APHRS Asia Pacific Heart Rhythm Society

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News
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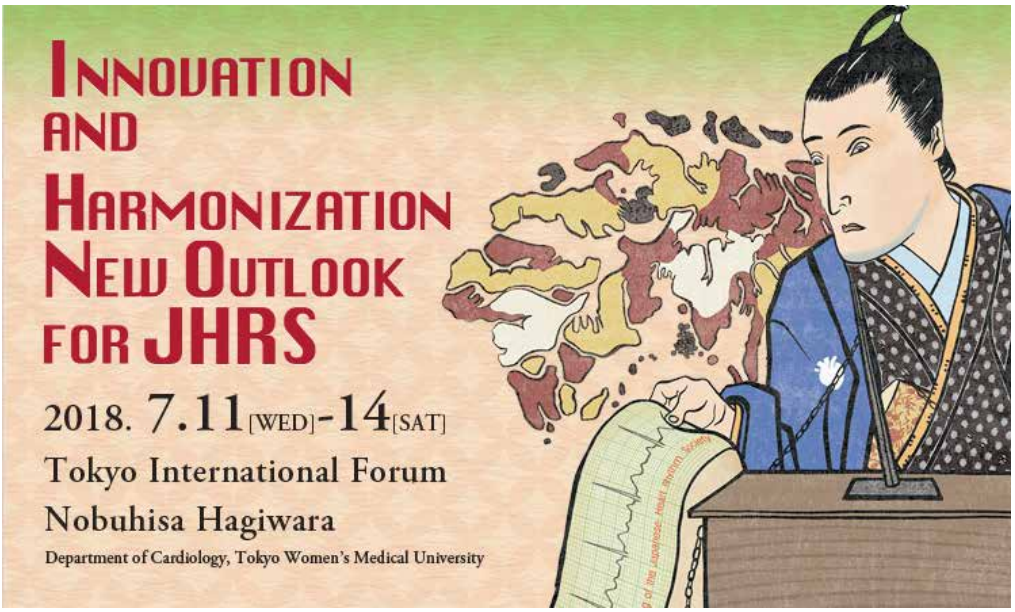
JHRS 2018: Welcome Message

Nobuhisa Hagiwara
Congress President, Annual Meeting of the JHRS 2018
Department of Cardiology, Tokyo Women's Medical University



It is my great pleasure to invite you to the Annual Meeting of the Japanese Heart Rhythm Society 2018 (JHRS 2018), which will be held over the four days from Wednesday, July 11 to Saturday, July 14, 2018 at the Tokyo International Forum, Tokyo, Japan.

The theme of this meeting is "Innovation and Harmonization: New Outlook for JHRS", and we will attempt to understand electrocardiographic phenomena and arrhythmias from a wide variety of perspectives.

Recent years have seen spectacular progress in areas ranging from regenerative medicine to simulations and monitoring, device development, and the clinical adoption of innovations. Rather than being limited to a single field, these revolutionary advances in medical technology require collaboration with other fields. On the other hand, the heart is a human organ, and the involvement of not just medical professionals but also of the community and society at large is important in the care of arrhythmia patients. This points the way to the future shape of the JHRS.

APHRS Asia Pacific Heart Rhythm Society

Nobuhisa Hagiwara
Annual Meeting of the JHRS 2018
Congress President
Department of Cardiology, Tokyo Women's Medical University

At this meeting, opinion leaders from both Japan and abroad will share the latest information on the future of electrocardiology and arrhythmia research, and I hope that doctors, medical staff, and researchers will join them in considering the clinical applications of new diagnostic technologies, monitoring systems, non-pharmacological treatments such as devices and catheter ablation, and drug therapies as well as their optimization. As indicated by the inclusion of the term "harmonization" in the conference theme, we will also debate matters from potential combinations of medical technologies and treatment methods to cross-disciplinary collaboration in the care of arrhythmia patients in a broad range of symposia and panel discussions. We are also planning the educational sessions, hands-on workshops, case studies, and workshops that are the trademarks of this conference.

I hope that as many APHRS and JHRS members as possible will attend this meeting, in order to make it a truly fruitful event.

