
- Mon, 9th September 08:00 – 12:00

Sunday Symposium

This year, the Sunday Symposium will be held at the same location as the conference; which is at Matrix, Biopolis. This Symposium is jointly co-organized with our clinical collaborators from the **National Heart Centre Singapore** (NHCS) and the topic will be **"Mind the Gap: Cardiologist and Engineer"**. We have lined up 6 exciting clinical presentations that will be split into 2 main themes: (i) Intervention + Imaging; and (ii) AI driven clinic decision support for cardiology. Within each theme, prominent local clinicians will share their clinical challenges with a focus on translating these challenges into engineering ideas that can be addressed by the broader CinC community.

About National Heart Centre Singapore (NHCS)

The National Heart Centre Singapore (NHCS) is a national and regional referral centre for cardiovascular diseases. NHCS provides a one-stop comprehensive cardiac care ranging from preventive, diagnostic, therapeutic to rehabilitative services. It is also the only heart and lung transplantation centre in Singapore.

Each year, NHCS handles over 120,000 outpatient consultations, 9,000 interventional and surgical procedures and 10,000 inpatients. Its clinical outcomes for heart attack treatment, balloon angioplasty with stenting and coronary bypass surgery have been shown to be equivalent to international benchmarks.

Programme outline

1:00 – 1:30pm: Registration

1:30 – 3:30pm: **Theme 1: Intervention + Imaging**

1:30 – 1:50pm: Keynote 1: A/Prof Yeo Khung Keong, Senior Consultant, National Heart Centre Singapore

New tech for Mitral and Tricuspid Valve disease

1:50 – 2:10pm: Clinical Talk 1 by A/Prof Tan Ru San, Senior Consultant National Heart Centre Singapore

Myocardial tissue characterization in heart disease

2:10 – 2:30pm: Clinical Talk 2 by Dr Fam Jiang Ming, Consultant, National Heart Centre Singapore

Imaging guided left main intervention

2:30 – 2:45pm: Ms Wong Woei Jiuang, Assistant Group Director, Health Sciences Authority, Singapore

Latest Health Sciences Authority (HSA) regulatory developments for "software as a medtech devices"

2:45 – 3:15pm: Panel Q&A

3:15 – 3:30pm: Tea-break

3:30 – 5.30pm: **Theme 2: AI driven clinic decision support for cardiology**

3:30 – 3:50pm: Keynote 2: Prof Marcus Ong Eng Hock, Senior Consultant, Singapore General Hospital

Explainable AI in Healthcare

3:50 – 4.10pm: Clinical Talk 1 by Dr Jason Chen, Senior Resident, Department of Cardiology, National University Heart Centre

SHAPE project: a computer vision and artificial intelligence solution to the heart failure epidemic

4:10 – 4.30pm: Clinical Talk 2 by Dr Mayank Dalakoti, Senior Resident, Department of Cardiology, National University Heart Centre

A deep learning AI model to target interventions for high risk readmitters

4:30 – 4.45pm: Dr. Li Yongfeng, Chief Development Officer, Diagnostics Development Hub (DxD)

Diagnostics product development: closing the gap from technology to product

4:45 – 5.00pm: Dr Wong Chee-Leong, Principal Patent Examiner, Intellectual Property Office of Singapore (IPOS)

Sharing of technology scan on AI in healthcare

5:00 – 5:30pm: Panel Q&A

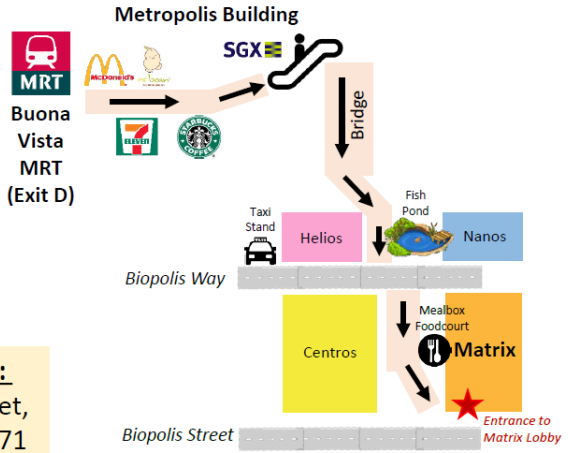
5:30pm onwards: Reception

Conference site

The 46th annual international conference of Computing in Cardiology will take place at Matrix, Biopolis, from Monday, September 9th through Wednesday, September 11th, 2019. All presentations, poster sessions and lunches are situated at either Matrix level 2 or level 4 (see "Map of the Conference venue").

The Matrix building is easily reachable by MRT (refer to walking direction below), and is only a short walk away from Park Avenue Rochester Hotel (one of the designated conference hotel). Please refer to the map "General Map of Biopolis, Singapore". The auditorium and theatrettes will be clearly marked with Computing in Cardiology signs.

Directions to Matrix, Biopolis from Buona Vista MRT



Matrix Address:
30 Biopolis Street,
Singapore 138671

1. Go to Exit D of Buona Vista MRT.
2. Once you exit, Turn left, and you will see Mcdonalds.
3. Walk straight and you will pass by Mr. Bean, 7 Eleven, Starbucks, and further down.
4. Nearer to the end, make a slight left turn, you see an escalator beside SGX. Take the escalator up.
5. Cross the bridge and walk straight towards the left.
6. You will then chance upon a fish pond, and then a small road.
7. Cross the small road, and the building on your left is the Matrix Building.
8. Walk straight down, you will pass by a Food court named 'Meal Box'.
9. Matrix Lobby is a few steps away from the Food court.

Monday Social Program

All social program participants are required to wear their CinC badges.

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.

On Monday, the conference will start in the Matrix building. After the morning sessions, a buffer lunch will be provided for all participants before departing for the social activities. This year, we have lined up 4 different activities to carter to the nature lovers, action seekers as well as those who want to know more about Singapore's history and culture.

The action seekers will take on the challenges at MegaZip Adventure Park in Sentosa. Here, they will have to conquer a 36-obstacle treetop ropes course, a 15m MegaJump free fall simulator and zip down the world famous MegaZip flying fox - that spans 450m, where you fly at 60kph over the jungle and beaches of Sentosa Island.

The nature lovers will either visit Sungei Buloh Wetland Reserve (a nature reserve in the northwest area of Singapore) or Gardens by the Bay (a nature park in the Central Region of Singapore).

Sungei Buloh Wetland Reserve is the first wetlands reserve to be gazetted in Singapore, and its global importance as a stop-over point for migratory birds was recognised by the inclusion of the reserve into the East Asian Australasian Shorebird Site Network. The reserve, with an area of 130 hectares, was listed as an ASEAN Heritage Park in 2003.

Gardens by the Bay is a nature park spanning 101 hectares of reclaimed land in the Central Region of Singapore, adjacent to the Marina Reservoir. Conference delegates will be visiting the

Bay South Garden with its iconic Supertrees and award-winning cooled conservatories (Flower Dome and Cloud Forest), among numerous outdoor/heritage/children's gardens, art sculptures, lakes, and pavillions.

Last but not least, the history and culture lovers will be embarking on 2 thematic guided tours specially created by the National Heritage Board (a statutory board of the Singapore Government; under the Ministry of Culture, Community and Youth). These tours will be led by volunteer guides and conference delegates will get to explore the beautiful architectural features of Singapore's National Monuments, and the history surrounding these treasure buildings.

To end off the day, we have the conference gala dinner at Picnic, Wisma Atria which is located at the heart of Orchard Road; the major shopping belt in central singapore. Picnic is a multi-cuisine communal dining restaurant that combines the buzz and energy of a food truck park with an immersive outdoor park experience. With 10 different stalls offering a range of cuisines from Japanese Butadon, Taiwanese beef noodles, Korean-Mexican tacos, Swiss Rosti, French poulet, Italian pastas, pizzas, and American-style smash burgers by Omakase Burger, you'll be spoilt for choice.

Tuesday Tech Showcase

Join us on Tuesday evening for a networking session between the local/overseas Medtech startups and Venture Capitalists!

We have the honour of inviting Dr. Charles A. Taylor, Co-founder, Chief Technology Officer, and a member of the Board of Directors of HeartFlow Inc to share his personal journey of translating research to market. Heartflow is a leading medical technology company that creates a personalized 3D model of the coronary arteries and analyses the impact that blockages have on blood flow using computational fluid dynamics techniques. This analysis is performed using proprietary software that has been approved by the U.S. Food and Drug Administration for clinical use. Come and listen to Dr. Charles Taylor, experience business pitches, and learn from the panel discussion, all aimed to gain experience about creating a small company.

The theme for the evening is "**Education, Mentoring and Coaching**". The main objective is to create the opportunity for both the VC and the academic community to learn from one another, and to facilitate further discussion between startups and interested parties.

Programme outline

5:45 – 6:30pm: Dinner Reception

6:30 – 7:00pm: **Keynote speech** by Dr. Charles A. Taylor

7:00 – 8:30pm: **Pitching sessions** by Startups

8:30 – 9:00pm: **Panel discussion** involving VC and invited speaker

9:00 – 9:30pm: Drinks reception

For Authors and Speakers

Oral Presentations

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

- All theatrettes will be equipped with a computer projection system (projector and PC with Windows 10, Powerpoint 2013, Windows Media Player and Adobe Acrobat Reader).
- Due to Powerpoint version issues, PDF format is preferred.
- Laptops can be connected through HDMI or VGA. MacBook users should make sure to bring a converter.

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

Poster Presentations

Poster sessions will take place in the foyer area outside either the auditorium on level 2 (Physionet Challenge), or the theatrettes on level 4 (All other posters). Poster session P7_1 to P7_7 is on Tuesday, 10th September from 15:45 onwards, and Poster session PA_1 to PA_7 is on Wednesday, 11th September, from 12:00-14:15. Authors are required to be present at their posters during their assigned session to discuss their work with other conference attendees.

- Check in: Authors presenting posters must check in with the help desk located at Level 4 at least 30 minutes before the start of their poster sessions in which their presentations are scheduled.
- Posters may be hung after 8:00 and prior to the start of the poster sessions on the day of presentation (either Tuesday or Wednesday).
- Posters stands and mounting material will be provided. The maximum size of poster that can be accommodated at CinC 2019 is A0 portrait (841 mm wide by 1189 mm high). Please note that any size larger than this, including A0 landscape, can not be accommodated on the poster boards that will be available.

- Posters are grouped by subject area, and each poster should be placed on the stand assigned to it (marked with a card corresponding to the Board Number reflected in the program book)
- If an author is not present to discuss a poster, it will not be published in the proceedings.
- Posters must be removed at the end of the day of presentation.

Rosanna Degani Young Investigator Award

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

Finalists in the competition will present their work in session RDYIA, at 8:45 am on *Monday, 9th September in the Matrix Auditorium* (see "Map of the Conference venue"). The name of the winner will be announced during the closing plenary session on Wednesday.

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, 11th September in the Matrix Auditorium* (see "Map of the Conference venue").

PhysioNet/Computing in Cardiology Challenge 2019

Since 2000, Computing in Cardiology has annually issued a Physionet Challenge in cooperation with Physionet, part of the NIH sponsored Research Resource for Complex Physiologic Signals. The title of this year's challenge is "Early Prediction of Sepsis from Clinical Data", which aims to correctly classify sleep arousals from physiological parameters (including the ECG) recorded from subjects in a sleep laboratory at the Massachusetts General Hospital. The challenge sessions are:

- Oral sessions S82 & S92
- Poster session P7_7 & PA_7

Maastricht Simulation Award (MSA)

During the 2018 edition of CinC, the Sunday Symposium was dedicated to a hands-on experience with 4 different simulation packages (CircAdapt, ECGSim, Myokit and SCIRun) running on 250 computers of Maastricht University. This event was well attended and greatly appreciated by a large number of participants, reflecting the increasing interest in mechanistic models and simulation within the CinC community. In order to stimulate this development and potentially attract new participants working on this topic to the CinC meeting, the organizers of CinC 2018 have established and funded a new Maastricht Simulation Award (MSA). The MSA submissions go through an initial grading as part of the track-based review process. Submissions that receive a high enough score then receive a second review by the MSA Review Panel who make a final decision.

A*STAR-STB Travel Grant

The Agency for Science, Technology and Research (A*STAR), Singapore – Singapore Tourism Board (STB) Travel Grant is meant to help defray part of the cost for attending CinC 2019 @ Singapore for early career researchers. This travel grant is worth **SGD$500** (approx. USD$365) and will be awarded to successful applicants who are less than 5 years post conferment of their PhD, who do not reside in Singapore, who submit acceptable papers to be presented at CinC 2019 and who do not have adequate funding potential to attend CinC 2019. Applicants for the A*STAR-STB Travel Grant may also enter the Rosanna Degani Young Investigator Award competition.

Manuscripts

Computing in Cardiology will publish the conference proceedings containing the complete manuscripts of all presentations made at the conference. The complete proceedings will be freely available via the CinC Web site (http://www.cinc.org). The proceedings will also be published by IEEE in the IEEEXplore digital library. For any questions about manuscripts, consult the CinC web site http://www.cinc.org or contact via email editor@cinc.org.

