

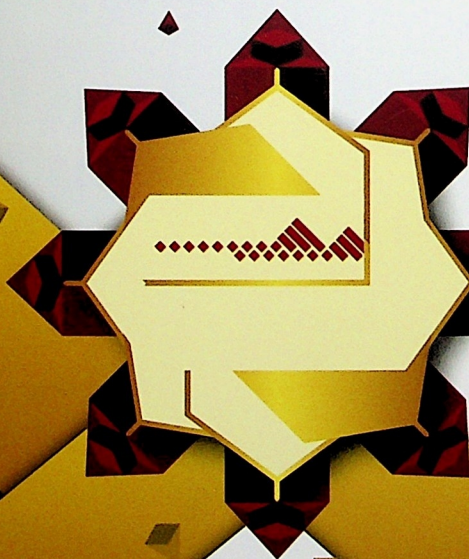


PROGRAM BOOK

THE 6th GLOBAL WIRELESS SUMMIT
(GWS 2018)

NOVEMBER 25-28, 2018

MAE FAH LUANG UNIVERSITY
CHIANG RAI, THAILAND



GWS



River Publisher

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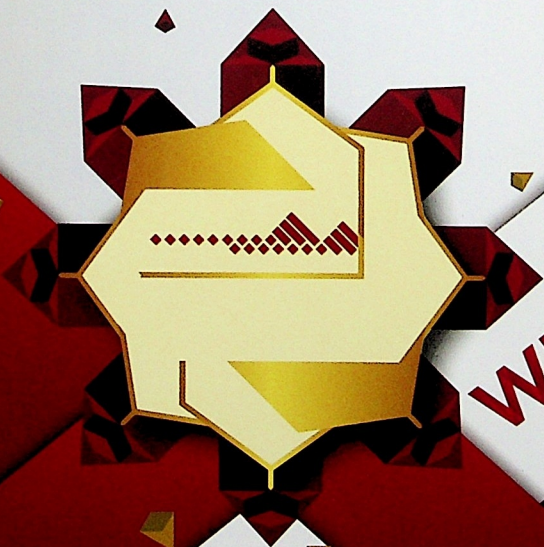


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THE 21st INTERNATIONAL SYMPOSIUM
ON WIRELESS PERSONAL MULTIMEDIA
COMMUNICATIONS
(WPMC 2018)

NOVEMBER 25-28, 2018

MAE FAH LUANG UNIVERSITY
CHIANG RAI, THAILAND



WPMC



National Institute of
Information and
Communications
Technology



ECTI



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Message from Steering Board Co-Chair



Welcome to Chiang Rai, Thailand to join WPMC 2018.

On behalf of the Steering Board of WPMC, I would like to express my deep gratitude to all the delegates from all over the world, and expect you will be having exciting experiences at WPMC 2018 in a very historical city, Chiang Rai, Thailand.

The WPMC 2018 is the 21st WPMC held for the second time in Thailand which was held in Bangkok in 2000. The WPMC was inaugurated in 1998 to establish a global platform for mutual cooperation and discussions in the field of wireless multimedia communications with a strong financial supports by National Institute of Information and Communications Technology (NICT). The first WPMC was held at Yokosuka Research Park (YRP) in Japan in honor of the opening of YRP in 1997. Since the first WPMC in YRP, the last twenty WPMCs were held through all over the world in Asia, Europe, North and South Americas. With the continued and strong support by numerous organizations and human relationships, the WPMC has grown into an international symposium widely recognized by industries and academic societies.

I wish to take this opportunity to express sincere thanks to Honorary Chair of WPMC 2018, Professor Dr. Vanchai Sirichana, President of Mae Fah Luang University (MFU), General Chair, Professor Dr. Chayaporn Wattanasiri, Vice President of MFU. I also express sincere thanks to all supporting committee members and staffs of WPMC2 018, especially for the Conference Co-hair, Dr. Teeravisit

Laohapensaeng, Acting Dean of MFU, General Secretary, Dr. Worasak Rueangsirarak, Assistant Dean of MFU, Technical Program Chair, Prof. Dr. Punnarumol Temdee of MFU, and Dr. Chayapol Kamyod.

I hope WPMC 2018 will bring all participants with much fruitful outputs such as new research idea, new businesses and new friends.

Dr. Shingo Ohmori
Co-chair of WPMC Steering Board
Vice President, YRP R&D Promotion Committee
President, YRP International Alliance Institute

About WPMC 2018



The 21st International Symposium on Wireless Personal Multimedia Communications (WPMC 2018) will be held in Chiang Rai, Thailand from November 25 - 28, 2018; as part of the celebrations of MFU's 20th anniversary. The theme of this year's conference is "Borderless Smart Society". The event is co-hosted by Mae Fah Luang University (MFU), National Institute of Information and Communications Technology (NICT), Yokosuka Research Park (YRP) and CTIF Global Capsule (CGC).

The WPMC symposia series were inaugurated in 1998, as a global platform which aims at enabling collaboration in the field of wireless information. Held in Asia, Europe and America, WPMC has established itself as a unique global conference dedicated to wireless multimedia convergence. Continuing the series, the 21st WPMC will bring together academia, industries and standardization bodies to explore activities, trends and future challenges towards ICT globalization for health and wellness issues in existing and future wireless technologies.

A key emphasis of this year's conferences is a borderless smart society - bridging across industries, public and private companies,

universities, research labs, and other knowledge societies in the exploration of the newest wireless technologies pursuing new ways of living as well as innovative and sustainable solutions for the future.

