IEEE MTT-S 2019 International Microwave Biomedical Conference (IMBIoC2019 Program at a Glance)

05/ Sun.	13:00 - 20:00	Registration (International Conference Hotel of Nanjing)		
06/ Mon.	09:00 - 09:30	Room O	Opening Ceremony	
	09:30 - 10:30	Room O	Keynote Presentation 1	Prof. David Feng（University of Sydney）
	10:40 - 11:40	Room O	Keynote Presentation 2	Prof. Koichi Ito (Chiba University)
	12:00 - 13:30	Lunch		
	Room	Room A	Room B	
	13:30 - 15:10	MP1A Smart-Flat for assisted living: from the sensor to the shallow machine learning Chair : Julien Le Kernec, University of Glasgow Co-Chair: Li Sun, Nanjing University of Science and Technology	MP1B Wireless and IoT-based biomedical applications Chair: Hung Cao, University of California, Irvine Co-Chair: Pai-Yen Chen, University of Illinois at Chicago	
	15:10 - 15:30	(Room P) Tea Break		
	15:30 - 16:00	Invited TalkA Cross-Disciplinary Analysis of Human Auditory Response to Pulsed Electromagnetic Radiation (Invited) James Lin	Invited TalkB Enhancing Doppler Frequency Shifts with Self-Injection-Locking Technology for Biomedical Radar Applications (Invited) Tzyy-Sheng Jason Horng	
	16:00 - 18:00	MP2A Innovative theranostic technology based on electromagnetic effects Chair : Jianfei Sun, Southeast University Co-Chair: Gui Rong Ding, Air Force Medical University	MP2B Low-Power Radar Systems for Biomedical Applications Chair: Xiaoguang Leo Liu, University of California, Davis Co-Chair: Changzhan Gu, Shanghai Jiao Tong University	
	18:00 - 19:30	Dinner		
07/ Tues.	Room	Room A	Room B	
	08:30 - 09:50	TA1A VR for Biomedical Applications I Chair: Lin Shu, South China University of Technology Co-Chair: Chao Chen, Tianjin University of Technology	TA1B Microwave and Antenna Technology for Biomedical Applications Chair: Hui Chu, Nanjing University of Science and Technology Co-Chair: Changrong Liu, Soochow University	
	09:50 - 10:20	(Room P) Poster Session I (TAP) & Tea Break		
	10:20 - 12:00	TA2A Antennas and propagation Chair: Jianpeng Wang, Nanjing University of Science and Technology Co-Chair: Xiao Zhang, Shenzhen University	TA2B Continuous-Wave Radar: System Architecture and Biomedical Applications Chair: Fu-kang Wang, National Sun Yat-sen University Co-Chair: Heng Zhao, Nanjing University of Science and Technology	
	12:00 - 13:30	Lunch		
	13:30 - 14:50	TP1A VR for Biomedical Applications II Chair: Xiujuan Zheng, Sichuan University Co-Chair: Chao Chen, Tianjin University of Technology	TP1B Circuit and System for Wireless Sensing and Communications Chair: Lianming Li, Southeast University Co-Chair: Changzhi Li, Texas Tech University	
	14:50 - 16:10	(Room P) Tea Break & (Room B) Best Student Papers Contest		
	16:10 - 16:40	Invited Talk2A Recent Advances in RF Structures for Magnetic Resonance Imaging（Invited） Robert Caverly	Invited Talk2B Microwave Spectroscopy for non-Invasive Biological and Health Sensing (Invited) Katia Grenier	
	16:40 - 18:00	TP2A RF/microwave circuits and systems II Chair: Changzhi Li, Texas Tech University Co-Chair: Jianchao Yang, Nanjing University of Science and Technology	TP2B From microwave sensing to electromagnetic effects on cells Chair: J.-C. Chiao, Southern Methodist University Co-Chair: Katia Grenier, LAAS-CNRS	
	18:30 - 20:30	Banquet & Best Student Papers Award		
08/ Wed.	Room	Room A	Room B	
	08:30 - 09:00	Invited Talk3A Miniature sensors for medical applications (Invited) J.-C. Chiao	Invited Talk3B Acoustically Actuated Magnetoelectric Antennas for Ultracompact Biomedical Implants (Invited) Nian X. Sun	
	09:00 - 11:00	WA1A Radar, imaging and sensor applications Chair: Changzhan Gu, Shanghai Jiao Tong University Co-Chair: Jiaming Yan, Nanjing University of Science and Technology	WA1B Biological and medical applications of microwave and RF systems Chair : Wenjie Feng, Nanjing University of Science and Technology Co-Chair: Hong Hong, Nanjing University of Science and Technology	
	11:00 - 12:00	(Room P) Poster Session II (WAP) & Tea Break		

Room A, Room B, Room O (2nd Floor, Zijin Building of International Conference Hotel of Nanjing)

Room P (1st Floor, Zijin Building of International Conference Hotel of Nanjing)

The IEEE MTT-S 2019 International Microwave Biomedical Conference (IMBioC 2019)

Technical Program

May 06-08, 2019

International Conference Hotel of Nanjing, Nanjing, China

IMBioC2019 Sponsorships

Sponsored by:
Nanjing University of Science and Technology

Technically Co-sponsored by:
IEEE MTT-S
IEEE AP-S

Co-sponsored by:
Tiebei Hongshan Newtown Administrative Committee of Nanjing

Greetings from General Chairs

It is our great pleasure to invite you to attend the IEEE MTT-S 2019 International Microwave Biomedical Conference (IMBioC2019). The IMBioC is a conference merged from the annual IEEE MTT BioWireless Conference in the Radio Wireless Week, and the IEEE MTT IMWS-Bio (International Microwave Workshop Series on RF and Wireless Technologies for Biomedical and Healthcare Applications). IMBioc2019 is also truly international: 152 papers from 17 countries/regions have been submitted, not only from Asia-Pacific countries but also from America, Europe and Africa.We would like to take this opportunity to express our sincere appreciation to the leading scientists, session organizers and all contributors for their great help and valuable supports to IMBioc2019. Many thanks also to the Technical Program Committee, the Organizing Committee and the International Advisory Committee as well as the sponsors and the technical sponsors for their efforts to bring all the participants an excellent technical program and an opportunity to spend a pleasant time at the conference.

The microwave technology, as one of the most brilliant achievements of mankind in the last century, has become more and more important in human life. IMBioc2019 will provide a an international forum to exchange ideas and information on state-of-the-art research in microwave and RF theory and techniques that bridge the science and engineering gap as applied to biomedical systems. The conference is also a platform for the new faces to become known and for the previous attendees to refresh their friendships. It is expected that the attendees including well-known scientists and engineers will bring many benefits to the scientific and technological development for all countries and to formation of new international cooperation and strengthening of established international collaborations.

Nanjing is an ancient city and the capital city of most developed Jiangsu Province. It is also one of the most important sightseeing cities in China with its many historic spots and beautiful scenery. We hope all of attendees an enjoyable and memorable stay in Nanjing, China.