Monday, September 09, 2019

8:30 - 8:45 **Welcome to CinC 2019**
CinC President: Rob MacLeod
Room: Auditorium

Session RDYIA - **Rosanna Degani Young Investigator Finals**
Chairs: Rob MacLeod and Maria Guillem
Room: Auditorium

8:45 - 9:05 **Pressure and Flow Interplay in Aortic Dilation Using 4D Flow Magnetic Resonance Imaging**
Kevin Bouaou, Thomas Dietenbeck, Soulat Gile, Sophia Houriez--Gombaud-Saintonge, Bargiotas Ioannis, De Cesare Alain, Gencer Umit, Giron Alain, Redheuil Alban, Emilie Bollache, Lucor Didier, Mousseaux Elie, Nadjia Kachenoura

9:05 - 9:25 **Response of Ventricular Repolarization to Simulated Microgravity Measured by Periodic Repolarization Dynamics Using Phase-Rectified Signal Averaging**
Saúl Palacios, Enrico Caiani, Esther Pueyo, Juan Pablo Martínez

9:25 - 9:45 **Delay-Based Regularization for ECG Imaging of Transmembrane Voltages**
Steffen Schuler, Danila Potyagaylo, Olaf Doessel

9:45 - 10:05 **Noninvasive One-Year Ablation Outcome Prediction for Paroxysmal Atrial Fibrillation Using Trajectories of Activation from Body Surface Potential Maps**
Yingjing Feng, Mirabeau Saha, Mélèze Hocini, Edward Vigmond

Monday, September 09, 2019

Session S21 - **Membrane and Cellular Models**
Chairs: Javier Saiz and Chema Ferrero
Room: Exploration

10:45 - 11:00 **Why Does Extracellular Potassium Rise in Acute Ischemia? Insights from Computational Simulations**
Ana Gonzalez-Ascaso, Patricia Olcina, Mireia Garcia-Daras, Jose F Rodriguez-Matas, Jose M Ferrero

11:00 - 11:15 **Automaticity in Cardiomyocytes Derived from Human Induced Pluripotent Stem Cells as Result of Different Mechanisms**
Michelangelo Paci, Stefano Severi, Jari Hyttinen

11:15 - 11:30 **Evolution of the Seminal O'Hara Rudy Model to More Accurately Simulate the Electrophysiology of Human Ventricular Cardiomyocytes**
Chiara Bartolucci, Michelangelo Paci, Jari Hyttinen, Elisa Passini, Stefano Severi

11:30 - 11:45 **A Comparison of Methods for Examining the Effect of Uncertainty in the Conductivities in a Model of Partial Thickness Ischaemia**
Barbara Johnston, Akil Narayan, Peter Johnston

11:45 - 12:00 **Influence of Fibrotic Tissue Arrangement on Intracardiac Electrograms During Persistent Atrial Fibrillation**
Jorge Sánchez, Mark Nothstein, Laura Unger, Javier Saiz, Beatriz Trénor Gomis, Olaf Doessel, Axel Loewe

12:00 - 12:15 **Observation Guided Systematic Reduction of a Detailed Human Ventricular Cell Model**
Tobias Gerach, Daniel Weiß, Olaf Doessel, Axel Loewe

Monday, September 09, 2019

Session S22 - **Special Session 1: Computational Fetal Monitoring**
Chairs: Joachim A. Behar and Philip Warrick
Room: Breakthrough

10:45 - 11:15 **Special Session on Computational Fetal Monitoring**
Joachim A. Behar

11:15 - 11:30 **LSTM Modeling of Perinatal Fetal Heart Rate**
Philip Warrick and Emily Hamilton

11:30 - 11:45 **Fetal Electrocardiography and Deep Learning for Prenatal Detection of Congenital Heart Disease**
Rik Vullings

11:45 - 12:00 **Wavelet-based Post-processing Methods for the En-hancement of Non-invasive Fetal ECG**
Giulia Baldazzi, Eleonora Sulas, Elisa Brungiu, Monica Urru, Roberto Tumbarello, Luigi Raffo, Danilo Pani

12:00 - 12:15 **Final Discussion**
Philip Warrick and Joachim A. Behar

Monday, September 09, 2019

Session S23 - **From Molecular to Clinical Aspects in AF**
Chairs: Willem Dassen and Henggui Zhang
Room: Discovery

10:45 - 11:15 **CLINICAL TALK**
Heart Rhythm Analysis: A Cardiologist' Perspective
Toon Wei Lim

11:15 - 11:30 **PITX2 Overexpression Leads to Atrial Electrical Remodeling Linked to Atrial Fibrillation**
Jieyun Bai, Yaosheng Lu, Andy C.Y. Lo, Jichao Zhao

11:30 - 11:45 **Structural Basis of Atrial Arrhythmogenesis in Metabolic Syndrome**
Shaleka Agrawal, Girish Ramlugun, Jesse Ashton, Gregory Sands, Manuel Zarzoso, Jichao Zhao

11:45 - 12:00 **Local Atrial Conduction Velocity During Pacing as Indication of Atrial Fibrillation Substrate Complexity**
Frank van Rosmalen, Laurent Pison, Tammo Delhaas, Harry Crijns, Stef Zeemering, Ulrich Schotten

12:00 - 12:15 **Fibrosis Explains AF Recurrences after Pulmonary Vein Isolations; a Simulation Study**
Ali Gharaviri, Simone Pezzuto, Mark Potse, Stef Zeemering, Rolf Krause, Angelo Auricchio, Ulrich Schotten

Monday, September 09, 2019

Session S24 - **Technical Progress in ECGI**
Chairs: Mark Potse and Jari Hyttinen
Room: Creation

10:45 - 11:00 **Comparison of Activation Times Estimation Methods for Potential-Based ECG Imaging**
Steffen Schuler, Laura Bear, Matthijs Cluitmans, Jaume Coll-Font, Önder Nazim Onak, Olaf Doessel, Dana Brooks

11:00 - 11:15 **Effects of Interpolation on the Inverse Problem of Electrocardiography**
Yesim Serinagaoglu Dogrusoz, Laura Bear, Jake Bergquist, Remi Dubois, Wilson Good, Rob MacLeod, Ali Rababah, Job Stoks

11:15 - 11:30 **The Influence of Using a Static Diastolic Geometry in ECG Imaging**
Job Stoks, Matthijs Cluitmans, Ralf Peeters, Paul Volders

11:30 - 11:45 **Effects of Prior Data on the Inference and Filtering Based Electrocardiographic Imaging**
Taha Erenler and Yesim Serinagaoglu Dogrusoz

11:45 - 12:00 **A Unified Pipeline for ECG Imaging Testing**
Jess Tate, Eelco van Dam, Wilson Good, Jake Bergquist, Peter van Dam, Rob MacLeod

12:00 - 12:15 **Optimizing the Reconstruction of Cardiac Potentials Using a Novel High Resolution Pericardiac Cage**
Jake Bergquist, Wilson Good, Brian Zenger, Jess Tate, Rob MacLeod

Tuesday, September 10, 2019

Special Session 2: Advanced Cardiac Imaging and Analysis in Congenital Heart Disease
Chairs: Liang Zhong and Lynette Teo
Room: Exploration

8:30 - 9:00 **Right Ventricular Remodeling in Adult Congenital Heart Disease: A Clinician Perspective**
Tarinee Tangcharoen

9:00 - 9:15 **Right Ventricular Function Assessment Using CMR: A Radiologist's Perspective**
Lynette Teo, Ching Ching Ong, Devinder Singh, Choon Kuang Low, Junda Song, Ping Chai

9:15 - 9:30 **Impaired CMR-derived Rapid Semi-automated Right Atrial Longitudinal Strain Is Associated with Decompensated Hemodynamics in Pulmonary Arterial Hypertension**
Liang Zhong, Shuang Leng, Ju-Le Tan, Ru-San Tan

9:30 - 9:45 **Patient-specific Computational Modeling of the Effects of Right Ventricular Assist Device on Treating Pulmonary Arterial Hypertension**
Sheikh Mohammad Shavik, Xiaodan Zhao, Liang Zhong, Lik Chuan Lee

9:45 - 10:00 **Final Discussion**
Liang Zhong and Lynette Teo

Tuesday, September 10, 2019

Session S32 - **Cardiovascular Mechanics**

Chairs: Mohanasankar Sivaprakasam and Zhang Jun-Mei

Room: Breakthrough

8:30 - 8:45 **Analysis of the Influence of Blood Flow on the Prediction of Non-Invasive Fractional Flow Reserve from CTCA and Reduced Order CFD**
Jun-Mei Zhang, Gaurav Chandola, Ris Low, Ru San Tan, Aaron Sung Lung Wong, Jack Wei Chieh Tan, Khung Keong Yeo, Ping Chai, Lynette LS Teo, Ching Ching Ong, Adrian F Low, Lohendran Baskaran, Terrance Chua, Tian Hai Koh, Swee Yaw Tan

8:45 - 9:00 **Estimation of Cardiac Time Intervals from the Mechanical Activity of the Heart Using Machine Learning**
Parastoo Dehkordi, Kouhyar Tavakolian, Te Zhao, Vahid Zakeri, Farzad Khosrow-khavar

9:00 - 9:15 **Determination of Incremental Local Pulse Wave Velocity Using Arterial Diameter Waveform: Mathematical Modeling and Practical Implementation**
Nabeel P M, V Kiran Raj, Jayaraj Joseph, Mohanasankar Sivaprakasam

9:15 - 9:30 **Evaluation of Short-Term Pacing Effect to Predict Long-Term Response to Cardiac Resynchronization Therapy: The TRAJECTORIES Study**
Giulia Santarelli, Roberta Ciccotelli, Giulio Molon, Francesco Zanon, Alessandro Corzani, Antonio Rossillo, Mauro Biffi, Gabriele Zanotto, Laura Lanzoni, Stefano Severi, Corrado Tomasi, Cristiana Corsi

Session details continued on next page..

9:30 - 9:45 **Cardiac Resynchronization Guided by Ultra-High Frequency ECG Maps**
Pavel Jurak, Magdalena Matejkova, Josef Halamek, Filip Plesinger, Ivo Viscor, Vlastimil Vondra, Jolana Lipoldova, Miroslav Novak, Radovan Smisek, Pavel Leinveber

9:45 - 10:00 **Electrode Positioning Using Finite Element Modelling for the Detection of Pulmonary Congestion**
Willemijn Groenendaal, Seulki Lee, Christophe Smeets, Pieter Vandervoort, Chris van Hoof

Tuesday, September 10, 2019

Session S33 - **System Study: Cardiorespiratory interactions**
Chairs: Carolina Varon and Mireia Calvo
Room: Discovery

8:30 - 8:45 **Sleep Stage Influence on the Autonomic Modulation of Sleep Apnea Syndrome**
Mireia Calvo and Raimon Jané

8:45 - 9:00 **Cardiorespiratory Coupling in Asthmatic Children**
Javier Milagro, Javier Gracia, Ville-Pekka Seppä, Jussi Karjalainen, Marita Paassilta, Michele Orini, Eduardo Gil, Raquel Bailón, Jari Viik

9:00 - 9:15 **Quantifying Redundant/Synergistic Interactions between Cardiorespiratory Reflexes and Cardiac Control Mechanisms During Light-to-Moderate Bicycle Exercise**
Alberto Porta, Beatrice Cairo, Vlasta Bari, Emanuele Vaini, Beatrice De Maria, Mara Malacarne, Massimo Pagani, Daniela Lucini

9:15 - 9:30 **Nonlinear Causal Cardiorespiratory Interaction in Response to Color Stimuli**
Saman Parvaneh, Sadaf Moharreri, Shahab Rezaei, Nader Jafarnia Dabanloo

9:30 - 9:45 **Cardiovascular Changes Induced by Acute Emotional Stress Estimated from the Pulse Transit Time Difference**
Pablo Armañac Julián, Spyridon Kontaxis, Jesus Lazaro, Pablo Laguna, Raquel Bailón, Eduardo Gil

Tuesday, September 10, 2019

Session S34 - **Sensor Systems and Algorithms**
Chairs: Matthias Görges and Daniel Guldenring
Room: Creation

8:30 - 8:45 **Multi-frequency Model Fusion for Robust Breathing Rate Estimation**
Soumaya Khreis, Ge Di, Zhu Jian, Guy Carrault

8:45 - 9:00 **Quality Assessment of Maternal and Fetal Cardiovascular Sounds Recorded from the Skin near the Uterine Arteries During Pregnancy**
Dagbjört Helga Eiríksdóttir, Rasmus Gundorff Sæderup, Diana Riknagel, Henrik Zimmermann, Maciej Plocharski, John Hansen, Johannes Struijk, Samuel Emil Schmidt

9:00 - 9:15 **ST Changes Observed in Short Spaced Bipolar Leads Suitable for Patch Based Monitoring**
Michael Jennings, Daniel Guldenring, Raymond Bond, Ali Rababah, Jim McLaughlin, Dewar Finlay

9:15 - 9:30 **Feasibility of Early Automated Vital Sign Instability Detection in Children Admitted to the Pediatric Intensive Care Unit**
Georg Seidel, Srinivas Murthy, Cheryl Peters, Philipp Rostalski, Matthias Görges

9:30 - 9:45 **The Performance of Wrist Photoplethysmography in Monitoring Atrial Fibrillation in Post Cardiac Surgery Patients**
Adrian Tarniceriu, Vilma Vuohelainen, Serj Haddad, Tuomas Halkola, Jakub Parak, Jari Laurikka, Antti Vehkaoja

9:45 - 10:00 **Autoregressive Whitening Filter for Detection of Coronary Artery Disease Based on Phonocardiography**
Bjarke Skogstad Larsen, Simon Winther, Louise Nissen, Axel Diederichsen, Morten Bøttcher, Johannes Struijk, Mads Græsbøll Christensen, Samuel Emil Schmidt

Tuesday, September 10, 2019

Session S41 - **Modeling Arrhythmias**
Chairs: Ronald Wilders and Niels Otani
Room: Exploration

10:15 - 10:30 **Transmural and Rate-dependent Properties of Drug-induced Arrhythmogenic Risks Obtained through in Silico Simulations of Multichannel Pharmacology**
平安 赵, Pan Li, Mengya Yuan

10:30 - 10:45 **Identifying Potential Re-entrant Circuit Locations from Atrial Fibre Maps**
Max Falkenberg, David Hickey, Louie Terrill, Alberto Ciacci, Nicholas S. Peters, Kim Christensen

10:45 - 11:00 **Effect of Blocking IKur on the Genesis of Repolarisation Alternans in Canine Atrium**
Na Zhao, Qince Li, Kuanquan Wang, Runnan He, Yongfeng Yuan, Henggui Zhang