The authors, reviewers, organizers, sponsors, and many other people who worked hard behind the scenes to make this event possible are gratefully acknowledged. We are looking forward to the next edition of WPMC 2014.

Assoc. Prof. Dr. Chingyong Wang
Vice President of Macau Polytechnic University
General Chair of WPMC 2014

It is my great pleasure to give to you all the welcome message for the participants of the WPMC 2014. The 31st International Symposium on Wireless Personal Multimedia Communications (WPMC 2014) is launched at Macau Polytechnic University, Chung Kai during November 25-28, 2014.

This international conference is intended to create an opportunity for researchers, developers, designers, engineers and technologists to exchange ideas and discuss development in wireless communication technology and related areas to strengthen the growth of sustainable development. We have received great honors from well-known keynote speakers who are experts in this technical field. Hopefully, participants may not only enjoy the research trend updates from the featured speakers, but also indulge yourself in the discussion on advanced research topics with the presenters in oral, tutorial, and special sessions. The organizing committee had provided a lovely welcome party next the venue on the first day. In order for each participant to get to know each other before starting the session, there will be a wonderful banquet at a formal ceremony at one of the Macau Polytechnic University highlight locations in the third evening.

Message from General Chair



It is my great pleasure to give to you all the welcome message for the participants of the WPMC 2018. The 21st International Symposium on Wireless Personal Multimedia Communications (WPMC 2018) is launched at Mae Fah Luang University, Chiang Rai during November 25 – 28, 2018.

This international conference is intended to create an opportunity for researchers, developers, designers, engineers and technologists to exchange ideas and discuss development in wireless communication technology and related areas to strengthen the growth of sustainable development. We have received great honors from well-known keynote speakers who are experts in this technical field. Hopefully, participants may not only enjoy the research trend update from the keynote speakers, but also indulge yourself in the discussion on advanced research topics with the presenters in oral, tutorial, and special sessions. The organizing committee had provided a lovely welcome party near the venue on the first day. In order for each participant to get to know each other before starting the sessions, there will be a wonderful banquet as a formal ceremony at one of Mae Fah Luang University highlight locations in the third evening.

On behalf of the organizing committee, I would like to express my sincere gratitude to all of the sponsors, especially Japan's National Institute of Information and Communications Technology and Yokosuka Research Park. I would also like to convey my gratitude to the authors, reviewers, organizing committee, and many other people who worked hard behind the scene to ensure the completeness of the WPMC 2018. I am looking forward to welcoming you all at the venue of WPMC 2018.

Assoc. Prof. Dr. Chayaporn Wattanasiri
Vice President of Mae Fah Luang University
General Chair of WPMC 2018

Message from President of National Institute of Information and Communications Technology



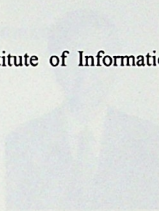
It is my great pleasure to hold the 21st International Symposium on Wireless Personal Multimedia Communications, WPMC2018, at Mae Fah Luang University (MFU) in a city Chiang Rai, the northern largest city with temples, culture, and dramatic mountain scenery.

Firstly, I would like to sincerely thank Dr. Vanchai Sirichana, the president of MFU for providing the venue for this international symposium, Dr. Chayaporn Wattanasiri, general chair of WPMC 2018 for her leadership leading to success, and all distinguished committee members and staff of this symposium.

Currently, the IoT system which is useful for improving the efficiency of society is attracting attention. In 2020, by realizing an innovative 5G system in the field of ICT, major reforms will be brought in society. Its application field is wide, and it is expected as a solution to various social issues. Wireless technology is positioned at its core, and the role is quite large. On the other hand, due to the complexity and sophistication of the system, it is becoming difficult to complete all R&D in one organization. It is meaningful to discuss at an international symposium like WPMC, share the technology and lead to future collaboration. NICT hopes to be an organization that contributes to the creation of such symposium, which is useful for solving social problems and improving the productivity of the world.

During this symposium I hope that all participants enjoy the tutorials, technical presentations and social events, as well as related discussions and experiences at Chiang Rai, and that the symposium enables participants to extend their own personal networks.

Hideyuki Tokuda,
President, National Institute of Information and Communications
Technology, Japan



Message from Chairman of YRP R&D Promotion Committee



On behalf of YRP R&D Promotion Committee, one of the co-organizers of the 21st International Symposium on Wireless Personal Multimedia Communications (WPMC 2018), it is my great pleasure to welcome you here in this exotic border city, Chiang Rai, Thailand.

The WPMC was born in 1998 in Yokosuka Research Park (YRP), Japan, under the strong leadership of the current National Institute of Information and Communications Technology (NICT). Established as an R&D site specially focused on radio and telecommunications technology, YRP has attracted great attentions of key representatives and researchers in this field, and one of the missions for us is to promote and accelerate international collaboration.

WPMC has long served as an important platform for researchers' international exchange, and the past WPMCs were held in various cities in the world. We are very glad that the WPMC 2018 will be held in Thailand again after the one held in Bangkok in 2000, and it is our great honor that the symposium is positioned as one of the event commemorating the 20th Anniversary of Mae Fah Luang University. We are truly grateful to all Committee members and staff of WPMC 2018, who had undoubtedly greatly contributed to enable this exciting event.

I hope that WPMC 2018 will be fruitful and enjoyable to all participants.

Prof. Dr. Mitsutoshi Hatori
Chairman
YRP R&D Promotion Committee