Venue	Tokyo International Forum
	5-1 Marunouchi 3-chome Chiyoda-ku, Tokyo 100-0005, Japan
	TEL: +81-3-5221-9056 FAX: +81-3-5221-9022
Access	• JR Lines 1-minute walk from Yurakucho Station 5-minute walk from Tokyo Station (connected by B1F Underground Concourse with Keiyo Line Tokyo Station)
	• Tokyo Metro Yurakucho Line 1-minute walk from Yurakucho Station D5 Exit (connected by B!F Underground Concourse)

Real-time Imaging of Clinical Non-Paroxysmal Atrial Fibrillation by Newly Developed Online Real-time Phase Mapping System: The ExTRa Mapping Project from Japan

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Otsu-city, Shiga Prefecture 520-2192, Japan

Atrial fibrillation (AF) is the major cause of cerebral infarction and heart failure. As the number of atrial fibrillation patients increases with aging of the population, the treatment is considered as urgent task in the countries with super-aged society.

In recent years, pulmonary vein isolation by catheter ablation has been conducted for paroxysmal AF (lasting within 7 days). However, such ablation strategy is not so effective for non-paroxysmal AF, i.e., persistent AF (lasting more than 7 days) and long-standing persistent AF (lasting more than 1 year).

To improve the outcome of non-paroxysmal AF ablation, it has been suggested that direct visualization of the AF drivers (perpetuators) rather than the indirect indicators based on intra-atrial electrograms is required. Although optical mapping technique is available in animal experiments, such direct visualization is technically and ethically not available in clinical practice.

In such situations, my primary concern was how to create an online real-time AF visualization system that can be employed during catheter ablation. I am one of the senior cardiac electrophysiologists in Japan, but at the same time I am one of the biomedical engineers who has been worked in computer simulation study (*in silico*) of cardiac arrhythmias for more than 20 years (Figure 1). In particular, I have been working on elucidating the mechanisms of refractory arrhythmias, such as AF and ventricular fibrillation.

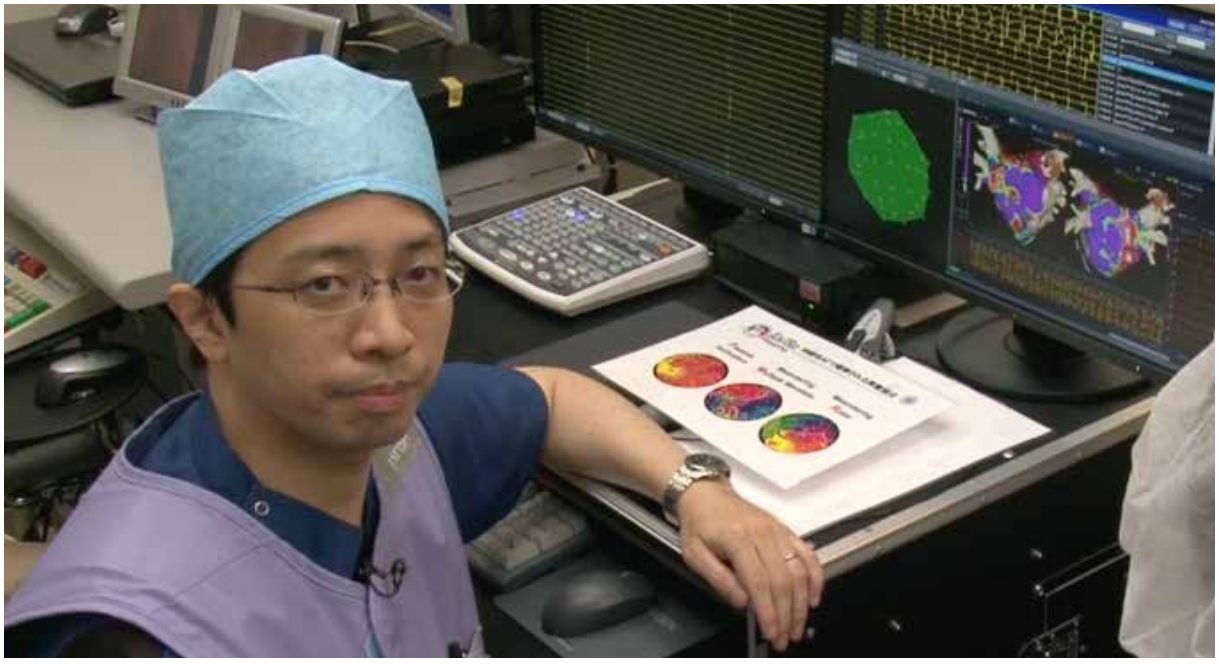

Figure 1: In front of the online real-time phase mapping system (ExTRa MappingTM) developed by my group.