Prof. Xiaohua Zhu, *General Chair*

Prof. Ke Wu, Prof. James C. M. Hwang, *General Co-Chairs*

April. 25, 2019

Prof. Xiaohua Zhu
Nanjing University of Science and Technology

Prof. Ke Wu
Université de Montréal

James C. M. Hwang
Lehigh University

Message from the Technical Program Chairs

On behalf of the Technical Program Committee (TPC), we welcome all of you to attend the IEEE MTT-S 2019 International Microwave Biomedical Conference (IMBioC2019) in Nanjing, one of the most ancient cities in China.

Along with the 66 members, IMBioC2019 TPC has worked together and generated a diverse and well-organized technical program, which covers nearly all topics that are important to the antenna community. Keeping the traditionally high standards of IMBioC, 152 papers were submitted to IMBioC2019, where 113 papers were from mainland China, and 39 papers were from overseas distributed in 17 countries and regions. 66 TPC members reviewed the papers for their technical merits and interests to the antenna community. Finally, a total number of 119 papers were accepted, including 6 invited papers, for presentation in IMBioC2019. We have arranged 14 oral sessions and 2 poster sessions from Monday to Wednesday to present the papers.

In this event, we have invited 2 Keynote Speakers dealing with hot research topics in our field. The invited sessions are distributed on Monday and Wednesday. Besides the regular papers, a high number of 43 student papers were received to take part in the student-paper competition. After the peer review by the TPC members, 12 papers were qualified to the final competition for the Best Student Paper Awards.

This year, all paper submissions, paper review and evaluation, and paper acceptance process are on-line based. We are indeed proud of the excellent work done by by staff of Nanjing University of Science and Technology. On behalf of the TPC, we would like to express our sincere thanks to all authors for their contributions to the conference. We would like to express our sincere appreciation to all TPC members, sesson organizers, session chairs, reviewers, and all who have been involved for their effort and dedication in finalizing this technical program.

We wish you an enjoyable and interesting IMBioC2019 in Nanjing, China.

Prof. Wenquan Che, *Technical Program Chair*

Prof. Changzhi Li, Prof. Wei Hong, *Technical Program Co-Chairs*

April. 25, 2019

Prof. Wenquan Che
South China University of Technology

Prof. Changzhi Li
Texas Tech University

Prof. Wei Hong
Southeast University

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Xiaohua Zhu (Nanjing University of Science and Technology)

General Co-Chairs

Ke Wu (Université de Montréal)

James C. M. Hwang (Lehigh University)

Technical Program Chair

Wenquan Che (South China University of Technology)

Technical Program Co-Chairs

Changzhi Li (Texas Tech University)

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Pai-Yen Chen (University of Illinois at Chicago)

Yongxin Guo (National University of Singapore)

Publication Chair

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IMBioC 2019 TPC Members

Abbas Omar (University of Magdeburg)

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Heng Zhao (Nanjing University of Science and Technology)

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Ifana Mahbub (University of North Texas)

Jenshan Lin (University of Florida)

Jessi Johnson (Nagasaki University)

Jiaming Yan (Nanjing University of Science and Technology)

Jianfei Sun (Southeast University)

Jianpeng Wang (Nanjing University of Science and Technology)

James C. M. Hwang (Lehigh University)

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Jose-Maria Mu ñoz-Ferreras (University of Alcal á)

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Kateryna Arkhypova (Usikov Institute for Radiophysics and Electronics NASU)

Katia Grenier (LAAS-CNRS)

Li Zhang (Nanjing University of Science and Technology)

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Lin Shu (South China University of Technology)

Mark Ming-Cheng Cheng (Wayne State University)

Maurizio Bozzi (University of Pavia)

Min Wang (Nanjing University of Science and Technology)

Olivier Romain (University Cergy Pontoise, ETIS)

Ou Xu (Southeast University)

Pai-Yen Chen (Wayne State University)

Perry Li (St. Jude Medical)

Qammer H. Abbasi (University of Glasgow)

Qin Li (Shenzhen Institute of Information Technology)

Robert Caverly (Villanova University)

Roberto Gomez Garcia (University of Alcala)

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T.-S. Jason Horng (National Sun Yat-sen University)

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Xiuxiu Li (Xi’an University of Technology)

Xu Meng (Galvani Bioelectronics)

Xudong Chen (National University of Singapore)

Yong Xin Guo (National University of Singapore)

Yong Zou (Tianjin University)

Yue Ma (Nanjing University of Science and Technology)

Zhengyu Peng (Aptiv)

Conference Site and Office Location

IEEE MTT-S 2019 International Microwave Biomedical Conference (IMBioC2019) will be held on May 6th – 8th, 2019 at **International Conference Hotel of Nanjing**. The office and session locations are shown in the back cover of this program.

Registration

The IMBioC 2019 Registration begins at 13:00 on 5th May, 2019. The registration will be open at 1st floor, Zijin Building of Internation Conference Hotel of Najing. The on-site registration fee is shown in the following table.

The on-site student registration requires a valid student ID. If you have pre-registered, your name badge and Technical Program will be ready for you to pick up at the registration desk during the conference. Please wear your name badge throughout the conference. Access will be prohibited to the exhibition, tea break, interactive areas, and technical sessions if a name badge is not visible.

On-site Registration Fee	
Non-Member	4900 CNY (710 USD)
IEEE Member	3800 CNY (550 USD)
Retiree, Life-Member	2400 CNY (315 USD)
Student None-Member	2800 CNY (400USD)
Student IEEE Member	2400 CNY (315USD)
Banquet Fee: 300 CNY (45 USD)	

Projection Facilities

Standard LCD projector (connected to a local PC) will be provided in each conference room.

Guidelines for Presentations

INFORMATION FOR CANDIDATES OF BEST STUDENT PAPERS CONTEST

The Best Student Paper Contest is an **Oral Session** scheduled during 14:40-16:10 pm, March 7th, Room B. All candidates are required to **orally** present his/her work in 2 minutes. The awards committee will select the final winners according to the paper quality and the author's presentation. No show means the authors withdraw their papers from the contest.

INFORMATION FOR ORAL PRESENTERS

Presenters are required to report at their session room to their session chair at least 15 minutes prior to the beginning of their session. Presenters are suggested to try out their presentations if there is any concern about the format, presentation length, etc. It is mandatory that the presentations should be loaded to the computer supplied by conference ahead of the beginning of each session. Any delays in the start of a presentation behind schedule due to the presenter's disregard of this guidance will result

in less presentation time for that paper. All oral presentations are limited to 20 minutes including 15 minutes' presentation and 5 minutes' Q&A. The Session Chair will remind the presenter 10 minutes after the presentation starts. The session room will be equipped with a computer and an LCD projector. This is the only permissible projection system. Presenter MUST use the session's computer for their presentation, i.e, their presentation must be loaded in advance on this computer.

Each computer is equipped with an USB flash memory. The operating system for session computers is Microsoft Windows 7 (or newer). The software available on each machines are Adobe Acrobat Reader (for PDF), MathType and Microsoft Office (Version: Office 2013) with Word, Excel and PowerPoint available. Therefore, all presenters must be compatible with these packages. There will be also assistance and advice available to presenters at registration desk. Please remember that due to the very large number of papers and a tight schedule, the responsibility of having your paper ready for presentation at the scheduled time is very important.