11:00 - 11:15 **Engineering a Biological Pacemaker Using Canine Ventricle Myocytes: A Simulation Study**
Xiaoshuai Fan and Henggui Zhang

11:15 - 11:30 **Resolving Inconsistencies in the Behavior of Discordant Alternans Using an Ephaptic Model of Intercellular Electrical Conductivity**
Niels Otani

Tuesday, September 10, 2019

Session S42 - **Atrial Fibrillation Detection**
Chairs: Jean-Marc Vesin and Stef Zeemering
Room: Breakthrough

10:15 - 10:30 **Atrial Fibrillation Detection from PPG Interbeat Intervals via a Recurrent Neural Network**
Jérôme Van Zaen, Elsa Genzoni, Philippe Renevey, Mathieu Lemay, Etienne Pruvot, Fabian Braun, Jean-Marc Vesin

10:30 - 10:45 **How Accurately Can We Detect Atrial Fibrillation Using Photoplethysmography Data Measured in Daily Life?**
Linda M. Eerikäinen, Alberto Bonomi, Fons Schipper, Lukas Dekker, Rik Vullings, Helma de Morree, Ronald M. Aarts

10:45 - 11:00 **Factors Influencing Automated Detection of Atrial Fibrillation**
Peter Macfarlane, Shahid Latif, Brian Devine

11:00 - 11:15 **Clustered Standard Deviation and Its Benefit to Identify Atrial Fibrillation**
Filip Plesinger, Ivo Viscor, Petr Nejedly, Veronika Bulkova, Josef Halamek, Pavel Jurak

11:15 - 11:30 **Local Activation Time Annotation in Atrial Electrogram Arrays Using Deconvolution**
Bahareh Abdi, Richard C. Hendriks, Alle-Jan van der Veen, Natasja M.S. de Groot

Tuesday, September 10, 2019

Session S43 - **Artificial Intelligence in Cardiovascular Imaging**
Chairs: Su Yi and Ivo Provaznik
Room: Discovery

10:15 - 10:30 **An Automated Approach Based on a Convolutional Neural Network for Left Atrium Segmentation from Late Gadolinium Enhanced Magnetic Resonance Imaging**
Davide Borra, Claudio Fabbri, Alessandro Masci, Lorena Esposito, Alice Andalò, Cristiana Corsi

10:30 - 10:45 **A Novel Spatio-temporal Self-supervised Framework to Improve the Generalization Ability for Left Ventricle Volume Quantification Based on CMR Data**
Gongning Luo, Kuanquan Wang, Naren Wulan, Shaodong Cao, Qince Li, Yongfeng Yuan, Henggui Zhang

10:45 - 11:00 **Atherosclerotic Plaques Recognition in Intracoronary Optical Images Using Neural Networks**
Maysa M G Macedo, Dario AB Oliveira, Marco Antonio Gutierrez

11:00 - 11:15 **Weakly Supervised Deformation Network for 3D Echo-cardiography Segmentation on Left Ventricle**
Suyu Dong, Gongning Luo, Naren Wulan, Shaodong Cao, Kuanquan Wang, Qince Li, Henggui Zhang

11:15 - 11:30 **Artificially Generated Training Data-sets for Supervised Machine Learning Techniques in Magnetic Resonance Imaging: An Example in Myocardial Segmentation**
Christos Xanthis, Kostas Haris, Dimitrios Filos, Anthony Aletras

Session details continued on next page..

11:30 - 11:45 **Generating Healthy Aortic Root Geometries from Ultrasound Images of the Individual Pathological Morphology Using Deep Convolutional Autoencoders**
Jannis Hagenah, Mohamad Mehdi, Floris Ernst

Tuesday, September 10, 2019

Session S44 - **Seismocardiography and Ballistocardiogram Sensing**

Chairs: Kouhyar Tavakolian and Samuel Emil Schmidt

Room: Creation

10:15 - 10:30 **Changes of Seismocardiographic Intervals in Cardiac Resynchronization Therapy**
Kasper Sørensen, Johannes Struijk, Ask Schou Jensen, Kasper Janus Grønn Emerek, Peter Søgaard, Samuel Emil Schmidt

10:30 - 10:45 **Dynamic Time Warping for Heartbeat Detection in Ballistocardiography**
Guillaume Cathelain, Bertrand Rivet, Sophie Achard, Jean Bergounioux, François Jouen

10:45 - 11:00 **On the Performance of Bed-Integrated Ballistocardiography in Long-Term Heart Rate Monitoring of Vascular Patients**
Christoph Hoog Antink, Yen Mai, Jukka Ranta, Adrian Tarniceriu, Christoph Brüser, Steffen Leonhardt, Niku Oksala, Antti Vehkaoja

11:00 - 11:15 **Head Pulsation Signal Analysis for 3-Axis Head-Worn Accelerometers**
Olli Lahdenoja, Tero Hurnanen, Juho Koskinen, Matti Kaisti, Kim Munck, Samuel Emil Schmidt, Tero Koivisto, Mikko Pänkäälä

11:15 - 11:30 **A Preliminary Repeatability Study on the Estimation of Systolic Time Intervals among Healthy Subjects Using Cardiac Electromechanical Signals**
Vahid Zakeri, Kouhyar Tavakolian, Andrew Blaber, Parastoo Dehkordi, Farzad Khosrow-khavar

Session details continued on next page..

11:30 - 11:45 **Potential of Weight Scale Based Ballistocardiography for Identifying Orthostatic Intolerance: A Tilt Table Study**
Stian Henriksen, Ajay Verma, Parshuram Aarotale, Kouhyar Tavakolian

Tuesday, September 10, 2019
Session S51 - **Multiscale and Whole Heart Models**
Chairs: Ed Vigmond and Ali Gharaviri
Room: Exploration

12:30 - 12:45 **Personalized Ventricular Arrhythmia Simulation Framework to Study Vulnerable Trigger Locations on Top of Scar Substrate**
Kevin Lau, Alexandra Groth, Irina Waechter-Stehle, Uyen Chau Nguyen, Paul Volders, Jürgen Weese, Matthijs Cluitmans

12:45 - 13:00 **A Combined In-Silico and Machine Learning Approach towards Predicting Arrhythmic Risk in Post-Infarction Patients**
Per Magne Florvaag, Vilde Strøm, Charlotte Glinge, Reza Jabbari, Niels Vejlstrup, Thomas Engstrom, Kiril Ahtarovski, Thomas Jespersen, Jacob Tfelt-Hansen, Valeriya Naumova, Hermenegild Arevalo

13:00 - 13:15 **Mechanism of Sinus Bradycardia in Carriers of the A414G Mutation in the HCN4 Gene**
Arie Verkerk and Ronald Wilders

13:15 - 13:30 **A Resonant Model of the Action Potential in Cardiac Cells**
Sucheta Sehgal, Nitish Patel, Mark Trew

13:30 - 13:45 **Effect of Percentage Reduction in Action Potential Duration of M-cells on Reentry in Short QT Syndrome**
Ponnuraj Kirthi Priya and Srinivasan Jayaraman

13:45 - 14:00 **Parameter Identification of a Cardiovascular Model for the Estimation of Ventricular Pressure on Aortic Stenosis**
Kimi Owashi, Arnaud Hubert, Elena Galli, Erwan Donal, Alfredo I. Hernandez, Virginie Le Rolle

Tuesday, September 10, 2019

Session S52 - **Radiofrequency Ablation in AF**
Chairs: Juan Pablo Martinez and Jichao Zhao
Room: Breakthrough

12:30 - 12:45 **Recurring Patterns of Ventricular Response During Persistent Atrial Fibrillation Correlate with the Ablation Outcomes**
Yann Prudat, Adrian Luca, Etienne Pruvot, Roser Vinals Terres, Andrea Buttu, Patrizio Pascale, Mathieu Le Bloa, Chan-Il Park, Laurent Roten, Michael Kühne, Florian Spies, Sven Knecht, Christian Sticherling, Jean-Marc Vesin

12:45 - 13:00 **Temporal Stability of Dominant Frequency as Predictor of Atrial Fibrillation Recurrence**
Alejandro Costoya-Sánchez, Andreu M. Climent, Ismael Hernández-Romero, Alejandro Liberos, Francisco Fernández-Avilés, Sanjiv M. Narayan, Felipe Atienza, Maria de la Salud Guillem Sánchez, Miguel Rodrigo

13:00 - 13:15 **Use of Atrial Fibrillation Organization to Evaluate the Efficacy of Guided Ablation**
Carlos Roberto, Laura Martínez-Mateu, Ana Andrés, Joaquín Osca, Javier Saiz

13:15 - 13:30 **Bi-Atrial Dominant Frequency Values and Gradients Can Help Discard Patients with Persistent Atrial Fibrillation Unresponsive to Ablation**
Alain Pithon, Andrea Buttu, Patrizio Pascale, Claudia Herrera, Mathieu Le Bloa, Laurent Roten, Michael Kuehne, Florian Spies, Sven Knecht, Christian Sticherling, Etienne Pruvot, Jean-Marc Vesin, Adrian Luca

Session details continued on next page..

13:30 - 13:45 **Comparison of Voltage Map Calculation Methods Using Non-Fractionated EGM Signals in a Persistent AF Patient**
Deborah Nairn, Heiko Lehrmann, Amir Jadidi, Olaf Doessel, Axel Loewe

13:45 - 14:00 **An Automated Platform to Standardize Position in the Left Atrium and Map Electrophysiological Data**
Marianna Meo, Josselin Duchâteau, Jason Bayer, Thomas Pambrun, Caroline Roney, Edward Vigmond, Nicolas Derval, Arnaud Denis, Pierre Jaïs, Mélèze Hocini, Michel Haïssaguerre, Remi Dubois

Tuesday, September 10, 2019
Session S53 - **Heart Rate Variability**
Chairs: Philip De Chazal and Feng Ling
Room: Discovery

12:30 - 12:45 **Heart Rate Variability Monitoring Using a Wearable Armband**
Jesus Lazaro, Natasa Reljin, Yeonsik Noh, Pablo Laguna, Ki Chon

12:45 - 13:00 **The Effect of U-shaped Patterns to Nonlinear Properties of Heart Rate Variability**
Mateusz Soliński, Rafał Baranowski, Beata Graff, Jan Żebrowski

13:00 - 13:15 **Autonomic Nervous System Response to Heat Stress Exposure by Means of Heart Rate Variability**
Spyridon Kontaxis, Raquel Bailón, Andrius Rapalis, Marius Brazaitis, Margarita Cernych, Jesus Lazaro, Pablo Laguna, Eduardo Gil, Vaidotas Marozas

13:15 - 13:30 **Comparison of Cardiotocography and Fetal Heart Rate Estimators Based on Non-invasive Fetal ECG**
Rasmus Gundorff Sæderup, Henrik Zimmermann, Dagbjört Helga Eiríksdóttir, John Hansen, Johannes Struijk, Samuel Emil Schmidt

13:30 - 13:45 **A Computational Model of Autonomic Nervous System for Heart Rate Variability**
Sajitha S Nair, Minimol Balakrishnan, Mini M G

13:45 - 14:00 **Assessment of the Autonomic Response to Sensory Stimulation in Autism Spectrum Disorder**
Lara Cavinato, Annie Cardinaux, Wasifa Jamal, Margaret Kjelgaard, Pawan Sinha, Riccardo Barbieri

Tuesday, September 10, 2019

Session S54 - **ECG and Repolarization**

Chairs: Cadathur Rajagopalan and Pavel Jurak

Room: Creation

12:30 - 12:45 **QT Interval Variability Independent of Heart Rate Predicts Mortality Post Myocardial Infarction**
Fatima Elhamad, Safa Yaghini Bonabi, Alexander Muller, Alexander Steger, Georg Schmidt, Mathias Baumert

12:45 - 13:00 **Prediction Algorithm of Malignant Ventricular Arrhythmia Validated Across Multiple Online Public Databases**
Wei Wei Heng, Eileen Su Lee Ming, Ahmad Nizar Jamaluddin, Fauzan Khairi Che Harun, Nurul Ashikin Abdul-Kadir, Che Fai Yeong

13:00 - 13:15 **In-silico Evaluation of an Iterative Pace-mapping Technique to Guide Catheter Ablation of Ventricular Ectopy**
Andony Arrieula, Hubert Cochet, Pierre Jaïs, Michel Haïssaguerre, Mark Potse

13:15 - 13:30 **Transmural Ventricular Heterogeneities Play a Major Role in Determining T-Wave Morphology at Different Serum Potassium Levels**
Syed Hassaan Ahmed Bukhari, Flavio Palmieri, Dina Ferreira, Mark Potse, Julia Ramırez, Pablo Laguna, Carlos Sanchez, Esther Pueyo

13:30 - 13:45 **Validation of Intramural Wavefront Reconstruction and Estimation of 3D Conduction Velocity**
Wilson Good, Karli Gillette, Jake Bergquist, Brian Zenger, Jess Tate, Gernot Plank, Rob MacLeod

Tuesday, September 10, 2019
Session S61 - **Tissue Models and Cardiovascular Models**
Chairs: Stefano Severi and Beatriz Trenor
Room: Exploration

14:15 - 14:30 **An In-Silico Study of the Effects of Conductance Variation on the Regionally Based Action Potential Morphology.**
Jordan Elliott, Olaf Doessel, Axel Loewe, Luca Mainardi, Valentina Corino, Josè Felix Rodriguez Matas

14:30 - 14:45 **Electromechanical Coupling in Cardiomyocytes Depends on Its Electrotonic Interaction with Fibroblasts. Simulation Study**
Anastasia Bazhutina, Nathalie Balakina-Vikulova, Leonid Katsnelson, Alexander Panfilov, Olga Solovyova

14:45 - 15:00 **Thermodynamical Fluxes for the Modeling of Cardiac Mitochondrial Calcium Handling**
Bachar Tarraf, Michael Leguèbe, Yves Coudière, Philippe Diolez

15:00 - 15:15 **Antiarrhythmic Drug Treatment for Atrial Fibrillation: Effectiveness of Drug Depends on Electrophysiological Profile**
Ana Maria Sanchez de la Nava, Alejandro Liberos, Ismael Hernández-Romero, Francisco Fernández-Avilés, Felipe Atienza, Maria de la Salud Guillem Sánchez, Andreu M. Climent

15:15 - 15:30 **A Three-Dimensional Model of the Human Atria with Heterogeneous Thickness and Fibre Transmurality. A Realistic Platform for the Study of Atrial Fibrillation**
Sara Rocher, Laura Martinez, Alejandro Lopez, Ana Ferrer, Damian Sanchez-Quintana, Javier Saiz

Session details continued on next page..