Development of a Clinically-Available Phase Mapping System in Japan

In July 2014, via the personal meeting with Dr. Takeshi Tsuchiya, a famous clinical electrophysiologist in Japan, and with Prof. Kazuo Nakazawa, a famous biomedical engineer in Japan, I decided to realize an idea regarding the arrhythmia visualization system that I conceived since 1999. I would like to express my faithful thanks to Nihon Kohden Corporation offered a helping hand to my unfeasible project.

Thus, in 2015, the world's first online real-time phase mapping system (ExTRa Mapping™, Nihon Kohden Co., Tokyo, Japan) capable of visualizing AF wave dynamics was developed by my group and approved by the Pharmaceuticals and Medical Devices Agency in Japan. Even now, this system continues to improve.

The real-time imaging of the complex AF wave dynamics was achieved by introducing the ultra-high-speed computation system, equipping with *in silico* analysis part and specialized artificial intelligence part,

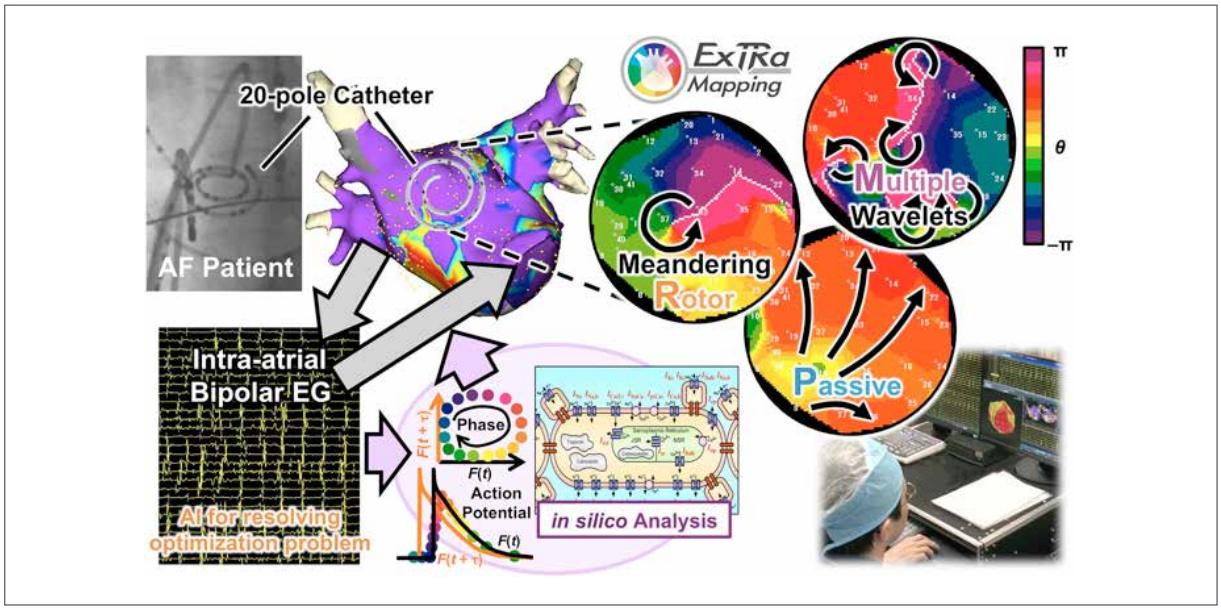

Figure 2: Schematic view of the ExTRa Mapping (patented).