INFORMATION FOR POSTER SESSION PRESENTATIONS

Presenters are required to put up their papers 15 minutes prior to the beginning of their session. During this time, the presenter must stand by the display board to answer questions and discuss about the contents of the poster informally. The poster display should include a statement of the topic, objectives of the research or project, the methodology used to solve the problem or implement the program, the major findings or outcomes and their significance and conclusions. There should be a logical sequence ---- introduction, development and conclusion--- of your display.

A heading should be prepared for your presentation using lettering at least 3cm high. The heading should include the title of the poster, all author names and institutional affiliations.

One poster board is provided for each presentation, which is 1.2 meter high by 0.8 meter wide. The background color of the board is usually beige or white. Pins or tapes are provided by conference committee to mount your posters on the boards. All materials to be displayed should be prepared before your arrival. Supplies will not be available at the conference site.

General Information

CONFERENCE VENUE

International Conference Hotel of Nanjing
Address: 2 Sifangcheng Zhongshanling, Nanjing.

TRANSPORTATION

http://www.em-conf.com/imbioc2019/conference/Transportation

ABOUT NANJING

Nanjing is the capital of Jiangsu Province. It lies in the lower reaches of the Yangtze River, covering 6.5 thousand square kilometers. Perennial temperature averages 17.8℃ (64℉). Nanjing is one of the important hubs of communications in China. The railway, highway and aviation are all convenient. Nanjing is awarded the title of Famous Historic and Culture City.

Tour Options

Dr. Sun Yat-Sen's Mausoleum
Covering an area of 80,000 square meters (about 20 acres), Dr.Sun Yat-Sen's Mausoleum is located in the Purple Mountain Scenic Area in the east suburb of Nanjing City, Jiangsu Province. As the mausoleum of Dr.Sun Sun Yat-Sen's, the father of the Republic of China, it is considered the Holy land of Chinese people both home and abroad. With deep historical significance, magnificent architecture and beautiful scenery, it is a must see when traveling in Nanjing.

Presidential Residence
It comprises three pieces of scenery: the former Nationalist Government and the Presidential Government; the former Provisional President Sun Sun Yat-Sen's Office Building, the Office of the Secretary General, the West Garden and the General Staff Headquarters; the Executive Yuan, the Tao Shu and Lin Zexu Memorial Temple, Stable and the Exhibition of the Material on the Liangjiang Viceroy's Official Residence. The presidential Palace has profound historical culture, unique historical materials and beautiful natural environment with classical constructions.

Please visit http://www.em-conf.com/imbioc2019/conference/Nanjing for more details.

LANGUAGE

The official language for the conference is English. However, in the public society, Chinese Mandarin is commonly spoken in Nanjing.

VISA

Each person from abroad, who wants to enter the Chinese Customs, needs to hold a visa issued by Chinese Embassy or Consulate. It should be submitted to the Chinese Embassy in your country for you to apply for the visa. You can also apply for a visa type of common tourist, which is convenient to be issued without the requisition form and valid for 30 days.

CURRENCY AND CREDIT CARDS

China's currency is RMB with its monetary unit RMB Yuan. The exchange rate is about 1 USD for 6.68 RMB.

TAX AND TIP

All the shopping is free of tax. Be sure to make big bargaining when buy merchandise from the Street Market. Tipping is by no means a traditional Chinese custom. Please help keep the good customs and do not tip a waiter/waitress or a taxi driver and other person who provides regular services.

OPENING HOURS

Bank and Post Office Opening hours: 9:00 a.m. to 5:00 p.m., from Monday to Sunday.
Government Office Opening hours: 8:00 a.m. to 5:00 p.m., from Monday to Friday.
Store Opening hours: 9:00 a.m. to 8:00 p.m., but the large shopping center serves till 10:00 p.m., from Monday to Sunday.

ELECTRICITY

In China, the standard outlets provide AC of 220 V/50 Hz.

TAXI

Usually, a taxi is available along the roadsides, while you wave for it. However, at main streets it is only available at taxi stops or in front of a hotel.

INTERNET ACCESS

There is WLAN with internet access in the conference venue.

Keynote Presentation 1

May 06 (Monday), Room O *(2nd Floor, Zijin Building of International Conference Hotel of Nanjing)*

09:30 – 10:30

Biomedical Data Processing for Future Medical Research and Healthcare Delivery

Professor (David) Dagan Feng

University of Sydney

Abstract of the talk

The repaid growth of various types of data from innumerable diverse sources, such as microwave new sensors, images, and other devices (related to genes, proteins, metabolism, pathology, organs, systems, individuals and population) has created an incredible opportunity for new information findings, knowledge development and services improvements. The large volume of data sets has also created a huge opportunity for artificial intelligence applications in biomedicine. Until very recently, most of biomedical research and healthcare delivery are still based on their traditional ways and their directly related information, such as diagnosis images, blood test results, etc. However, such practices have started to have a revolutionary change, due to much previously ignored information is becoming so relevant, and can possibly be integrated into the biomedical research and healthcare delivery equations, such as precision medicine and disease management. In this talk, we will discuss the impact of big data and artificial intelligence in biomedicine and how they will reshape the future medical research and healthcare delivery.

Biography of the speaker

Professor (David) Dagan Feng is Director, Biomedical and Multimedia Information Technology (BMIT) Research Group, Funding Head, School of Information Technology (recently renamed as School of Computer Science) and Funding Director, Institute of Biomedical Engineering & Technology (before the recent formation of the School of Biomedical Engineering) at the University of Sydney. He received his ME in Electrical Engineering & Computer Science (EECS) from Shanghai Jiao Tong University in 1982, MSc in Biocybernetics and PhD in Computer Science from the University of California, Los Angeles (UCLA) in 1985 and 1988 respectively, where he received the Crump Prize for Excellence in Medical Engineering. In conjunction with his team members and students, he has been responsible for more than 50 key research projects, published over 900 scholarly research papers, pioneered several new research directions, and made a number of landmark contributions in his field. He has served as Chair of the International Federation of Automatic Control (IFAC) Technical Committee on Biological and Medical Systems, Special Area Editor / Associate Editor / Editorial Board Member for a dozen of core journals in his area, and Scientific Advisor for a number of prestigious organizations. He has been invited to give over 100 keynote presentations in 23 countries and regions, and has organized / chaired over 100 major international conferences / symposia / workshops. Professor Feng is Fellow of ACS, HKIE, IET, IEEE, and Australian Academy of Technological Sciences and Engineering.