15:30 - 15:45 **Toward Quantification and Visualization of Active Stress Waves for Myocardial Biomechanical Function Assessment**
Cristian Linte, Suzanne Shontz, Niels Otani

Tuesday, September 10, 2019

Session S62 - **Atrial Fibrillation Drivers and Targets**
Chairs: Ravi Ranjian and Miguel Rodrigo
Room: Breakthrough

14:15 - 14:30 **Temporal Stability of Rotors in Patients with PersAF**
Mahmoud Ehnesh, Xin Li, Nawshin Dastagir, Saaima Ahmad, Taher Biala, P J Stafford, G. Andre Ng, Fernando Schlindwein

14:30 - 14:45 **Inducibility of Atrial Fibrillation Depends Chaotically on Ionic Model Parameters**
Mark Potse

14:45 - 15:00 **Maximum Entropy Accurately Predicts the Distribution of Phase Singularity Lifetimes in Atrial Fibrillation: Implications for the AF Mechanism**
Dhani Dharmaprani, Madeline Schopp, Pawel Kuklik, Darius Chapman, Anandaroop Lahiri, Lukah Dykes, Kenneth Pope, Christian Meyer, Stephan Willems, Andrew McGavigan, Anand Ganesan

15:00 - 15:15 **Characterization of Propagation Patterns with Omnipolar EGM in Epicardial Multi-electrode Arrays**
Jennifer Riccio, Alejandro Alcaine, Natasja de Groot, Richard Houben, Pablo Laguna, Juan Pablo Martínez

15:15 - 15:30 **Automatic Quality Electrogram Assessment Improves Reentrant Activity Identification in Atrial Fibrillation**
Alejandro Costoya-Sánchez, Andreu M. Climent, Ismael Hernández-Romero, Alejandro Liberos, Francisco Fernández-Avilés, Sanjiv M. Narayan, Felipe Atienza, Maria de la Salud Guillem Sánchez, Miguel Rodrigo

Session details continued on next page..

15:30 - 15:45 **High Dominant Frequency Sites in Persistent Atrial Fibrillation Are Spatially Stable across Multiple Episodes**
Ravi Ranjan, Elyar Ghafoori, Roya Kamali, Eugene Kwan, Kennosuke Yamashita, Rob MacLeod, Derek Dosdall

Tuesday, September 10, 2019

Session S63 - **ECGI Clinical Applications**

Chairs: Marianna Meo and Yesim Serinagaoglu Dogrusoz

Room: Discovery

14:15 - 14:30 **Modeling an Activation of Heart Ventricular Segments**
Radovan Smisek, Pavel Jurak, Josef Halamek, Filip Plesinger, Ivo Viscor, Magdalena Matejkova, Pavel Leinveber

14:30 - 14:45 **Noninvasive Electrocardiographic Imaging with Magnetic Resonance Tomography in Candidates for Cardiac Resynchronization Therapy**
Stepan Zubarev, Mikhail Chmelevsky, Margarita Budanova, Danila Potyagaylo, Maria Trukshina, Sergey Rud, Anton Ryzhkov, Dmitriy Lebedev

14:45 - 15:00 **Noninvasive Electrocardiographic Imaging Diagnosis of Brugada Syndrome**
Maria Chaykovskaya, Mikhail Chmelevsky, Boris Rudic, Erol Tueluemen, Vitaly Kalinin

15:00 - 15:15 **Clinical Evaluation of Endocardial ECGI Mapping Accuracy in the Septal Area Using Different Equivalent Single Layer Algorithms**
Mikhail Chmelevsky, Danila Potyagaylo, Margarita Budanova, Stepan Zubarev, Tatjana Treshkur, Dmitry Lebedev

15:15 - 15:30 **Single-Layer Based Algorithms for Solving the Inverse Problem of ECG**
Danila Potyagaylo, Mikhail Chmelevsky, Alexander Kalinin

15:30 - 15:45 **Multiobjective Optimization Approach to Localization of Ectopic Beats by Single Dipole**
Jana Svehlikova, Jan Zelinka, Milan Tysler, Peter Tino

Tuesday, September 10, 2019
Session S64 - **ECG and Machine Learning**
Chairs: Gary Clifford and Jordi Heijman
Room: Creation

14:15 - 14:30 **Machine Learning Approach and Waves Synchronization Improvement for the Localization of Atrial Flutter Circuit Based on the 12-Leads ECG**
Olivier Meste, Muhammad Haziq Kamarul Azman, Decebal G. Latcu

14:30 - 14:45 **Non-Invasive Localization of Atrial Flutter Circuit Using Recurrence Quantification Analysis and Machine Learning**
Muhammad Haziq Kamarul Azman, Olivier Meste, Decebal G. Latcu, Kushsairy Kadir

14:45 - 15:00 **A Machine Learning Approach to Classify Myocardial Infarction Using Vectorcardiographic Ventricular Depolarization and Repolarization**
Filip Karisik and Mathias Baumert

15:00 - 15:15 **U-Net Architecture for the Automatic Detection and Delineation of the Electrocardiogram**
Guillermo Jimenez-Perez, Alejandro Alcaine, Oscar Camara

15:15 - 15:30 **Detecting Low Frequency Oscillations in Cardiovascular Signals Using Gradient Frequency Neural Networks**
Thomas Kaplan and Elaine Chew

15:30 - 15:45 **Cardiac Response to Live Music Performance: Computing Techniques for Feature Extraction and Analysis**
Elaine Chew, Peter Taggart, Pier Lambiase

Tuesday, September 10, 2019
15:45 - 17:45 Session P7_1 - **Cardiovascular Imaging**
Room: 4th Floor Foyer

Board 1 **Spatial-temporal-boundary Regularization for Cardiac Motion Tracking from Noisy Ultrasound Images**
Wei Xuan Chan, Hadi Wiputra, Sheldon Ho, Yoke Yin Foo, Choon Hwai Yap

Board 2 **An Advanced Non-Rigid Point Set Registration Algorithm for 4D Coronary Arteries from CTA Sequences**
Ying Kang, Ying Su, Wenjun Tan, Lisheng Xu

Board 3 **Classifying HCM Subtypes via Left Ventricular Two-dimensional Curvature and Dynamic Time Wrapping**
Min Wan, Yuli Yang, Xiaodan Zhao, Shuang Leng, Jun-Mei Zhang, Ru San Tan, Liang Zhong

Board 4 **Methodology to Display Dynamic Structure and Evaluation 4D Pumping Function of Heart with CT Cardiac Images**
Weichih Hu and Hsuan-Ming Tsao

Board 5 **A Framework of Left Atrium Segmentation on CT Images with Combined Detection Network and Level Set Model**
Yashu Liu, Kuanquan Wang, Gongning Luo, Henggui Zhang

Board 6 **A Novel Compressed Sensing-based Approach for Fast MRI Reconstruction from Highly Undersampled K-Space Data**
Chiara Di Martino, Cristiana Corsi, Damiana Lazzaro

Session details continued on next page..

Board 7 **Topographic Identification of High-Risk Valvular Regions for Patients with Calcific Degenerative Aortic Valve Stenosis**
John Sims, Rodrigo Castaldoni, Jose de Arimateia Araujo-Filho, Roberto Victor, Thamara Morais, Antonio de Santis, Pedro Lemos, Flavio Tarasoutchi, Marcelo Vieira, João Salinet, Antonildes Assuncao-Jr, Cesar Nomura

Board 8 **Linearization of Optical Mapping Measurement of the Action Potential with the Is8sbestic Point**
Ilija Uzelac and Flavio Fenton

Board 9 **Baseline Wandering Removal in Optical Mapping Measurements with PID Feedback Control in Phase Space**
Ilija Uzelac and Flavio Fenton

Tuesday, September 10, 2019
15:45 - 17:45 Session P7_2 - **Cardiovascular Mechanics**
Room: 4th Floor Foyer

Board 10 **Myofibroblasts Alter Tension and Strain of Cardiac Fiber: A Computational Study**
Heqing Zhan and Jingtao Zhang

Board 11 **Can Superhydrophobicity Technology Reduce Blood Damage in Blood Pumps? An in Silico Evaluation**
Wei Xuan Chan, Vivek Vasudevan, Choon Hwai Yap

Board 12 **Optimized CRT Stimulation Based on High Frequency QRS Analysis**
Magdalena Matejkova, Jolana Lipoldova, Pavel Leinveber, Josef Halamek, Pavel Jurak, Filip Plesinger, Andrej Nagy, Miroslav Novak

Board 13 **Directional Analysis of 2D Cardiac Motion Slices Using the Discrete Helmholtz Hodge Decomposition**
John Sims, Anderson Santiago, João Salinet, Marco Gutierrez

Board 14 **Investigation of Mechanisms of Regulation of Electromechanical Function of Cardiomyocytes in the Biomechanical Model of Myocardium**
Vladimir Sholohov, Vladimir Zverev, Alexander Kursanov

Board 15 **Incorporating Arterial Viscoelastic Modelling for the Assessment of Changes in Pulse Wave Velocity within a Cardiac Cycle Using Bramwell-Hill Equation**
V Kiran Raj, Nabeel P M, Jayaraj Joseph, Mohanasankar Sivaprakasam

Board 16 **Evaluation of Arterial Diameter by Mathematical Transformation of APG for Ambulatory Stiffness Evaluation**
Arathy R, Nabeel P M, Jayaraj Joseph, VV Abhidev, Mohanasankar Sivaprakasam

Session details continued on next page..

Board 17 **Poroelastic Modelling of Cardiac Perfusion to Optimise Targeted Drug Delivery and Reveal the Mechanisms behind Adverse Myocardial Remodelling**
Alexandra Diem and Kristian Valen-Sendstad

Board 18 **Numerical Investigation of Effect of Myocardium Viscoelasticity and Inertia on Left Ventricle Cardiac Cycle**
Imran Akhtar, Tahir Zaidi, S. M. Imran Majeed, Ovais Ahmed Jaffery

Board 19 **The Ultra-High-Frequency QRS Dyssynchrony in the Assessment of Cardiac Resynchronization Therapy Effect**
Pavel Leinveber, Josef Halamek, Pavel Jurak, Magdalena Matejkova, Radovan Smisek, Filip Plesinger, Jolana Lipoldova, Miroslav Novak

Tuesday, September 10, 2019
15:45 - 17:45 Session P7_3 - **ECG-Arrhythmias**
Room: 4th Floor Foyer

Board 20 **In Silico Screening of the Key Electrical Remodelling Targets in Atrial Fibrillation-induced Sinoatrial Node Dysfunction**
Jieyun Bai, Yaosheng Lu, Roshan Sharma, Jichao Zhao

Board 21 **A Faster R CNN-based Real-time QRS Detector**
Hao Yang, Maolin Huang, Zhipeng Cai, Yingjia Yao, Chengyu Liu

Board 22 **Modelling the Effects of Hypertension on Ventricle Cells of Human Heart**
Hamsa Naser, Yinhua Zhang, Henggui Zhang

Board 23 **Premature Ventricular Contraction Recognition for Wearable ECGs Using Modified Frequency Slice Wavelet Transform and Convolutional Neural Network**
Zhongyao Zhao, Xingyao Wang, Zhipeng Cai, Jianqing Li, Chengyu Liu

Board 24 **Targeted Particle Delivery in Arrhythmia Patients**
Pawan Kumar Pandey and Malay Das

Board 25 **Arrhythmogenic Mechanism of the Enhanced Late Sodium Current in Human Ventricular Myocytes - a Simulation Study**
Wei Wang, Shanzhuo Zhang, Kuanquan Wang, Henggui Zhang

Board 26 **Influence of M-cells on the Generation of Re-entry in Short QT Syndrome**
Ponnuraj Kirthi Priya and Srinivasan Jayaraman

Session details continued on next page..