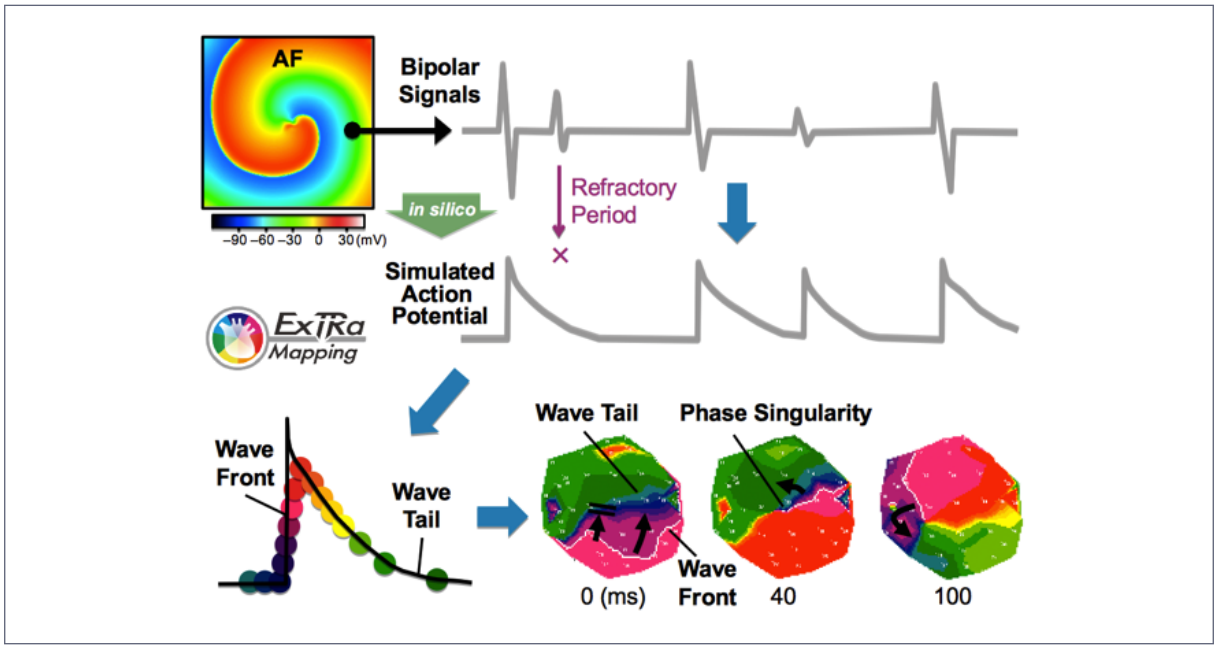

Figure 3: A feature of the phase mapping algorithm of the ExTRa Mapping.

in order to spatio-temporally interpolate the intra-atrial bipolar signals (Figure 2). This mapping system was based on 41 bipolar intra-atrial electrograms, including 9 virtual electrograms, recorded by a 20-pole spiral-shaped catheter with a diameter of 2.5 cm (Reflexion HD™, St. Jude Medical Inc., MN, USA); therefore, a high signal density (~8 signals/cm^2) was achieved. Based on the 5-second wave dynamics during AF, each phase map movie was fully automatically created with the ExTRa Mapping within a few seconds and was immediately played at a 1/10 speed for 50 seconds.

By referring the timing of the intra-atrial bipolar signals, the in silico part calculated the virtual action potentials during AF (Figure 3, top panels). Because the phase mapping of this system was conducted according to the consecutive virtual action potentials, the wave front and wave tail interaction, developing phase singularities of rotors, was able to be visualized (Figure 3, bottom panels).

Development of the ExTRa Mapping-guided Non-Paroxysmal AF Ablation

My group is now working on the research developing a novel ablation strategy for non-paroxysmal AF with the use of the ExTRa Mapping (Figures 4 to 6). Then my group's first paper on the ExTRa Mapping was very recently published in the official journal of APHRS (Sakata T, et al. J Arrhythmia 2018;34:176-184).

In this study, the ExTRa Mapping was applied to 28 patients with non-paroxysmal AF after pulmonary vein isolation. Then, non-passively activated areas (NPAs), in the forms of meandering rotors and/or multiple wavelets assumed to contain non-paroxysmal AF drivers, were automatically detected by the mapping system. Intriguingly, the NPAs, in which rotors were frequently observed, did not always coincide with the conventional indirect indicators of AF drivers, such as complex fractionated atrial electrogram areas and low voltage areas.

Figure 4: Clinical cardiac electrophysiology lab in our university hospital. (Left) Dr. Kensuke Sakata; (Middle) me; and (Right) Dr. Tomoya Ozawa.

Furthermore, we found that the catheter ablation targeting such NPAs were effective in patients with non-paroxysmal AF for maintaining sinus rhythm. The end point of the ablation filling the NPAs by dragging technique with low-power radiofrequency wave was to modify the electrical and/or anatomical properties of the NPAs rather than the AF termination during the procedure. Surprisingly, the freedom from non-paroxysmal AF and/or atrial tachycardia (AT) during the 8.1±4.2-month follow-up after the ExTRa Mapping-guided NPA ablation in addition to PVI was 79%, which was markedly higher than that of the CFAE-targeted ablation in our hospital (47%, unpublished data). In addition, the recurrence of atrial tachyarrhythmia probably due to the iatrogenic AT was very rarely observed during the follow-up.