Keynote Presentation 2

May 06 (Monday), Room O *(2nd Floor, Zijin Building of International Conference Hotel of Nanjing)*

10:40 – 11:40

Physical Phantoms for Evaluation of Wireless In-body Medical Devices

Professor Koichi Ito
Center for Frontier Medical Engineering, Chiba University, Japan
ito.koichi@faculty.chiba-u.jp

Abstract of the talk

In recent years, wireless medical devices have been widely used, for example, to monitor physiological parameters, to deliver drugs and to stimulate nervous systems. One of the key technologies for R&D of such wireless medical devices is body-centric wireless communications. Wireless in-body medical devices can be divided into three categories based on the way of insertion into the human body, i.e., implantables, ingestibles, and injectables.It is almost impossible to utilize a real human body to evaluate in-body medical devices experimentally. Instead, human-body physical phantoms which have nearly the same relative permittivity and conductivity of human tissues are indispensable for such experiments. In the experimental evaluation of the performances of wireless in-body medical devices, human-body physical phantoms are usually used. It should be noted that electrical and thermal characteristics of the phantoms are dependent on phantom materials. In addition, various shapes of phantoms are used in the measurement, e.g., head, hand, abdomen, torso, whole-body, etc. The size and shape of phantoms sometimes affect radiation characteristics of wireless in-body devices in particular. Different types of human tissue-equivalent phantoms are utilized for their purposes in the experimental investigations. Typical physical phantoms are liquid, gel, semi-hard (semi-solid) and solid phantoms. Semi-hard (semi-solid) phantoms are suitable to the experiments for in-body medical devices because it is easy to embed devices at the right position in the phantoms and to fix them without any support. Conventional semi-hard phantoms are not transparent. If they are transparent, it would be easy to locate the devices and to confirm their conditions from outside of the phantoms. By choosing appropriate materials and employing special techniques, transparent semi-hard phantoms have been realized and tested. A few examples of such transparent phantoms will be introduced in the presentation.

Biography of the speaker

Koichi Ito received the B.S. and M.S. degrees from Chiba University, Japan, and the Ph.D degree from Tokyo Institute of Technology, Japan. He served as Deputy Vice-President for Research and Director of the Center for Frontier Medical Engineering, Chiba University. He is currently a Professor Emeritus and Visiting Professor at the Center for Frontier Medical Engineering, Chiba University.

His main research interests include small antennas for mobile communications, microwave antennas for medical applications such as cancer treatment, research on evaluation of the interaction between electromagnetic fields and the human body by use of phantoms, and antenna systems for body-centric wireless communications.

Dr. Ito is a Life Fellow of the IEEE and a Fellow of the IEICE, Japan. He served as Chair of the IEICE Technical Committee on Human Phantoms for Electromagnetics, Chair of the IEEE AP-S Japan Chapter, an Associate Editor for the IEEE Transactions on Antennas and Propagation, an AdCom member for the IEEE

AP-S, a Distinguished Lecturer for the IEEE AP-S, General Chair of IEEE iWAT2008, Chair of the IEICE Technical Committee on Antennas and Propagation, a member of the Board of Directors, the Bioelectromagnetics Society (BEMS), a Councilor to the Asian Society of Hyperthermic Oncology (ASHO), General Chair of ISAP2012, and a Delegate to the European Association on Antennas and Propagation (EurAAP). He currently serves as a Vice-President of the Japanese Society for Thermal Medicine (JSTM), Vice-Chair of URSI Commission K, and as IEEE AP-S President for 2019.

Invited Talk A

May 06 (Monday), Room A *(2nd Floor, Zijin Building of International Conference Hotel of Nanjing)*

15:30 – 16:00

Multiphysics Analysis of Human Auditory Response to Pulsed Electromagnetic Radiation

Professor James Lin, Ph.D, University of Illinois at Chicago
851 South Morgan Street (M/C 154)
Chicago, Illinois 60607-7053 USA
Email: lin@uic.edu

Abstract of the talk

The U.S. State Department disclosure that Havana-based U.S. diplomats were experiencing health issues associated with hearing loud buzzing or what was described as bursts of sound in 2017. Diplomatic staff had reported symptoms of hearing loss, ringing in the ears, headaches, nausea, and problems with balance or vertigo, which are suggestive of a connection to the inner ear apparatus within the human head. Experts in and outside the U.S. government were baffled or mystified by it. Officials had difficulty to pin down the source of sound. There were speculations that the diplomats may have been attacked with an advanced weapon

In this talk, I will discuss the details of a cross disciplinary investigation involving multiple physical theories and models, physiological events and phenomena, and computer analysis and simulation. The results show that a cascade of events may occur when beams of high-power microwave pulses are aimed at the subject or subject's head, for example. Absorption of pulsed microwave energy creates a rapid expansion of brain matter and launches an acoustic wave of pressure that travels inside the head, by bone conduction to the inner ear. There, it activates the nerve cells in the cochlea and the neural signals are then relayed through the central auditory system to the cerebral cortex for perception, via the same process involved in normal air-conducted sound hearing. The predicted center frequency of acoustic pressure wave is about 8 kHz for human adults -- well within the range of human auditory response. Depending on the intensity of the impinging microwave pulses, the level of induced sound pressure could be considerably above the threshold of human auditory perception--to approaching or exceeding levels of reported discomfort and even causing potential tissue injury, It is significant to note that the high-power microwave pulses may be covertly delivered remotely, so that only the intended target would perceive the sound in his or her own head.

Biography of the speaker

James C. Lin received the BS, MS and PhD degrees in Electrical Engineering from the University of Washington, Seattle. He is Professor Emeritus at the University of Illinois in Chicago (UIC), where he has served as Head of the Bioengineering Department, Director of the Robotics and Automation Laboratory, and Director of Special Projects in the College of Engineering.

He is a Fellow of AAAS, AIMBE and URSI, and a Life Fellow of IEEE. He held a NSC Research Chair from 1993 to 1997 and served for many years as an IEEE-EMBS distinguished lecturer. He is a recipient of the d'Arsonval Medal from the Bioelectromagnetics Society, IEEE EMC Transactions Prize Paper Award, IEEE COMAR Recognition Award,

and CAPAMA Outstanding Leadership and Service Awards. He served as a member of U.S. President's Committee for National Medal of Science (1992 and 1993).

Professor Lin has served in leadership positions of several scientific and professional organizations including President of the Bioelectromagnetics Society, Chairman of the International Scientific Radio Union (URSI) Commission on Electromagnetics in Biology and Medicine, Chairman of the IEEE Committee on Man and Radiation, Vice President US National Council on Radiation Protection and Measurements (NCRP), and member of International Commission on Nonionizing Radiation Protection (ICNIRP). He also served on numerous advisory committees and panels for the U.S. Congress, Office of the U.S. President, National Academy of Sciences, National Research Council, National Science Foundation, National Institutes of Health, Marconi Foundation, and the World Health Organization.

He has authored or edited 13 books, authored 380+ book chapters and articles in journals and magazines, and made 280+ conference presentations. In addition to fundamental scientific contributions to electromagnetics in biology and medicine, he has pioneered several medical applications of RF and microwave energies, including invention of minimally invasive microwave ablation treatment for cardiac arrhythmia and noncontact and noninvasive microwave sensing of physiological signatures and vital signs. He has chaired several international conferences including IEEE, BEMS and ICST (founding chairman of Wireless Mobile Communication and Healthcare - MobiHealth). He is Editor-in-Chief of the Bioelectromagnetics journal since 2006 and has served as guest editor and member of the editorial boards of several journals. He is a member of Sigma Xi, Phi Tau Phi, Tau Beta Pi, and Golden Key honorary societies. He has been listed in American Men and Women of Science, Who's Who in America, Who's Who in Engineering, Who's Who in the World, and Men of Achievement, among others.