Board 27 **High Intensity Focused Ultrasound Therapy Guidance System by Image-based Registration for Patients with Cardiac Fibrillation**
Batoul Dahman and Jean-Louis Dillenseger

Board 28 **Atrial Fibrillation Detection Using MEMS Accelerometer Based Bedsensor**
Tero Koivisto, Olli Lahdenoja, Juho Koskinen, Tuukka Panula, Tero Hurnanen, Matti Kaisti, Jere Kinnunen, Pekka Kostiainen, Ulf Meriheinä, Tuija Vasankari, Samuli Jaakkola, Tuomas Kiviniemi, Juhani Airaksinen, Mikko Pänkäälä

Board 29 **Personal ECG Devices: How Will We Cope? A Single Centre Case Study**
Rob Brisk, Raymond Bond and Dewar Finlay

Board 30 **Data Quality Assessment of Capacitively-coupled ECG Signals**
Ivan Castro, Carolina Varon, Jonathan Moeyersons, Amalia Villa Gómez, John Morales, Margot Deviaene, Tom Torfs, Sabine Van Huffel, Robert Puers, Christopher Van Hoof

Board 31 **Multi-feature Probabilistic Detector Applied on Apnea/hypopnea Monitoring**
Ge Di

Board 32 **Miniaturizing High-performance Computation of 3D Cardiac Dynamics onto Personal Computers, Tablets, and Even Cell-phone Browsers Using Abubu.js**
Abouzar Kaboudian, Elizabeth Cherry, Flavio Fenton

Tuesday, September 10, 2019
15:45 - 17:45 Session P7_4 - **Atrial Fibrillation**
Room: 4th Floor Foyer

Board 33 **Intrinsic Mode Function Complexity Index Tracks the Pivot Point of a Numerically Simulated Meandering Rotor**
Suganti Shivaram, Anjani Muthyala, Divaakar Siva Baala Sundaram, Rogith Balasubramani, Shivaram Poigai Arunachalam

Board 34 **Are Atrial Fibrillation Dominant Frequency Areas the Source of Dominant Excitation Patterns? A Left Atrial Panoramic View**
Frederique Vanheusden, Ahmed Ulusow, Gavin Chu, Xin Li, Joao L Salinet, Peter Stafford, G. André Ng, Fernando S. Schlindwein

Board 35 **Complexity Analysis of Normal Sinus Rhythm ECG: Can We Predict Paroxysmal Atrial Fibrillation? Insights from the Equine Athlete.**
Vadim Alexeenko, James Fraser, Mark Bowen, Christopher Huang, Celia Marr, Kamalan Jeevaratnam

Board 36 **Design, Development and Test of Different Cardiac Contraction Models in Atrial Fibrillation**
Michela Colonnelli, Alessandro Masci, Corrado Tomasi, Cristiana Corsi

Board 37 **Fusion of Multiple Univariate Data Analysis Based Detectors to Build a Specific Fingerprint of Atrial Fibrillation**
Zouhair Haddi, Bouchra Ananou, Ouladsine Mustapha, Jean-François Pons, Stéphane Delliaux, Jean-Claude Deharo

Board 38 **Myocardial Transmural Electrical Disruption Affects Electrogram Pattern**
Mirabeau Saha, Caroline Roney, Hubert Cochet, steven niederer, Edward Vigmond, Stanley Nattel

Session details continued on next page..

Board 39 **Anti-interference Ability Analysis for Common Atrial Fibrillation Features**
Ying Li, Fan Zhou, Xiangyu Zhang, Jianqing Li, Chengyu Liu

Board 40 **A Ventricular Far-field Artefact Filtering Technique for Atrial Electrograms**
Simanto Saha, Simon Hartmann, Dominik Linz, Prashanthan Sanders, Mathias Baumert

Board 41 **Atrial Fibrillation Stratification via Fibrillatory Wave Characterization Using the Filter Diagonalization Method**
Saumitra Mishra, Sreehari Mohan, Khalid Rajab, Gurpreet Dhillon, Pier Lambiase, Ross J. Hunter, Elaine Chew

Board 42 **A Novel Amalgamation of Computing Models to Follow the Propagation & Entropy of Atrial Fibrillation (AF) in the Left Atrium (LA). a Simulation Model**
Saaima Ahmad and Fernando Schlindwein

Board 43 **Cardiac Tachyarrhythmia Detection by Poincaré Plot-Based Image Analysis**
Guadalupe García Isla, Valentina Corino, Luca Mainardi

Board 44 **Comparison of CARTO LAT Maps and Non-Invasive Activation Maps for Patients with Intraventricular Conduction Disturbance During Sinus Rhythm**
Margarita Budanova, Mikhail Chmelevsky, Stepan Zubarev, Danila Potyagaylo, Boris Rudic, Erol Tulumen, Martin Borggrefe

Board 45 **Interatrial Septum and Appendage Ostium in Atrial Fibrillation Patients: A Population Study**
Anupama Goparaju, Alan Morris, Ibolya Csecs, Riddhish Bhalodia, Tom Ditter, Kristine Fuimaono, Evgueni Kholmovski, Nassir Marrouche, Joshua Cates, Shireen Elhabian

Tuesday, September 10, 2019

15:45 - 17:45 Session P7_5 - **Membrane and Cell Models, Modeling Drug Effects**
Room: 4th Floor Foyer

Board 46 **In Silico Investigation of the CACNA1C N2091S Mutation in Timothy Syndrome**
Jieyun Bai, Yaosheng Lu, Tao Song, Kuanquan Wang, Henggui Zhang

Board 47 **An Engineering-Optimized Cardiac Pacemaker by Manipulating Na+/Ca2+ Exchange Current and Na+/K+ Pumping Current**
Yacong Li, Kuanquan Wang, Qince Li, Na Zhao, Cunjin Luo, Yizhou Liu, Henggui Zhang

Board 48 **Design and Prototype Development of a Low-cost Blood Flow Simulator for Vascular Phantoms**
Matteo Zauli, Cristiana Corsi, Luca De Marchi

Board 49 **Reconstructing Cardiac Shape via Constrained Voronoi Diagram and Cyclic Dynamic Time Wrapping from CMR**
Min Wan, Yuli Yang, Xiaodan Zhao, Shuang Leng, Jun-Mei Zhang, Ru San Tan, Liang Zhong

Board 50 **A Mathematical Model of Action Potential in the Rat Atrial Cells**
Na Zhao, Qince Li, Yimei Du, Kuanquan Wang, Henggui Zhang

Board 51 **Parametrizing Drug Effects with Machine Learning in a New Resonant Model of Cell Electrophysiology**
Sucheta Sehgal, Nitish Patel, Mark Trew

Board 52 **Towards Detailed Real-Time Simulations of Cardiac Arrhythmia**
Johannes Langguth, Hermenegild Arevalo, Kristian Gregorius Hustad, Xing Cai

Session details continued on next page..

Board 53 **Detection and termination of broken-spiral-waves in mathematical models for cardiac tissue: a deep-learning approach**
Mahesh Kumar Mulimani, Jaya KUmar Alageshan, Rahul Pandit

Board 54 **Effects of Taurine-Magnesium Coordination Compound on Type 2 Short QT Syndrome: A Simulation Study**
Cunjin Luo, Dominic G. Whittaker, Ying He, Tong Liu, Yacong Li, Kuanquan Wang, Na Zhao, Henggui Zhang

Tuesday, September 10, 2019

15:45 - 17:45 Session P7_6 - **Health Informatics and Technology**
Room: 4th Floor Foyer

Board 55 **A Graphical Evaluation Tool to Utilize ECG Data without Reference Annotation**
Yu-He Zhang and Saeed Babaeizadeh

Board 56 **PPG Signal Morphology-Based Stress Assessment**
Mantas Rinkevičius, Spyridon Kontaxis, Eduardo Gil, Raquel Bailón, Jesus Lazaro, Pablo Laguna, Vaidotas Marozas

Board 57 **A Statistical Metrology Approach to Compare the Quality of Optical Pulse Wave Signals.**
Janos Palhalmi and Jan-Hein Broeders

Board 58 **How Accurate Are ECG Parameters from Wearable Single-lead ECG System for 24-Hours Monitoring**
Zhipeng Cai, Jianqing Li, Xiangyu Zhang, Qin Shen, Alan Murray, Chengyu Liu

Board 59 **Visualization of the Multichannel Seismocardiogram**
Kim Munck, Kasper Sørensen, Johannes Struijk, Samuel Emil Schmidt

Board 60 **Variation of the Seismocardiogram Depending on Measurement Position**
Kim Munck, Maria Weinkouff Pedersen, Nanna Louise Junker Udesen, Massar Omar, Kasper Sørensen, Johannes Struijk, Jacob Eifer Møller, Peter Søgaard, Samuel Emil Schmidt

Board 61 **Accelerating Action Potential Generation Using GPU Implementation of a Resonant Model of a Cell**
Sucheta Sehgal, Saif Charania, Jonathan Reshef, Nitish Patel, Mark Trew

Session details continued on next page..

Board 62 **Patient Monitoring During Magnetic Resonance Imaging Exams by Means of Ballistocardiography**
Karen Meyer zu Hartlage, Enrico Pannicke, Johannes Passand, Georg Rose, Ralf Vick

Board 63 **High-resolution Synchronous Digital Ballistocardiography Setup**
Nico Jähne-Raden, Henrike Gütschleg, Thiemo Clausen, Tobias Jura, Ulf Kulau, Stephan Sigg, Lars Wolf

Tuesday, September 10, 2019
15:45 - 17:45 Session P7_7 - **Challenge_1**
Room: 2nd Floor Foyer

Board 66 **Novelty Detection for the Early Prediction of Sepsis**
Oliver Carr, Stefan Bostock, Nicolas Basty, John Prince, Navin Cooray, Kirubin Pillay, Maarten De Vos

Board 67 **The Signature-based Model for Early Detection of Sepsis from Electronic Health Records**
James Morrill and Andrey Kormilitzin

Board 68 **Early Prediction of Sepsis from Clinical Data Using XGBoost**
wenxiao jia

Board 69 **Sample-and-hold/mean Imputation and XGBoost for Sepsis Prediction**
Lei Zuo and Hewei Yang

Board 70 **Early Prediction of Sepsis Using a Sliding Window-based AdaBoost Learning and Bayesian Regression**
Meicheng Yang, Hongxiang Gao, Xingyao Wang, Fan Zhou, Jianan Di, Tiantian Wang, Jianqing Li, Chengyu Liu

Board 71 **An Ensemble of Bagged Decision Trees for Early Prediction of Sepsis**
Reza Firoozabadi and Saeed Babaeizadeh

Board 72 **Early Sepsis Prediction with Deep Recurrent Reinforcement Learning**
Shenda Hong, Junyuan Shang, Meng Wu, Yuxi Zhou, Yen-Hsiu Chou, Moxian Song, Yongyue Sun, Hongyan Li

Board 73 **Extreme Gradient Boosting Method for Early Detection of Sepsis**
Tingting Zhao, Zhuoyang Xu, Zheng Cai

Session details continued on next page..

Board 74 **Development of a Sepsis Early Warning Indicator**
Gregory Arbour, David Dai, Kasthuri Karunanithi, Neal Kaw, Sebnem Kuzulugil, Josh Murray, Chloé Pou-Prom, Michaelia Young

Board 75 **A Low Dimensional Algorithm for Detection of Sepsis from Electronic Medical Record Data**
Aruna Deogire

Board 76 **Long Short-Term Memory Recurrent Neural Networks for the Early Prediction of Sepsis in the Intensive Care Unit**
Edwar Macias Toro, Guillem Boquet, Antoni Morell, Javier Serrano, Jose Lopez Vicario, Jose Ibeas

Board 77 **Sepsis Prediction by Segmentation of Multivariate Time Series Using Convolutional Neural Network**
Rohit Pardasani and Navchetan Awasthi

Board 78 **Feature Importance for Sepsis Prediction Using Gradient Boosting Decision Tree**
Kang Yanni and Jia Xiaoyu

Board 79 **Modified Early Warning Scoring and RUSBoost for Sepsis Prediction**
Pardis Biglarbeigi, Khaleed Rjoob, Donal McLaughlin, Abdullah Abdullah, Niamh McCallan, Raymond Bond, Ali Rababah, Alan Kennedy, James McLaughlin

Board 80 **A Convolutional Neural Network for Early Detection of Sepsis Using Hourly Physiological Data from Patients in Intensive Care Unit**
Xin Li, G. André Ng, Fernando Schlindwein

Board 81 **An Algorithm for Early Detection of Sepsis Using Traditional Statistical Regression Modeling**
Roshan Pawar, Jeffrey Bone, Mark Ansermino, Matthias Görges

Session details continued on next page..

Board 82 **Using Features Extracted from Vital Time Series for Early Prediction of Sepsis**
Qiang Yu, Xiaolin Huang, Cheng Wang, Yun Ge

Board 83 **A Recurrent Neural Network for the Prediction of Vital Sign Evolution and Sepsis in ICU**
Benjamin Roussel and Julien Oster

Board 84 **Real-time Prediction of Sepsis with a Deep Neural Network and Time-windowed Measurements**
Joel Jaskari and Simo Särkkä

Board 85 **A Recurrent Neuronal Network Approach for Sepsis Onset Prediction**
Matthieu Scherpf, Miriam Goldammer, Hagen Malberg, Felix Gräßer

Board 86 **Sepsis Prediction Model Based on Vital Signs Related Features**
Vytautas Abromavicius and Artūras Serackis

Board 87 **When to Start Sepsis Bundle? A Machine Learning Approach to Earlier Detection Using Electronic Medical Records**
Franco van Wyk, Akram Mohammed, Anahita Khojandi, Rishikesan Kamaleswaran

Board 88 **Early Prediction of Sepsis by Heterogeneous Event LSTM Model**
Zichang Wang, Luchen Liu, Haoxian Wu, Zequn Liu, Ming Zhang

Board 89 **A Real-Time Technique for Early Prediction of Sepsis Using Wearable Devices**
Dionisije Sopic, Tomas Teijeiro, Amir Aminifar, David Atienza

Board 90 **Early Prediction of Sepsis Using LSTM**
Congmin Xu and Peng Qiu

Session details continued on next page..