Figure 5: Utilization of the ExTRa Mapping for non-paroxysmal AF ablation in our university hospital.

Future Direction

Recently, there were some reports from USA and Europe as to the low additional effectiveness of the rotor ablation. However, the online real-time rotor imaging by the ExTRa Mapping was very useful for improving the outcome of the non-paroxysmal AF ablation in our hospital. The novel phase mapping system developed by my group has already been employed at several hospitals in Japan. In the near future, I would like to conduct multicenter study to elucidate more effective strategy of the rotor ablation, and to contribute to further improvements of non-paroxysmal AF ablation. I also hope that the ExTRa Mapping will spread throughout the world including Asia and can contribute to improving non-paroxysmal AF ablation.

Figure 6: Clinical data of the ExTRa Mapping was mainly analyzed by Dr. Kensuke Sakata.

The New Lead Extraction Subcommittee of APHRS

Morio SHODA
Chairperson of the APHRS Lead Extraction Subcommittee

It's a great pleasure for me to announce the Lead Extraction subcommittee of APHRS has just established.

As the implantation number of cardiac pacing devices such as pacemaker, implantable cardioverter-defibrillator and cardiac resynchronization device is dramatically increasing, the problem which should be solved has become greater in size and device infection is the major complication among them. We know total device removal with lead extraction is the only curative approach for infection, however, many patients are undertreated especially in the Asian Pacific region.

The initial aims of the Lead Extraction sub-committee of APHRS are to investigate the prevalence of device infection and condition which needs lead extraction and to educate physicians who are willing to participate in this important medicine. We hope to establish the registration program for lead extraction near in the future and to provide appropriate management to all patients in Asian Pacific countries.

APHRS Lead Extraction Subcommittee	
Chairperson	Morio SHODA (Japan)
Members	Nigel LEVER (New Zealand)
	Wee Siong TEO (Singapore)
	Hung-Fat TSE (Hong Kong)
	Neil Strathmore (Australia)
	Tachapong Ngarmukos (Thailand)
	Xuebin LI (China)
	Yenbin LIU (Taiwan)
	Boyoung JOUNG (Korea)
	Balbir SINGH (India)

The History of EP in Cambodia

MAM Chandara, MD
Electrophysiologist and Interventional Cardiologist
Calmette Hospital, Phnom Penh, Cambodia

KINGDOM OF CAMBODIA

Capital: **Phnom Penh**

Religion: **97%** Theravada Buddhism

Current population: **16 184 620** peoples

Official language: **Khmer**

Area: **181 035** km²

Figure 1: Kingdom of Cambodia: Angkor Wat

The Kingdom of Cambodia is a country in Southeast Asian bordered by Vietnam to the east, Laos to the north, Thailand tot the northwest, and the Gulf of Thailand to the southwest.

Electrophysiology in Cambodia was started in 2010 at Phnom Penh Heart Center, Calmette Hospital, contributed by the effort of two electrophysiologists: Dr. MAM Chandara (a Cambodian EP who finished his training from Pitier Sapetriere Hospital in Paris, France) and Dr. William Choe (an American EP from Denver, Colorado).

At the beginning, we combined and installed the donated materials from France and the USA with help of American engineering supporters from Denver (Saint Jude Medical and Biotronik), Colorado to establish the lab. At the time, there was only one cardiac catheterization laboratory in the hospital and it was used for both interventional and electrophysiology procedures.

We (Dr. MAM Chandara and Dr. William Choe) did the first case of AVRT ablation successfully without recurrence to date. Over the years, we have also trained three nurses working alongside with us to assist in the ablation procedures.

Figure 2: Photos featuring my professors and colleagues (left) and myself after a successful AVNRT ablation (right) at Pitie Sapetriere Hospital, Paris, France in 2009.

Figure 3: We (Dr. MAM Chandara and Dr. William Choe, Josh from St. Jude Medical) were doing a procedure at Phnom Penh Heart Center, Calmette Hospital in 2010.

Figure 4: Professor Melvin Scheinman, Dr. MAM Chandara, Dr. CHUN Hwang and EP fellows at Phnom Penh Heart Center's EP lab, Calmette Hospital in 2016.