Invited Talk B

May 06 (Monday), Room B *(2nd Floor, Zijin Building of International Conference Hotel of Nanjing)*

15:30 – 16:00

Enhancing Doppler Frequency Shifts with Self-Injection-Locking Technology for Biomedical Radar Applications

Professor T.-S. Jason Horng

National Sun Yat-Sen University

Abstract of the talk

The biomedical radar is a sensor device that uses radio waves to detect a biological target, providing physiological information such as respiration rate, heart rate and pulse wave velocity. It is based on the detection of a reflected signal that is Doppler frequency-shifted by the physiological movement of the target. However, the Doppler frequency shift to be detected by the radar is a rather weak and close to dc signal, which is contaminated by dc offset and flicker noise and thus with poor SNR. This presentation introduces a self-injection-locking (SIL) method to resolve the dc-offset and flicker noise problem by substantially increasing the Doppler frequency shift in the reflected signal. The key of the method is to inject the reflected signal back into the oscillator that generates the transmitted signal. Then the oscillator enters a SIL state and outputs a signal with a frequency modulation synchronized with the physiological movement of the target. The frequency modulation index of this signal is usually several million times that of the reflected signal without feedback injection, thereby improving the SNR by more than 100 dB. Such a wideband frequency-modulated signal can be easily demodulated using a frequency discriminator. Thanks to the very high SNR, the biomedical radar using SIL technology is extraordinarily sensitive, which will be demonstrated in this presentation.

Biography of the speaker

T.-S. Jason Horng received the Ph.D. degree from the Electrical Engineering Department, UCLA, in 1992. Since August 1992, he has been with the Electrical Engineering Department, National Sun Yat-Sen University, Taiwan, where he is now a Distinguished Professor. He has authored or coauthored over 250 technical publications in refereed journals and conference proceedings. He holds over 50 worldwide patents. His research expertise covers RF and microwave systems for wireless communications and Doppler radars for biomedical applications. Dr. Horng was the founder chair of the IEEE MTT-S Tainan Chapter in 2009, and an associate editor of the IEEE Transactions on Microwave Theory and Techniques from 2012 to 2015. He is now a member of the IEEE MTT-S Technical Committee MTT-10 and a Fellow of IEEE.

Invited Talk 2A

May 07 (Tuesday), Room A *(2nd Floor, Zijin Building of International Conference Hotel of Nanjing)*

16:10 – 16:40

Recent Advances in RF Aspects in Magnetic Resonance Imaging (MRI)

Professor Robert H. Caverly

Villanova University, Villanova, PA 19085 USA

Abstract of the talk

Magnetic Resonance Imaging (MRI) scanners are an important diagnostic tool for the medical practitioner. MRI provides a non-invasive means of obtaining high contrast images of soft tissues and to obtain real-time images of the cardiovascular system and other dynamic changes in the human body. MRI scanners rely heavily on a number of topical areas of interest to Electrical Engineers: image processing, high speed computing and RF (radio frequency) systems and components. This presentation will focus on recent advances on the RF aspects of MR scanners. A primer on the physical phenomenon behind magnetic resonance will start the presentation and include a discussion of the origin of the MR signal. The need for the high static magnetic field (B0), the use of gradient coils for MR signal spatial encoding, simple RF pulse sequences and how they are used in image construction will be covered. This MR image construction process and the control of the various steps that manipulate the atomic nuclei to generate the final MR diagnostic image put demanding constraints on RF equipment capabilities and these will be discussed, along with a high-level overview of the various components making up conventional MRI systems. This high-level overview will include a look at various examples of transmit and receive RF systems and examples of transmit and receive coils that make up MR scanners and system diagrams for both the RF transmit and receive paths. The talk will then narrow in scope to look at how these RF coils are modeled and controlled in both transmit and receive states and how these components are used for transmit/receive switching and patient and equipment protection.

Biography of the speaker

Dr. Robert H. Caverly received his Ph.D. degree in electrical engineering from The Johns Hopkins University, Baltimore, MD, in 1983. He has been a faculty member at Villanova University in the Department of Electrical and Computer Engineering since 1997 and is a Full Professor. Previously, he was a Professor for more than 14 years at the University of Massachusetts Dartmouth. Dr.Caverly's research interests are focused on the characterization of semiconductor devices such as PIN diodes and FETs in the microwave and RF control environment. He has published more than 100 journal and conference papers and is the author of the books Microwave and RF Semiconductor Control Device Modeling (2016) and CMOS RFIC Design Principles (2007), both from Artech House. An IEEE Fellow, Dr. Caverly is the Editor-in-Chief of the IEEE Microwave Magazine, a member of the MTT-S Administrative Committee, and a member of the HF-VHF-UHF Technology (TC-17) and Biomedical Applications (TC-10) Technical Committees of the MTT Society.

Invited Talk 2B

May 07 (Tuesday), Room B *(2nd Floor, Zijin Building of International Conference Hotel of Nanjing)*

16:10 – 16:40

Microwave Spectroscopy for Non-invasive Biological and Health Sensing

Professor Katia Grenier

CNRS researcher, LAAS-CNRS

Abstract of the talk

Microwave dielectric spectroscopy is a powerful technique to perform a non-ionizing and non-destructive characterization of materials. In the context of biological and health sensing, the analyzing technique benefits from different appealing features such as rapidity, non-invasive and label-free abilities as well as in-liquid measurements. This analyzing technique may therefore be applied at different scales, from molecule or cell sensing in aqueous solution to tissues and organs investigations.The talk will consequently give an overview of such sensing capabilities through various appropriate sensors and metrologies, while highlighting the breakthrough brought by this sensing technique.

Biography of the speaker

Katia Grenier received her Ph.D. degree in electrical engineering from the University of Toulouse, France, in 2000. After a Postdoctoral Fellowship at Agere Systems (Bell Labs) in 2001, she joined the Laboratory of Analysis and Architecture of Systems of the National Scientific Research Center (LAAS-CNRS), in France and was engaged in the development of RadioFrequency microelectromechanical systems (RF MEMS) circuits on silicon for wireless applications. From 2007 to 2009, she was a visiting researcher with the Laboratory for Integrated Micromechatronic Systems of CNRS (LIMMS-CNRS) and the University of Tokyo, in Japan, where she was engaged in launching research activities on miniature microwave and millimeterwave-based biosensors. Since 2009, she is heading a research group in LAAS-CNRS dedicated to the development of High Frequency and Fluidic Microwave Microsystems. Her research interests are focused on the interaction of RF electromagnetic waves with complex fluids at the milli and microscales. It involves two research orientations. One is related to the development of analyzing instruments for biological and medical applications, whereas the second one focuses on the impact of electromagnetic waves on the living. She has published more than 200 papers in peer reviewed journals and conferences. Dr. Grenier is a member of the Technical Committee (MTT-10) dedicated to Biological effect and medical applications of RF and microwave of the IEEE Microwave Theory and Techniques Society. She also serves as a member of the European Microwave Association (EuMA) and is involved in conferences such as IEEE International Microwave Bio Conference (IMBioC) and IEEE MTT-S International Microwave Symposium (IMS).