Board 91 **Early Prediction of Sepsis from Clinical Data Using a Specialized Hidden Markov Model**
Morteza Amini

Board 92 **Two Stage Deep Neural Networks for Early Prediction of Sepsis**
Naoki Nonaka and Jun Seita

Board 93 **Using Missing Indicators and Difference Features to Predict Sepsis with XGBoost**
Humza Haider

Board 94 **A Random Forest Approach for Predicting Early Onset of Sepsis**
Lakshman Narayanaswamy, Devendra Garg, Bhargavi Narra

Board 95 **Early Prediction of Sepsis Using Auxiliary Features and Hierarchical LSTM Network**
ByeongTak Lee, KyungJae Cho, Oyeon Kwon

Board 96 **Prediction of Sepsis in Intensive Care Unit Using Electronic Medical Records and Convolutional Bidirectional Recurrent Neural Networks**
Kaveh Samiee

Board 97 **Early Sepsis Diagnosis with Recurrent Neural Networks**
Dariusz Kucharski, Dominik Rzepka, Mateusz Pabian

Board 98 **Anomaly Detection Semi-supervised Framework for Sepsis Treatment.**
Ines Krissaane and Richard Wilkinson

Board 99 **Early Detection of Sepsis Using Ensemblers**
Shailesh Nirgudkar and Tianyu Ding

Board 100 **Prediction of Sepsis from Clinical Data Using a Convolutional Recurrent Neural Networks**
Wang Yongchao, Bin Xiao, Xiuli Bi, Weisheng Li, Junhui Zhang, Xu Ma

Wednesday, September 11, 2019

Session S81 - **Special Session 3: Unmet Clinical Needs and Challenges in Cardiac MRI for Heart Failure with Preserved Ejection Fraction: From Warping Methods to Feature Tracking**

Chairs: Liang Zhong and Chai Ping

Room: Exploration

8:30 - 9:00 **Heart Failure with Preserved Ejection Fraction: Clinical Unmet Need**
David Sim

9:00 - 9:15 **The Role of Cardiovascular Magnetic Resonance in Heart Failure with Preserved Ejection Fraction**
Ping Chai

9:15 - 9:30 **In Vivo Quantification and Interpretation of Changes in Myocardial Strain in Heart Failure with Preserved Ejection Fraction**
Ce Xi, Sheikh Mohammad Shavik, Xiaodan Zhao, Martin Genet, Liang Zhong, Samuel Wall, Daniel Burkhoff, Lik Chuan Lee

9:30 - 9:45 **Feature Tracking for Ventricular Strain Assessment in Heart Failure with Preserved Ejection Fraction**
Liang Zhong, Shuang Leng, Xiaodan Zhao, Ru-San Tan

9:45 - 10:00 **Final Discussion**
Liang Zhong and Ping Chai

Wednesday, September 11, 2019

Session S82 - **Challenge 1**

Chairs: Gari Clifford and Matthew Reyna

Room: Breakthrough

8:30 - 8:45 **Early Prediction of Sepsis from Clinical Data: The PhysioNet/Computing in Cardiology Challenge 2019**
Matthew Reyna, Supreeth Prajwal Shashikumar, Benjamin Moody, Ping Gu, Ashish Sharma, shamim nemati, Gari Clifford

8:45 - 9:00 **Representation Learning for Early Sepsis Prediction**
Luan Tran, Cyrus Shahabi, Manh Nguyen

9:00 - 9:15 **Sepsis Prediction Using Advanced Imputation and Long Short Term Memory Networks**
Jonathan Rubin, Yale Chang, Gregory Boverman, Shruti Vij, Asif Rahman, Annamalai Natarajan, Saman Parvaneh

9:15 - 9:30 **A Transformer-based Model on Electronic Health Records with Data Imbalance**
Luchen Liu, Haoxian Wu, Zichang Wang, Zequn Liu, Ming Zhang

9:30 - 9:45 **Uncertainty-Aware Model for Reliable Prediction of Sepsis in the ICU**
Marco Pimentel, Adam Mahdi, Oliver Redfern, Mauro Santos, Lionel Tarassenko

9:45 - 10:00 **Dealing with Imbalance and Missing Values in Electronic Health Record Data to Produce Accurate and Interpretable Sepsis Prediction**
Tatiana Malygina, Elena Ericheva, Ivan Drokin

Wednesday, September 11, 2019

Session S83 - **ECGI Applied to atrial arrhythmias**

Chairs: Joel Karel and Fernando Schlindwein

Room: Discovery

8:30 - 8:45 **Effect of Reducing the Number of Leads in Body Surface Potential Mapping of Computer Models of Atrial Arrhythmias**
Victor Gonçalves Marques, Miguel Rodrigo, Maria de la Salud Guillem Sánchez, João Salinet

8:45 - 9:00 **Non-Invasive Assessment of Reentrant Activity During Atrial Fibrillation: Comparison with Basket Mapping**
Miguel Rodrigo, Andreu M. Climent, Ismael Hernández-Romero, Alejandro Liberos, Francisco Fernandez-Aviles, Sanjiv M Narayan, Felipe Atienza, Maria de la Salud Guillem Sánchez

9:00 - 9:15 **Dominant Frequency Assessment During Atrial Fibrillation from Body Surface Mapping: Correlation with Intracardiac Basket Mapping**
Miguel Rodrigo, Andreu M. Climent, Alejandro Costoya-Sánchez, Ismael Hernández-Romero, Alejandro Liberos, Tina Baykaner, Francisco Fernandez-Avilés, Sanjiv Narayan, Felipe Atienza, Maria de la Salud Guillem Sánchez

9:15 - 9:30 **Effects of Geometry in Atrial Fibrillation Markers Obtained with Electrocardiographic Imaging**
Rubén Molero Alabau, Andreu M. Climent, Ismael Hernández Romero, Alejandro Liberos, Francisco Jesús Fernández Avilés, Felipe Atienza, Maria de la Salud Guillem Sánchez, Miguel Rodrigo Bort

Session details continued on next page..

9:30 - 9:45 **Non-invasive Conduction Velocity Estimation During Sinus Rhythm in Atrial Fibrillation Patients**
Ismael Hernández-Romero, Alejandro Liberos, Miguel Rodrigo, Francisco Fernández-Avilés, Felipe Atienza, Maria de la Salud Guillem Sánchez, Andreu M. Climent

9:45 - 10:00 **Non-invasive Electrophysiological Mapping Entropy Predicts Atrial Fibrillation Ablation Efficacy Better than Clinical Characteristics**
Ana Maria Sanchez de la Nava, Macarena Castillo Fabregat, Miguel Rodrigo, Ismael Hernández-Romero, Alejandro Liberos, Francisco Fernández-Avilés, Felipe Atienza, Maria de la Salud Guillem Sánchez, Andreu M. Climent

Wednesday, September 11, 2019
Session S84 - **Clinical ECGs**
Chairs: Peter McFarlane and Johan DeBie
Room: Creation

8:30 - 8:45 **Sex Differences in Nocturnal Ventricular Repolarization Variability**
Martin Schmidt, Mathias Baumert, Hagen Malberg, Sebastian Zaunseder

8:45 - 9:00 **Detection of First-degree Atrioventricular Block on Variable-length Electrocardiogram via a Hierarchical Deep Learning Method**
Dongya Jia, wei zhao, Zhenqi Li, Hongmei Wang, jing hu, Cong Yan

9:00 - 9:15 **A Highly-Reliable Full-Automatic System for Analyzing ECG Waveforms in Real Time Applications**
Antoun Khawaja

9:15 - 9:30 **Source Classification in Atrial Fibrillation Using Machine Learning Approach**
Pedro Marinho Ramos de Oliveira, Vicente Zarzoso, Carlos Alexandre Rolim Fernandes

9:30 - 9:45 **A New Graphical Method for Reporting Performance Results of a Diagnostic Test**
John Wang

9:45 - 10:00 **A Review of Bandwidth for PediatricC ECGs**
Shen Luo, Wei Hong, Peter Macfarlane

Wednesday, September 11, 2019

Session S91 - **Novel Quantification Techniques from MRI**
Chairs: Hermenegild Arevalo and Teo Soo Kng
Room: Exploration

10:30 - 11:00 **CLINICAL TALK**
Cardiac Magnetic Resonance Assessment of Chamber and Myocardial Function in Heart Failure
Tan Ru San

11:00 - 11:15 **Characterization of Blood Flow Changes in Normal and Pathological Aortic Dilation from 4D Flow Magnetic Resonance Imaging**
Sophia Houriez--Gombaud-Saintonge, Ariel Pascaner, Gilles Soulat, Umit Gencer, Thomas Dietenbeck, Damian Craiem, Emilie Bollache, Yasmina Chenoune, Elie Mousseaux, Nadjia Kachenoura

11:15 - 11:30 **Cardiovascular Magnetic Resonance-derived Tricuspid Annular Motion Indices in the Assessment of Right Ventricular Function in Patients with Repaired Tetralogy of Fallot**
Shuang Leng, Ru-San Tan, Ju Le Tan, Ping Chai, Lynetto Teo, Marielle V Fortier, Teng Hong Tan, Wen Ruan, Xiaodan Zhao, Ching Ching Ong, Devinder Singh, John C Allen, Ghassan S Kassab, James W Yip, Liang Zhong

11:30 - 11:45 **Does Alignment in Statistical Shape Modeling of Left Atrium Appendage Impact Stroke Prediction?**
Riddhish Bhalodia, Archanasri Subramanian, Alan Morris, Joshua Cates, Evgueni Kholmovski, Nassir Marrouche, Shireen Elhabian

Session details continued on next page..

11:45 - 12:00 **Automated 3D MRI Aortic Morphometry Demonstrates the Added Value of Volumes as Compared to Diameters**
Thomas Dietenbeck, Sophia Houriez--Gombaud-Saintonge, Umit Gencer, Alain Giron, Gilles Soulat, Elie Mousseaux, Philippe Cluzel, Alban Redheuil, Nadjia Kachenoura

Wednesday, September 11, 2019
Session S92 - **Challenge 2**
Chairs: Gari Clifford and Matthew Reyna
Room: Breakthrough

10:30 - 10:45 **Boosted Gradient Regression Trees with Gamma Error Assumption for Early Prediction of Sepsis**
Ibrahim Hammoud, IV Ramakrishnan, Mark Henry

10:45 - 11:00 **Prediction of Sepsis Using LSTM with Hyperparameter Optimization with a Genetic Algorithm**
Petr Nejedly, Filip Plesinger, Ivo Viscor, Josef Halamek, Pavel Jurak

11:00 - 11:15 **Incorporating Pathophysiological Knowledge into a Time-Aware Long-Short Term Memory for the Early Prediction of Sepsis**
Marcus Vollmer, Christian F. Luz, Philipp Sodmann, Maarten W. N. Nijsten, Bhanu Sinha, Sven-Olaf Kuhn

11:15 - 11:30 **Developing an Interpretable Predictive Model for Early Diagnosis of Sepsis Using Automatic Feature Extraction**
Edward Ho, Cathy Ong-Ly, Alex Zhou

11:30 - 11:45 **Sepsis Prediction in Intensive Care Unit Using XGBoost with Random Undersampling for Unbalanced Censored Data**
Morteza Zabihi, Serkan Kiranyaz, Moncef Gabbouj

11:45 - 12:00 **Early Prediction of Sepsis Using Random Forest Classification for Imbalanced Clinical Data**
Simon Lyra, Steffen Leonhardt, Christoph Hoog Antink

Wednesday, September 11, 2019

Session S93 - **Ventricular Arrhythmias: From Mechanisms to Diagnosis**

Chairs: Pyotr Platonov and Alberto Porta

Room: Discovery

10:30 - 11:00 **CLINICAL TALK**
ECG-based Risk Assessment of Sudden Cardiac Death in Hospitalized Patients
Yunlong Xia

11:00 - 11:15 **Blocking L-type Calcium Current Reduces Vulnerability to Reentry in Human iPSC-Derived Cardiomyocytes Tissue**
Albert Dasí, Andreu M. Climent, Jose M Ferrero, Beatriz Trenor

11:15 - 11:30 **Predicting the Origin of Outflow Tract Ventricular Arrhythmias Using Machine Learning Techniques Trained with Patient-Specific Electrophysiological Simulations**
Ruben Doste, Juan Francisco Gomez, Alejandro Alcaine, Miguel Lozano, Lluis Mont, Antonio Berruezo, Oscar Camara, Rafael Sebastian

11:30 - 11:45 **Phase Space Approach for Quantification of Arrhythmia Caused by Regional Potassium Level Heterogeneities in Isolated Rabbit Hearts**
Ilija Uzelac and Flavio Fenton

11:45 - 12:00 **Multivariate Classification of Brugada Syndrome Patients Based on the Autonomic Response During Sleep, Exercise and Head-up Tilt Testing**
Mireia Calvo, Virginie Le Rolle, Daniel Romero, Nathalie Béhar, Pedro Gomis, Philippe Mabo, Alfredo Hernández

Wednesday, September 11, 2019
Session S94 - **ECG Signal Processing I**
Chairs: Pablo Laguna and Olivier Meste
Room: Creation

10:30 - 10:45 **Alignment of Multi-Sensored Data: Adjustment of Sampling Frequencies and Time Shifts**
Marcus Vollmer, Dominic Bläsing, Lars Kaderali

10:45 - 11:00 **Modeling and Classification of the ST-T Segment Morphology for Enhanced Detection of Acute Myocardial Infarction**
Reza Firoozabadi, Richard Gregg, Saeed Babaeizadeh

11:00 - 11:15 **New Information from Old Signals: Attractor Reconstruction Analysis of the Electrocardiogram**
Jane Lyle, Philip Aston, Esther Bonet-Luz, Manasi Nandi

11:15 - 11:30 **Evaluating Mathematical Models for Morphological Classification of the QRS Complex**
João Paulo do Vale Madeiro, Délcio Barreto, João Alexandre Marques, João Salinet

11:30 - 11:45 **Adaboost Based ECG Signal Quality Evaluation**
Zeyang Zhu, Wenyan Liu, Yang Yao, Xuewei Chen, Yingxian Sun, Lisheng XU

11:45 - 12:00 **Maximizing the Reliability of a Full-Automatic ECG-Waveforms Delineating Algorithm Using Extensive ECG Databank**
Antoun Khawaja

Wednesday, September 11, 2019

12:00 - 14:00 Session PA_1 - **ECG Waveform Analysis**
Room: 4th Floor Foyer

Board 1 **A Suitability Recognition Method for Multi-parameter Synchronous Analysis**
Xianliang He, Sanchao Liu, Zehui Sun, Wenyu Ye, Jianwei Su, Haoyu Jiang, Cadathur Rajagopalan

Board 2 **Deep Learning Applied to Attractor Images Derived from ECG Signals for Detection of Genetic Mutation**
Philip Aston, Jane Lyle, Esther Bonet-Luz, Christopher Huang, Yanmin Zhang, Kamalan Jeevaratnam, Manasi Nandi

Board 3 **Application of the Entropy of Approximation for the Nonlinear Characterization in Patients with Chagas Disease**
Miguel Vizcardo, Miriam Manrique, Antonio Ravelo Garcia

Board 4 **What Can Tone and Entropy Tell Us about Risk of Cardiovascular Diseases?**
Ahsan Khandoker, Yahya Al Zaabi, Herbert Jelinek

Board 5 **Pay Attention and Watch Temporal Correlation: A Novel 1-D Convolutional Neural Network for ECG Record Classification**
Wang Yongchao, Bin Xiao, XiuLi Bi, Weisheng Li, Junhui Zhang, Xu Ma

Board 6 **An Efficient Instantaneous ECG Delineation Algorithm**
Yuan Wen Hau, Thion Ming Chieng, Zaid Omar, Chiao Wen Lim

Board 7 **A Novel 2-Lead to 12-Lead ECG Reconstruction Methodology for Remote Health Monitoring Applications**
Naresh Vemishetty, Vishnuvardhan Gundlapalle, Amit Acharyya, Bhudeb Chakravarti

Session details continued on next page..