At Calmette Hospital, we perform cardiac ablation for arrhythmia disorders such as supra-ventricular tachycardias, frequent PVCs and ventricular tachycardias (without structural heart disease). We have yet been using 3D anatomic mapping system for doing complex cases like ventricular tachycardia (with structural heart diseases), atrial fibrillation and others.

In 2017, we installed a new cath-lab operating room for facilitating the activity of all interventional procedures at Calmette Hospital.

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Recommandation for S-ICD in 2017 AHA/ACC/HRS Guidelines[1]	
Guidance	**Recommendation**
Class I	In patients who meet criteria for an ICD who have inadequate vascular access or are at **high risk for infection**, and in whom pacing for bradycardia or VT termination or as part of CRT is neither needed nor anticipated, a subcuteneous implantable cardioverter defibrillator is recommended.

"The risk of infection appears to be lower with subcutaneous implantable cardioverter-defibrillators than with transvenous ICDs. Therefore, a subcutaneous implantable cardioverter defibrillator may be preferred in patients who are at high risk of infection, such as those with a prior device infection, ESRD, diabetes mellitus, or who are chronically immunosuppressed."[1]

Recommandation for S-ICD in 2017 AHA/ACC/HRS Guidelines[1]	
Guidance	**Recommendation**
Class IIa	In patients who meet indication for an ICD, implantation of subcutaneous implantable cardioverter-defibrillator is reasonable if pacing for bradycardia or VT termination or as part of CRT is neither needed nor anticipated

"Nonrandomized studies show that the subcutaneous implantable cardioverter-defibrillator reliably detects and converts VF during defibrillation threshold testing and successfully terminates spontaneous sustained VT that occurs during follow-up". In the IDE study..."All spontaneous episodes of VT/VF recorded in 21 patients (6.7%) were successfully converted, and there were no lead failures, endocarditis or bacteremia, tamponade, cardiac perforation, pneumothorax, or hemothorax associated with the subcutaneous implantable cardioverter-defibrillator."[1]

Recommendation for S-ICD in 2015 ESC Guidelines[2]	
Guidance	**Recommendation**
Class IIa	Subcutaneous defibrillators should be considered as an alternative to transvenous defibrillators in patients with an indication for an ICD when pacing therapy for bradycardia support, cardiac resynchronization or antitachycardia pacing is not needed.

1. Al-Khatib, SM, et al., 2017 AHA/ACC/HRS Guideline for Management of Patients With Ventricular Arrhythmias and the Prevention of Sudden Cardiac Death. Heart Rhythm, 2017
2. Priori, SG. et al. 2015 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death. Eur Heart J. 2015; Nov 1;36(41):2793-867.

Call for Abstracts & Registration

APHRS 2018 11th

The 11th Asia Pacific Heart Rhythm Society Scientific Session

In conjunction with the
14th Asia Pacific Atrial Fibrillation Symposium and the
4th International Forum of Ventricular Arrhythmias

October 17-20, Taipei, Taiwan

Share Your Insights from Daily Practice

Call for Abstracts & Registration

Abstract Submission Deadline	May 31, 2018
Notification of Acceptance	July 31, 2018
Early-bird Registration Deadline	August 20, 2018

PROGRAM HIGHLIGHTS

The 11th Asia Pacific Heart Rhythm Society Scientific Session, October 17-20, 2018 at the Taipei International Convention Center and Taipei Word Trade Center in Taipei, Taiwan, will convene with the finest clinicians, scientists, researchers, and innovators in the field of cardiac electrophysiology and arrhythmia management.

Together, we will explore new possibilities and immerse ourselves in this standout community of professionals committed to improving the care of patients with heart rhythm disorders.

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- **P**restigious Invited Faculty
- **H**ot Topic Joint Symposium
- **R**ealistic Live Demonstration
- **S**uperb Scientists & Experts

Exceeding **300** Scientific Sessions

25 Parallel Sessions

More than **600** Invited Faculties

3,000 Expected Attendees

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EXPLORE TAIPEI

APHRS 2018 11th

Taipei invites you into a world of fascinating contrasts - a mix of the modern and traditional, with a generous dash of energy and friendly smiles to make this one of your most memorable trips to Asia.

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Come to this amazing island and explore what it has to offer

See you in October

The amazing city of Taipei itself is worth exploring as it is a vibrant blend of traditional culture and cosmopolitan life. Also, experience the hospitality that Taiwanese people are famous for. You will find your stay here rewarding, both professionally and personally.

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