Invited Talk 3A

May 08 (Wednesday), Room A *(2nd Floor, Zijin Building of International Conference Hotel of Nanjing)*

08:30 – 09:00

Miniature Wireless Sensors for Closed-loop Health Management

Professor J.-C. Chiao

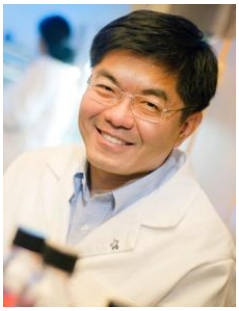
Southern Methodist University

Abstract of the talk

Mobile technologies have changed our life style significantly. Personalized tools such as wearable and implantable devices through wireless communication and Internet of Things have been utilized in healthcare to provide unique functions and reduce costs. Individuals can be empowered with tailored solutions without limitation in mobility or daily activities. Quantitative documentation of physiological parameters presents more accurate assessment. Direct stimulation on tissues or organs by electrical signals can restore or improve body functions. Continuous monitoring and adaptive administration of therapy to treat symptoms via wireless body networking can optimize the closed-loop health management.

Our research focuses on the development of micro devices and integrated systems for clinical applications. The systems are based on batteryless, wireless implants and wearables with enhancement in miniaturization and functionalization. Miniaturization owing to deformable substrates and the elimination of bulky batteries allows endoscopic or minimally invasive procedures to deploy the implants without painful surgeries. Clinical applications focus on the management of neural disorders, such as pain. The system is also extended to current procedures such as intraoperative neural monitoring for spine surgery. These works aim to inspire new means to address the implementation and cost challenges in healthcare, and enable integration of electronics and medicines to improve human welfare and assist better living.

Biography of the speaker



J.-C. Chiao is Mary and Richard Templeton Centennial Chair of Electrical and Computer Engineering at Southern Methodist University (SMU). He received his PhD at Caltech. Dr. Chiao was with Bellcore (Bell Communication Research), University of Hawaii-Manoa and Chorum Technologies. He was Greene endowed professor and Garrett professor of Electrical Engineering at University of Texas - Arlington in 2002–18. Dr. Chiao has published more than 280 peer-reviewed papers, received 13 awarded and 11 pending patents and given 171 invited speeches. He is an SPIE (International Society for Optics and Photonics) Fellow. He received the 2011 O'Donnell Award in Engineering presented by The Academy of Medicine, Engineering and Science of Texas. He received the Tech Titan Technology Innovator Award; Lockheed Martin Aeronautics Excellence in Engineering Teaching Award; Research in Medicine milestone award by Heroes of Healthcare; IEEE MTT Distinguished Microwave Lecturer; IEEE Region 5 Outstanding Engineering Educator and individual Achievement awards. Currently, he is an IEEE Sensors Council Distinguished Lecturer and serving as the Editor-in-Chief for Journal of Electromagnetics, RF and Microwaves in Medicine and Biology. His works have been covered by national and international media extensively including National Geographic magazine, Washington Post, CBS Henry Ford Innovation Nation, Wired magazine, Forbes, and others. Website is at http://smu.edu/jcchiao/

Invited Talk 3B

May 08 (Wednesday), Room B *(2nd Floor, Zijin Building of International Conference Hotel of Nanjing)*

08:30 – 09:00

Acoustically Actuated Magnetoelectric Antennas for Ultracompact Biomedical Implants

Professor Nian Sun

W.M. Keck Laboratory for Integrated Ferroics, & ECE Department,

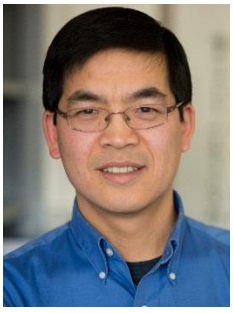
Northeastern University, Boston, MA, USA

Abstract of the talk

In this presentation, I will cover the most recent progress on acoustically actuated magnetoelectric antennas for ultracompact biomedical implants. Biomedical implants need ultracompact antennas that has minimal coupling to human body. Conventional compact antennas are based on resonating electric currents in electric conductors at their electromagnetic resonance frequency, which leads to large antenna size comparable to their electromagnetic wavelength, and ground plane problems. Here we introduce acoustically actuated ultra-compact RF NEMS acoustic magnetoelectric antennas immune from ground plane effect with < 0/100 in size, self-biased operation and ground plane immunity. These novel acoustically actuated magnetoelectric antennas show great promise for applications in ultracompact biomedical implants, IoT, etc.

Reference: 1. N.X. Sun and G. Srinivasan, SPIN, 02, 1240004 (2012); 2. J. Lou, et al., Advanced Materials, 21, 4711 (2009); 3. J. Lou, et al. Appl. Phys. Lett. 94, 112508 (2009); 4. M. Liu, et al. Advanced Functional Materials, 21, 2593 (2011); 5. T. Nan, et al. Scientific Reports, 3, 1985 (2013); 6. M. Liu, et al. Advanced Materials, 25, 1435 (2013); 7. M. Liu, et al. Advanced Functional Materials, 19, 1826 (2009); 8. Ziyao Zhou, et al. Nature Communications, 6, 6082 (2015). 9. T. Nan, et al. Nature Comm. 8, 296 (2017).

Biography of the speaker



Nian Sun is professor at the Electrical and Computer Engineering Department, Director of the W.M. Keck Laboratory for Integrated Ferroics, Northeastern University, and founder and chief technical advisor of Winchester Technologies, LLC. He received his Ph.D. degree from Stanford University. Prior to joining Northeastern University, he was a Scientist at IBM and Hitachi Global Storage Technologies. Dr. Sun was the recipient of the NSF CAREER Award, ONR Young Investigator Award, the Søren Buus Outstanding Research Award, etc. His research interests include novel magnetic, ferroelectric and multiferroic materials, devices and subsystems. He has over 250 publications and over 20 patents and patent applications. One of his papers was selected as the "ten most outstanding full papers in the past decade (2001~2010) in Advanced Functional Materials". Dr. Sun has given over 150 plenary/keynote/invited presentations and seminars. He is an editor of Sensors, and IEEE Transactions on Magnetics, and a fellow of the Institute of Physics, and of the Institution of Engineering and Technology.