Board 8 **Reconstruction of Limb Leads Recorded on the Subject'S Torso**
Judyta Salamon

Board 9 **A Novel Method for ECG Paper Records Digitization**
Xiaohan Sun, Qince Li, Kuanquan Wang, Runnan He, Henggui Zhang

Board 10 **Prediction of Ventricular Fibrillation Occurance Using Artificial Neural Network**
Taye Getu Tadele and Ki Moo Lim

Board 11 **Contextual LSTM (CLSTM) Models for Early Prediction of Sepsis**
Yao Chen and Jiancheng Lv

Board 12 **Massive ECG Data: Patterns and Variability**
William Mateus, Marco Paluszny, Marianela Lentini

Board 13 **Evaluation of Features from Multi-lag Poincare Plot for Discrimination between Normal Sinus Rhythm and Atrial Fibrillation**
Shahab Rezaei, Sadaf Moharreri, Nader Jafarnia Dabanloo

Board 14 **Supraventricular Tachycardia Recognition Using Vectorcardiography Vector and Particle Swarm Optimization Algorithm**
Javid Farhadi and Nader Jafarnia Dabanloo

Wednesday, September 11, 2019
12:00 - 14:00 Session PA_2 – **ECGI**
Room: 4th Floor Foyer

Board 15 **A 3D-printed Heart Including a Heat-map of the Electrical Activity from Non-invasive Measurements**
Roger Abächerli, Adrian von Wyl, Peter van Dam, Carsten Haack

Board 16 **Non-Invasive Characterization of Cardiac Activation Patterns: Contributions of Body Surface Potential Mapping in Healthy Volunteers**
João Salinet, Jimena Paredes, Marcelo Mazzetto, Victor Gonçalves Marques, Nelson Samesima, Carlos Alberto Pastore, Idágene Cestari

Board 17 **Non-invasive Characterization of Atrial Arrhythmic Driving Mechanisms in Computer Models**
Victor Gonçalves Marques, Miguel Rodrigo, Maria de la Salud Guillem Sánchez, João Salinet

Board 18 **Neural Network-Based Matrix Completion for Minimal Configuration of Body Surface Potential Mapping**
Darek Rubio Bizcaino, Kamil Bujnarowski, Max Matyschik, Henry Mauranen, Ruhui Zhao, Pietro Bonizzi, Joel Karel

Board 19 **Direct Mapping from Body Surface Potentials to Cardiac Activation Maps Using Neural Networks**
Amel Karoui, Nejib Zemzemi, Mostafa Bendahamane

Board 20 **The Combined Effect of Myocardial Infarction and Ischemia on Excitation Wave Propagation in Ventricular Tissue**
Cuiping Liang, Kuanquan Wang, Qince Li, Henggui Zhang

Session details continued on next page..

Board 21 **An Algorithm Based on Combining hs-cTNT and H-FABP for Ruling Out Acute Myocardial Infarction**
Cesar Oswaldo Navarro, Mary Jo Kurth, Mark Ruddock, Sam Fishlock, James McLaughlin

Board 22 **Equivalent Conductivity Estimation Improves the ECGI Reconstruction**
Nejib Zemzemi, Pauline Migerditichan, Mark Potse

Wednesday, September 11, 2019

12:00 - 14:00 Session PA_3 – **Ion channel Models, Tissue Models, Cardiovascular Models**
Room: 4th Floor Foyer

Board 23 **Computer Simulation of Anterograde Accessory Pathway Conduction in Wolff-Parkinson-White Syndrome with a Simplified Model**
Ryo Haraguchi, Taka-aki Matsuyama, Jun Yoshimoto, Takashi Ashihara

Board 24 **Simulating the Hemodynamic Environment in the Zebrafish Embryonic Heart in Four Dimensions**
Yoke Yin Foo, Shuhao Shen, Huiping, Shermaine Tay, Nurgul Imangali, Martin Buist, Nanguang Chen, Christoph Winkler, Choon Hwai Yap

Board 25 **In Silico Prediction of Drug-induced Arrhythmogenic Events through Tissue-level Simulations of Multichannel Pharmacology**
Mengya Yuan, Pingan Zhao, Pan Li

Board 26 **Aortic Pressure Waveforms Reconstruction Using Simplified Kalman Filter**
Wenyan Liu, Zongpeng Li, Yang Yao, Shuran Zhou, Lisheng XU

Board 27 **Predicting Plausible Human Purkinje Network Morphology from Simulations**
Matthias Lange, Toni Lassila, Alejandro Frangi

Board 28 **New Mathematical Models for the Mouse Cardiac Fast Sodium Channel**
Shanzhuo Zhang, Wei Wang, Kuanquan Wang, Henggui Zhang

Session details continued on next page..

Board 29 **Physically-coherent Extraction of Mitral Valve Chordae**
Daryna Panicheva, Pierre-Frédéric Villard, Peter E. Hammer, Marie-Odile Berger

Board 30 **Role of the Instantaneous Component of the Funny Current in Murine Sinoatrial Node Pacemaking**
Jack Rowley Noble, Yanwen Wang, Jue Li, Mark Boyett, Henggui Zhang

Board 31 **In Silico Study of Gaseous Air Pollutants Effects on Human Atrial Tissue**
Catalina Tobon, Diana C Pachajoa, Juan P Ugarte, Javier Saiz

Board 32 **In-silico 2D Atrial Tissue Modelling on a Population: Impact of Fibrosis in Arrhythmogenesis**
Alonso Dominguez Sobrino, Ana Maria Sanchez de la Nava, Ismael Hernández-Romero, Miguel Rodrigo, Maria de la Salud Guillem Sánchez, Felipe Atienza, Francisco Fernández Avilés, Andreu M. Climent, Alejandro Liberos

Board 33 **A Novel Paradigm for in Silico Simulation of Cardiac Electrophysiology through the Mixed Collocation Meshless Petrov-Galerkin Method**
Konstantinos Mountris, Carlos Sanchez, Esther Pueyo

Wednesday, September 11, 2019

12:00 -14:00 Session PA_4 - **Health Informatics and Technology**
Room: 4th Floor Foyer

Board 34 **Machine Learning Improves the Detection of Misplaced v1 and v2 Electrodes During 12-Lead Electrocardiogram Acquisition**
Khaled Rjoob, Raymond Bond, Dewar Finlay, Victoria McGilligan, Stephen Leslie, Aleeha Iftikhar, Daniel Guldenring, Ali Rababah, Charles Knoery, Aaron Peace

Board 35 **Monitoring Remote of Biomedical Signals**
Diego da Silva, William Watanabe, Walter Lopes, Henrique Rodrigues, Robson da SIlva, João Salinet, Marcia Bissaco, Gustavo Goroso

Board 36 **An Automated Device for Recording Peripheral Arterial Waveform**
Tuukka Panula, Juuso Blomster, Mikko Pänkäälä, Tero Koivisto, Matti Kaisti

Board 37 **Monitoring Remote of Heart Rate Variability: Arrhythmia Detection**
William Watanabe, Diego da Silva, Walter Lopes, Henrique Rodrigues, Robson da Silva, Marcia Bissaco, João Salinet, Gustavo Goroso

Board 38 **Wearable Technology: Signal Recovery of ECG from Short Spaced Leads in the Far-field Using Discrete Wavelet Transform Based Techniques**
Niamh McCallan, Pardis Biglarbeigi, Dewar Finlay, Gilberto Perpiñan, James McLaughlin, Omar Escalona

Board 39 **Efficient Segmentation Pipeline Using Diffeomorphic Image Registration: A Validation Study**
Shalin Parikh, Anupama Goparaju, Riddhish Bhalodia, Bosten Loveless, Alan Morris, Joshua Cates, Evgueni Kholmovski, Nassir Marrouche, Shireen Elhabian

Session details continued on next page..

Board 40 **Security Defense Strategy for ECG Diagnosis Systems (EDS)**
Ying He, Hasan Soygazi, Cunjin Luo, Na Zhao, Henggui Zhang

Board 41 **GPU Accelerated near Real-Time Removal of Optical Mapping Baseline Wandering**
Ilija Uzelac and Flavio Fenton

Wednesday, September 11, 2019
12:00 - 14:00 Session PA_5 - **System Study**
Room: 4th Floor Foyer

Board 42 **Instantaneous Time-Course of the Autonomic Cardiovascular Respiratory Response of Healthy Subjects to Hypoglycemic Stimulus**
Salvador Carrasco-Sosa and Alejandra Guillén-Mandujano

Board 43 **Deep Convolutional Encoder-Decoder Framework for Fetal ECG Signal Denoising**
Eleni Fotiadou, Tomasz Konopczyński, Jürgen Hesser, Rik Vullings

Board 44 **Sleep RR-Interval U-patterns and Their Correlation to Movement Events**
Sasan Yazdani, Alexandre Cherqui, Nicolas Bourdillon, Gregoire Millet, Jean-Marc Vesin

Board 45 **Heart Rate Variability Analysis Assessment for Asthma Control Stratification**
Javier Milagro, Lorena Soto, Jordi Giner, Carolina Varon, Pablo Laguna, Vicente Plaza, Eduardo Gil, Raquel Bailón

Board 46 **Propofol General Anesthesia Decreases the Coupling Strength between Mean Arterial Blood Pressure and Mean Cerebral Blood Flow Velocity in Patients Undergoing Coronary Artery Bypass Grafting**
Vlasta Bari, Emanuele Vaini, Angela Fantinato, Beatrice De Maria, Beatrice Cairo, Valeria Pistuddi, Marco Ranucci, Alberto Porta

Board 47 **Effect of Propranolol and Its Dosages on Maternal-fetal Heart Rates Coupling in Pregnant Mice and Fetuses**
Ahsan Khandoker, Chihiro Yoshida, Yoshiyuki Kasahara, Kiyoe Funamoto, Kyuichi Niizeki, Yoshitaka Kimura

Session details continued on next page..

Board 48 **Causal Relationship Analysis of Heart Rate Variability and Power Spectral Density Time Series of Electroencephalographic Signals**
Marinieves Pardo-rodriguez and Erik Bojorges-Valdez

Board 49 **Pulse Oximetry Markers for Cardiovascular Disease in Sleep Apnea**
Margot Deviaene, Pascal Borzée, Bertien Buyse, Dries Testelmans, Sabine Van Huffel, Carolina Varon

Board 50 **A Recurrence Plot Based Method for the Detection of End of T-wave in Abnormal Non-invasive Fetal Electrocardiogram Signals**
Namareq Widatalla, Ahsan Khandoker, Yoshiyuki Kasahara, Yoshitaka Kimura

Board 51 **Computation of Mean Cerebral Blood Flow Velocity for the Assessment of Cerebral Autoregulation: Comparison of Different Strategies**
Emanuele Vaini, Vlasta Bari, Beatrice Cairo, Beatrice De Maria, Gianluca Rossato, Davide Tonon, Alberto Porta

Wednesday, September 11, 2019
12:00 - 14:00 Session PA_6 - **Heart Rate Variability**
Room: 4th Floor Foyer

Board 52 **HRVTool - an Open-Source Matlab Toolbox for Analyzing Heart Rate Variability**
Marcus Vollmer

Board 53 **A New Entropy-based Heart Failure Detector**
Jinle Xiong, Xueyu Liang, Chengyu Liu

Board 54 **Decreased Vagal Influence on the Heart after 24-Week Carnitine Supplementation**
Stanislaw Zajaczkowski, Piotr Badtke, Milosz A Zajaczkowski, Robert A Olek, Tomasz H. Wierzba

Board 55 **Non-Linear Heart Rate Variability Measures in Sleep Stage Analysis with Photoplethysmography**
Matti Molkkari, Mirja Tenhunen, Adrian Tarniceriu, Antti Vehkaoja, Sari-Leena Himanen, Esa Räsänen

Board 56 **Influence of the Heart Rate Variability Representations on the Quantification of the Cardiorespiratory Interactions**
John Morales, Bolea Juan, Sabine Van Huffel, Raquel Bailón, Carolina Varon

Board 57 **The Effects of Reading and Listening to the Heavenly Books on Heart Rate Variability**
Nader Jafarnia Dabanloo, Maysam Mashhadimalek, Saman Parvaneh, Shahriar Gharibzadeh

Board 58 **Quantification of Linear and Nonlinear Cardiorespiratory Interactions under Autonomic Nervous System Blockade**
Carolina Varon, Dries Hendrikx, Juan Bolea, Pablo Laguna, Raquel Bailón

Session details continued on next page..