2019-05-06 PM

Room A

ORAL Session: MP1A

Smart-Flat for assisted living: from the sensor to the shallow machine learning

Chair : Julien Le Kernec, University of Glasgow

Co-Chair: Li Sun, Nanjing University of Science and Technology

13:30 - 13:50 21 Activities Recognition and Fall Detection in Continuous Data Streams Using Radar Sensor
Haobo Li, Aman Shrestha, Hadi Heidari, Julien Le Kernec, Francesco Fioranelli (University of Glasgow)

13:50 - 14:10 45 Conditional Random Field Feature Generation of Smart Home Sensor Data using Random Forests
Mark Eastwood, Alexandros Konios, Bo Tan, Yanguo Jing, Abdul Hamid (Coventry University)

14:10 - 14:30 26 Accuracy Evaluation on the Respiration Rate Estimation using Off-the-shelf Pulse-Doppler Radar
Xingzhuo Li, Shaoxuan Li, Haobo Li, Francesco Fioranelli (University of Glasgow)

14:30 - 14:50 48 Non-Contact Human Activity Classification using DCNN based on UWB Radar
Wenying Chen, Chuanwei Ding, Yu Zou, Li Zhang, Chen Gu, Hong Hong, Xiaohua Zhu (Nanjing University of Science and Technology)

14:50 - 15:10 46 Radar Sensing in Assisted Living: an Overview
Julien Le Kernec, Francesco Fioranelli, Chuanwei Ding, Heng Zhao, Li Sun, Hong Hong, Olivier Romain, Jordane Lorandel (University of Glasgow)

ORAL Session: MP2A

Innovative theranostic technology based on electromagnetic effects

Chair : Jianfei Sun, Southeast University

Co-Chair: Gui Rong Ding, Air Force Medical University

16:00 - 16:20 38 Multimodal Single-Cell Death Recognition Based on Optically Induced Electrokinetics Cell Manipulation
Yuliang Zhao (Northeastern University at QHD)

16:20 - 16:40 63 Novel Magnetic Cell-Scaffold Construct with and without Magnetic Field Enhanced Osteogenesis of Stem Cells and Formation of new bone
Yang Xia, Jianfei Sun, Feimin Zhang, Ning Gu, Hockin Xu (Nanjing Medical University)

16:40 - 17:00 64 Effects of EMP on BBB permeability and the application in brain tumor treatment
Kang-Chu Li , Lian-Bo Qiu, Yan-Zhou, Peng-Gao, Qin-Chen, Jia-Jin Lin, Guo-Zhen Guo, Gui-Rong Ding (Fourth Military Medical University)

17:00 - 17:20 79 Testosterone secretion in mouse Leydig cells decreasing induced by Radiofrequency electromagnetic radiation
Yan-Yun Lin, Tao Wu, Jun-Ye Liu, Peng Gao, Kang-Chu Li, Qi-yan Guo, Hai-yang Lang, Meng Yuan, Guo-zhen Guo, Lihua ZENG (Fourth Military Medical University)

17:20 - 17:40 106 Label-free Circulating Tumor Cell Detection based on Microfluidic Millimeter-wave Dielectric Sensing
Haijun Gao, Xiwei Huang, Lingling Sun (Hangzhou Dianzi University)

17:40 - 18:00 169 A Computational Study on Number of Elements in Antenna Array for Focused Microwave Breast Hyperthermia
Jianian Li, Lifan Xu, Xiong Wang (ShanghaiTech University)

2019-05-06 PM
Room B

ORAL Session: MP1B

Wireless and IoT-based biomedical applications

Chair: Hung Cao, University of California, Irvine
Co-Chair: Pai-Yen Chen, University of Illinois at Chicago

13:30 - 13:50 Home-based mobile fetal/maternal electrocardiogram acquisition and extraction with cloud assistance
107
Tai Le, Joseph Fortunato, Nicholas Maritato, Yeeun Cho, Quoc-Dinh Nguyen, Tadesse Ghirmai, Michael P.H.Lau, Huy-Dung Han, Cuong Kieu Nguyen, Vu Cong Nguyen, Hung Cao (University of California, Irvine)

13:50 - 14:10 Co-matching Method for Implantable Antenna Applications
29
Yuan Feng, Yue Li (Tsinghua University)

14:10 - 14:30 MD-Link: A portable ECG monitoring device with active dry electrodes and its validation
162
Tai Le, Le-Lan Tran, Thai-Hoc Hoang, Huy-Dung Han, Ngoc T Phan, Vu Cong Nguyen, Tuan A Nguyen, Nga TT Pham, Hung Cao, Cuong Kieu Nguyen (UC Irvine)

14:30 - 14:50 A Self-Service Scheme of Infant Scale for Height and Weight
141
Heping Qian, Jingping Liu, Yun Wu (Nanjing University of Science and Technology)

14:50 - 15:10 Body Movement Cancellation Based on Hybrid Radar-Webcam Sensing System
105
Hongyu Zhang, Li Zhang, Qian Gao, Yameng Xiao, Hong Hong, Xiaohua Zhu (Nanjing University of Science and Technology)

ORAL Session: MP2B

Low-Power Radar Systems for Biomedical Applications

Chair: Xiaoguang Leo Liu, University of California, Davis
Co-Chair: Changzhan Gu, Shanghai Jiao Tong University

16:00 - 16:20 Doppler Radar Techniques for Vital Signs Detection Featuring Noise Cancellation
178
Fang Zhu, Kuangda Wang, Ke Wu (Polytechnique Montréal)

16:20 - 16:40 RF Compressed Sensing Based Radar for 2-D Localization and Mapping
101
Prateek Nallabolu, Changzhi Li (Texas Tech University)

16:40 - 17:00 Signal Processing for Monitoring of Static Persons Using UWB Sensors: A Survey
22
Dušan Kocur, Mária Švecová (Technical University of Kosice)

17:00 - 17:20 A Reconfigurable Active Beamforming Array for Biomedical Radar Applications
36
Qiangli Xi, He Wang, Shiwei Dong, Lixin Ran (Zhejiang University)

17:20 - 17:40 The Development of Vital-SAR-Imaging with an FMCW Radar System
68
Jiaming Yan, Jiaming Hu, Gepeng Zhang, Hanqing Chen, Heng Hu, Hong Hong, Chen Gu, Xiaohua Zhu, Changzhi Li (Nanjing University of Science and Technology)

17:40 - 18:00 Noncontact Measurement of Human Vital Signs during Sleep Using Low-power Millimeter-wave Ultrawideband MIMO Array Radar
168
Takuya Sakamoto (Kyoto University)

2019-05-07 AM

Room A

ORAL Session: TA1A

VR for Biomedical Applications I

Chair: Lin Shu, South China University of Technology

Co-Chair: Chao Chen, Tianjin University of Technology

08:30 - 08:50 (93) A VR Combined with MI-BCI Application for Upper Limb Rehabilitation of Stroke
Wei Wang, Banghua Yang, Cuntai Guan, Bo Li (Shanghai University)

08:50 - 09:10 (128) Design and Evaluation of the Mental Relaxation VR Scenes Using Forehead EEG Features
Lingqing Zhu, Xiang Tian, Xiangmin Xu, Lin Shu (South China University of Technology)

09:10 - 09:30 (112) Brain network analysis of hand motor execution and imagination based on Granger causality
Jiaxin Zhang, Rui Xu, Abdelkader Nasreddine Belkacem, Duk Shin, Kun Wang, Zhongpeng Wang, Lu Yu, Zhifeng Qiao, Changming Wang, Chao Chen (Tianjin University of Technology)

09:30 - 09:50 (113) A Novel Virtual Reality Design of Portable Automatic Perimetry
Jia He, Sheng Zhang, Peixuan Wu, Yun Zhang, Xiujuan Zheng, Lingxiao Zhou (Xi'an Jiaotong University)