Board 59 **Automatic Emotions Assessment Using Heart Rate Variability Analysis and 2D Regression Model of Emotions**
Sadaf Moharreri, Shahab Rezaei, Nader Jafarnia Dabanloo, Saman Parvaneh

Board 60 **Evaluating the Effects of Traditional Persian Music on Nonlinear Parameters of HRV**
Bahareh Khodabakhshian, Sadaf Moharreri, Saman Parvaneh

Board 61 **Effect of Postural Changing on Complexity Measures of Heart Rhythm in Late Adolescents**
Tomasz H. Wierzba, Hanna Ćwikałowska-Grudzińska, Piotr Badtke, Paweł Figarski, Aleksandra Kicińska, Piotr Skonieczny, Stanislaw Zajaczkowski

Board 62 **The Evolution of HRV Parameters During Cardiac Rehabilitation**
Hélène De Cannière, John Morales, Melanie Schoutteten, Christophe Smeets, Willemijn Groenendaal, Carolina Varon, Chris Van Hoof, Sabine Van Huffel, Pieter Vandervoort

Board 63 **Cross-Talk between the Heart and Arteries in Older 65+ Adults**
Tomasz H. Wierzba, Stanislaw Zajaczkowski, Robert A Olek, Artur Polinski

Wednesday, September 11, 2019
12:00 - 14:00 Session PA_7 - **Challenge_2**
Room: 2nd Floor Foyer

Board 66 **Hand Crafted Features and an LSTM for Predicting Sepsis**
Yanbo Xu, Siddharth Biswal, Rahul Duggal, Yu Jing, Jimeng Sun

Board 67 **A Comparison of Machine Learning Tools for Early Prediction of Sepsis from ICU Data**
Po-Ya Hsu and Chester Holtz

Board 68 **Diagnosis of Sepsis Using Ratio Based Features**
Shivnarayan Patidar

Board 69 **Memristor Models for Early Detection of Sepsis in ICU Patients**
Vasileios Athanasiou and Zoran Konkoli

Board 70 **Combining Clinical Scores and Statistical Features with a Random Forest for Predicting Sepsis**
Sai Pavan Kumar Veeranki, Günter Schreier, Martin Kropf, Dieter Hayn, Alphons Eggerth, Andreas Ziegl

Board 71 **Early Sepsis Prediction by Cascaded Classification of Multi-Modal Clinical Parameters**
Tanuka Bhattacharjee, Sakyajit Bhattacharya, Varsha Sharma, Anirban Dutta Choudhury, Sunil Kumar Kopparapu, Rupayan Chakraborty, Upasana Tiwari, Murali Poduval, Sundeep Khandelwal, Kayapanda Muthana Mandana

Board 72 **Source Separation of the Second Heart Sound Using Gaussian Mixture Models**
Francesco Renna and Miguel Coimbra

Session details continued on next page..

Board 73 **A Generative LSTM for the Prediction of Sepsis**
Shiyu Liu, Ming Lun Ong, Kar Kin Mun, Jia Yao, Mehul Motani

Board 74 **Benchmark of Machine Learning Models for Early Sepsis Prediction**
Anamika paul Rupa, Saddam Al Amin, Sanjay Purushotham

Board 75
Deep Feature Learning for Early Disease Prediction
Jia Yao, Ming Lun Ong, Kar Kin Mun, Shiyu Liu, Mehul Motani

Board 76 **Real-time Diagnosis of Sepsis in Intensive Care Using Logistic Regression and Cox Proportional Hazards Model**
Fernando Andreotti, Anna Antoniou, Stojan Jovanovic, Rabia Khan, Andras Szabo, Joe Zhu

Board 77 **Integrating Feature Selection Approaches with Recurrent Neural Networks to Predict Early Onset Sepsis in Critical Care Patients**
Jill Cates, Kevin Ha, Gabe Musso

Board 78 **A Method Based on HMM for Early Prediction of Sepsis**
Saman Noorzadeh, Shahrooz FaghihRoohi, Mojtaba Zarei

Board 79 **Early Prediction of Sepsis: Using State-of-the-art Machine Learning Techniques on Vital Sign Inputs**
Manmay Nakhashi, Anoop Toffy, Achuth P V, Lingaselvan Palanichamy

Board 80 **Early Sepsis Prediction Using LSTM Recurrent Neural Network**
Zhengling He, Xianxiang Chen, Zhen Fang, Chenshuo Wang, Li Jiang, Zhongkai Tong, Zhongrui Bai, Yichen Pan, Yueqi Li

Session details continued on next page..

Board 81 **Utilizing Informative Missingness for Early Prediction of Sepsis**
Janmajay Singh, Oshiro Kentaro, Raghava Krishnan, Masahiro Sato, Tomoko Ohkuma, Noriji Kato

Board 82 **A Three Layer Artificial Neural Network Approach for Prediction of Sepsis**
Lia Winter, Trey DeLong, Ben Sweely, Garett Dessinger, Will Clayton, Xiaopeng Zhao

Board 83 **A NaïVe Neural-Net Approach to Prediction of Sepsis with Time-Series Data**
Clare Congdon

Board 84 **Sepsis Detection Using Matrix Factorization and LSTM Networks**
Sven Schellenberger, Kilin Shi, Jan Philipp Wiedemann, Fabian Lurz, Robert Weigel, Alexander Koelpin

Board 85 **Ensemble Tree Classifier with Multi-level Augmented Features in Sepsis Onset Detection**
Yanpu Li and Juxian Chen

Board 86 **Convolutional Neural Networks Based Model to Provide Early Prediction of Sepsis from Clinical Data**
Mohammed Baydoun, Lise Safatly, Hassan Ghaziri, Ali Elhaj

Board 87 **A Large Margin Deep Neural Network for Sepsis Classification**
Yiwen Wang

Board 88 **An Ensemble Machine Learning Model for the Early Detection of Sepsis from Clinical Data**
Mengsha Fu, Jiabin Yuan, Menglin Lu, Pengfei Hong, Mei Zeng, Zhenhua Xu

Session details continued on next page..

Board 89 **Ring-Topology Echo State Networks for ICU Sepsis Classification**
Miquel Alfaras, Rui Varandas, Hugo Gamboa

Board 90 **Interpretable Artificial Intelligence (AI) Algorithms, in the Early Prediction of Sepsis**
Induparkavi Murugesan, Karthikeyan Murugesan, Lingeshwaran Balasubramanian, Malathi Arumugam

Board 91 **Sepsis Detection in Sparse Clinical Data Using Long Short-Term Memory Network with Dice Loss**
Tomas Vicar, Jakub Hejc, Petra Novotna, Marina Ronzhina, Radovan Smisek

Board 92 **Randomly under Sampled Boosted Tree for Predicting Sepsis from Intensive Care Unit Databases**
Peter Doggart and Megan Rutherford

Board 93 **Combining Survival Analysis and Deep Learning for Early Detection of Sepsis**
Soufiane CHAMI, Bijay Guragain, Bradley Hoffmann, Shubha Majumder, Naima Kaabouch, Kouhyar Tavakolian

Board 94 **Early Detection of Sepsis Using Feature Selection, Feature Extraction, and Neural Network Classification**
Erik Gilbertson, Khristian Jones, Abigail Stroh, Bradley Whitaker

Board 95 **Sepsis Detection Using Missingness Information**
Clémentine Aguet, Jérôme Van Zaen, Mathieu Lemay

Board 96 **Trend and Filtered State Extraction through Savitzky-Golay Filtering for the Early Detection of Sepsis Events**
Diogo Nunes

Session details continued on next page..

Board 97 **Cracking the "Sepsis" Code: Assessing Time Series Nature of EHR Data, and Using Deep Learning for Early Sepsis Prediction**
Soodabeh Sarafrazi, Rohini Choudhari, Himanshi Mehta, Chiral Mehta, Omid Japalaghi, Patricia Francis-Lyon

Board 98 **A Comparison of Neural Network Approaches for Sepsis Prediction**
Nadi Sadr, John Anda Du, Philip de Chazal

Board 99 **Exploring the Effects of Imputation on the Early Prediction of Sepsis**
Srinivasan Sivanandan, Daniel Dastoor, Sneha Desai, Angad Kalra, Liam McCoy, Michael Detsky, Ben Fine

Board 100 **Multi-task Recurrent Neural Network for Early Sepsis Detection Using Multi-Resolution Medical Signals**
Iman Deznabi, Bhanu Pratap Singh, Madalina Fiterau Brostear

Board 101 **Exploring the Effects of Missingness and Imputation on the Early Prediction of Sepsis**
Liam McCoy, Srinivasan Sivanandan, Daniel Dastoor, Sneha Desai, Angad Kalra

Board 102 **Early Sepsis Detection Using LightGBM**
Yuanfang Guan

Wednesday, September 11, 2019

Session SB1 - **System Study: Autonomic Nervous System**
Chairs: Alejandra Guillen and Riccardo Barbieri
Room: Exploration

14:00 - 14:15 **Calcium-Activated Potassium Channel Inhibition in Autonomically Stimulated Human Atrial Myocytes.**
Chiara Celotto, Carlos Sánchez, Pablo Laguna, Esther Pueyo

14:15 - 14:30 **Dose-Optimization of Respiratory-Gated Auricular Vagal Afferent Nerve Stimulation (RAVANS) for Blood Pressure Modulation in Hypertensive Patients**
Jessica Stowell, Ronald Garcia, Rachel Staley, Roberta Sclocco, Harrison Fisher, Vitaly Napadow, Jill Goldstein, Riccardo Barbieri

14:30 - 14:45 **Time-Courses of Central Frequencies of Low-Frequency Components of Systolic and Diastolic Pressures and RR Interval Variabilities in Response to Incremental Isometric Exercise**
Alejandra Guillén-Mandujano and Salvador Carrasco-Sosa

14:45 - 15:00 **Variability in Blood Pressure Measurements from Recorded Auscultation Sounds**
Alan Murray, Dingchang Zheng, Chengyu Liu, David Graham, Jeff Neasham, Adrian Cossor, Clive Griffiths

Wednesday, September 11, 2019

Session SB2 - **ECGI and Myocardial Ischemia**
Chairs: Peter Johnston and Matthijs Cluitmans
Room: Breakthrough

14:00 - 14:15 **Optimizing Cardiac Source Model Accuracy by Incorporating Endocardial Electro-anatomical Structures**
Machteld Boonstra, Rob Roudijk, Peter Loh, Peter van Dam

14:15 - 14:30 **A Model of Anatomically Opposed Ischaemia: Revisited**
Peter Johnston

14:30 - 14:45 **Acute MI Detection Derived from ECG Parameters Distribution**
Alfonso Aranda, Pietro Bonizzi, Joel Karel, Ralf Peeters

14:45 - 15:00 **Experimental Validation of Image-Based Modeling of Torso Surface Potentials During Acute Myocardial Ischemia**
Brian Zenger, Jake Bergquist, Wilson Good, Jess Tate, Rob MacLeod

Wednesday, September 11, 2019

Session SB3 - **The impact of Signal-processing Methodology on Assessment of Arrhythmic Substrate**

Chairs: Guy Carrault and Alfredo Hernandez

Room: Discovery

14:00 - 14:15 **Derivation of the Stochastic Model for Predicting Mechanical Performance Using Electrical Patterns During Ventricular Tachy-arrhythmia**
Da Un Jeong and Ki Moo Lim

14:15 - 14:30 **The Effect of 40 Hz Low-Pass Filtering on the Magnitude of the Spatial Ventricular Gradient**
Daniel Guldenring, Dewar Finlay, Alan Kennedy, Raymond Bond, Michael Jennings, James McLaughlin

14:30 - 14:45 **Automatic Recognition of Ventricular Late Potentials in Intracardiac Electrograms**
Giulia Baldazzi, Marco Orrù, Mirko Matraxia, Graziana Viola, Danilo Pani

14:45 - 15:00 **Assessment of the Effect of Fibrillatory Waves in the Analysis of Spatial Heterogeneity of Ventricular Repolarization**
Javier Saiz-Vivo, Valentina Corino, Massimo W Rivolta, Roberto Sassi, Luca Mainardi

Wednesday, September 11, 2019
Session SB4 - **ECG Signal Processing II**
Chairs: Claus Graff and Antoun Kawaja
Room: Creation

14:00 - 14:15 **Noise Quantification and Noise Reduction for Unipolar and Bipolar Electrograms**
Laura Anna Unger, Tobias Georg Oesterlein, Axel Loewe, Olaf Doessel

14:15 - 14:30 **Improving Flutter Localization Performance by Optimizing the Inverse Dower Transform**
Muhammad Haziq Kamarul Azman, Olivier Meste, Decebal G. Latcu, Kushsairy Kadir

14:30 - 14:45 **Analysis of Signal-Averaged Electrocardiogram Performances for Body Surface Recordings**
Nolwenn Tan, Laura Bear, Mark Potse, Stéphane Puyo, Marianna Meo, Remi Dubois

14:45 - 15:00 **Denoising Performance of Discrete Wavelet Transform and Empirical Mode Decomposition Based Techniques on Monitoring Cardiac Electrograms from the Left-Arm**
Gilberto Perpiñan, David McEneaney, Omar Escalona

Wednesday, September 11, 2019
Session MC - **Closing Plenary**
Room: Auditorium

15:00 - 15:15 **T-Wave Morphology Changes as Surrogate for Blood Potassium Concentration in Hemodialysis Patients**
Flavio Palmieri, Pedro Gomis, José Esteban Ruiz, Beatriz Bergasa, Ferreira Dina, Alba Martin, Syed Hassaan Ahamed, Esther Pueyo, Juan Pablo Martínez, Julia Ramírez, Pablo Laguna

15:15 - 15:30 **Influence of the Stimulation Current on the Differences between Cell and Tissue Electrophysiological Simulations**
Violeta Monasterio, Esther Pueyo, José Félix Rodríguez-Matas, Jesús Carro

15:30 - 15:45 **The Ionic Mechanisms of Triggered Atrial Activity under a TBX5-Driven Regulatory Network**
Andy Lo, Jieyun Bai, Patrick Gladding, Jichao Zhao

15:45 - 16:00 **QT Interval Variability and QT-HP Coupling Strength in Amyotrophic Lateral Sclerosis Patients**
Beatrice De Maria, Gabriele Mora, Kalliopi Marinou, Riccardo Sideri, Vlasta Bari, Beatrice Cairo, Emanuele Vaini, Laura Dalla Vecchia, Alberto Porta

16:00 - 16:30 **Closing Remarks and CinC2020 Announcement**
Rob MacLeod, Stefano Severi, Cristiana Corsi