ORAL Session: TA2A

Antennas and propagation

Chair: Jianpeng Wang, Nanjing University of Science and Technology

Co-Chair: Xiao Zhang, Shenzhen University

10:20 - 10:40 (14) A Coaxial Tri-slot Antenna with Aperiodic Layout of the Slots for Microwave Ablation
Yishuai Xu, Wenjun Zhang, Bing Zhang (East China University of Science and Technology)

10:40 - 11:00 (44) Low-profile Flexible Perovskite based Millimetre Wave Antenna
Abdoalbaset Abohmra, Fizzah Jilani, Hasan Abbas, Rami Ghannam,Hadi Heidari, Muhammad Ali Imran , Qammer H. Abbasi (University of Glasgow)

11:00 - 11:20 (136) Slot Loading Effect on the Impedance and Radiation Performance of the TM03-Mode High-Gain Square Patch Antenna
Kaidong Hong, Cong Zhang, Xiao Zhang, Lei Zhu, Guanlong Huang, Tao Yuan (Shenzhen University)

11:20 - 11:40 (166) A Self-Complementary Fractal Antenna with Broad Bandwidth
Yanlin Hei, Johannes A.Russer, Wen Wu (Nanjing University of Science and Technology)

11:40 - 12:00 (180) Electrically Small Half-Mode Substrate Integrated Waveguide Circular Cavity Antenna with Improved Gain
Shui Liu, Feng Xu, Ke Wu (Nanjing University of Posts and Telecommunications)

2019-05-07 AM

Room B

ORAL Session: TA1B

Microwave and Antenna Technology for Biomedical Applications

Chair: Hui Chu, Nanjing University of Science and Technology

Co-Chair: Changrong Liu, Soochow University

08:30 - 08:50 37 A Dual-Mode Multi-Polarization Millimeter Wave Wearable Antenna for WBAN Applications
Xuanfeng Tong, Changrong Liu, Yan Chen, Jingbo Zhu, Xinmi Yang, Huiping Guo, Xueguan Liu (Soochow University)

08:50 - 09:10 95 Antenna Design with Polarization Diversity for Wireless Ingestible Capsule
Hui Chu (Nanjing University of Science and Technology)

09:10 - 09:30 27 Monitoring of Limb Movement Activities during Physical Exercises using UWB Channel Parameters
Richa Bharadwaj, Shiban K.Koul (Indian Institute of Technology Delhi)

09:30 - 09:50 23 Averaging Area for Transmitted Power Density Correlated to Temperature Elevation on Human Skin Surface due to RF Exposure at 60 GHz
Kun Li, Kensuke Sasaki, Soichi Watanabe, Kanako Wake (National Institute of Information and Communications Technology)

ORAL Session: TA2B

Continuous-Wave Radar: System Architecture and Biomedical Applications

Chair: Fu-kang Wang, National Sun Yat-sen University

Co-Chair: Heng Zhao, Nanjing University of Science and Technology

10:20 - 10:40 12 FMCW-Radar-Based Vital-Sign Monitoring of Multiple Patients
José-María Muñoz-Ferreras, Jing Wang, Zhengyu Peng, Changzhi Li, and Roberto Gómez-Garcíaa (University of Alcalá)

10:40 - 11:00 17 SIL-Radar-based Rat Detector for Warehouse Management System
Pin-Hsun Juan, Fu-Kang Wang, Yi-Ting Tzeng (National Sun Yat-sen University)

11:00 - 11:20 19 A Simple Muscle-sphere Model to Approximate the Radar Cross Section of the Man Heart for Vital-Signs Detection Range Problem At Different RF Frequencies
Huey-Ru Chuang, Hsin-Chih Kuo, Chien-Chang Chou (National Cheng Kung University)

11:20 - 11:40 28 Multi-Target Continuous-Wave Vital Sign Radar using 24 GHz Metamaterial Leaky Wave Antennas
Chunchi Lu, Yichao Yuan, Chao-Hsiung Tseng, Chung-Tse Michael Wu (National Taiwan University of Science and Technology)

11:40 - 12:00 40 Development of Simultaneous Sensor Location-Detection and Powering with Harmonic Radar Technology for Biomedical Sensing
Chun-Yu Ku, Chiao-Chieh Yang, Tzuen-Hsi Huang (National Cheng Kung University)

2019-05-07 AM
Room P

09:50 - 10:20

POSTER Session: TAP
Poster Session I

P.1 5
Miniaturized wearable watch antenna for wristband applications
Yuetian Jia, Lei Liu, Jiesi Hu, Lijie Xu (Nanjing University of Posts and Telecommunications)

P.2 11
Transient Analysis with Simplified Particular Solution for Near-Field Resonant Transmission used in 13.56 MHz Wireless Power Transfer
Tsai-Sheng Chu, Yu-Yu Fan, Fu-Bin Yang, Po-Hung Chen (National Chiao Tung University)

P.3 15
Effects of 220 MHz Radiofrequency Field on Sperm Quality of SD Rat
Ling Guo, Yizhe Xue, Jiajin Lin, GuangzhouAn, JunpingZhang, KeyingZhang, Wei He, Huan Wang, Wei Li, Guirong Ding (Fourth Military Medical University)

P.4 32
Research on Microwave Detection of Blood Volume Changes in Bleeding Stroke
Miaoqin Zhong, Xing Jiang, Lin Peng, Hongjin An, Kairan Zhang, Xianrong Yu, Mujin Ye, Xiaoming Li, Xiaofeng Li (Guilin University of Electronic Technology)

P.5 39
Design of Cortical Bone Drilling Temperature Measurement Instrument in Virtual reality system
Hao Bin, Hu Yahui, Zheng Qinchun, He Xin, Chen Chao (Tianjin University of Technology)

P.6 50
CBMeMBer Filter for Extended Target Tracking Based on Binomial Measurement Number Model
Wenjuan Li, Hong Gu, Weimin Su, Jianchao Yang, Mengying Xia (Nanjing University of Science and Technology)

P.7 51
Decoupling circuit design for dual-band and dual-polarized microstrip antenna
Yulan Lin, Chunhong Chen, Shanjiang Dai, Xuanli Fu, Hang Lan (Nanjing University of Science and technology)

P.8 56
Ultra-wideband (UWB) Monopole Antenna with Dual Notched Bands by Combining Electromagnetic-Bandgap (EBG) and Slot Structures
Yi Wang, Tongde Huang, Dongdong Ma, Peipei Shen, Jiaofei Hu, Wen Wu (Nanjing University of Science and Technology)

P.9 77
Dual-Band Dual-Polarized Slot-Coupled Microstrip Antenna for Duplex Applications
Xuanli Fu, Chunhong Chen, Yunjiao Chen, Ming Xie, Yulan Lin (Nanjing University of Science and Technology)

P.10 94
Application of hyper beamforming algorithm in automobile anti-collision radar
Hui Tang, Chen Miao (Nanjing University of Science and Technology)

P.11 96
Design of Compact Coaxial Cavity Bandpass Filter with High Selectivity
Sai Li, Xuedao Wang, Yi Li, Jianpeng Wang (Nanjing University of Science and Technology)

P.12 99
Research on a Bioradar Based on the Analog Correlator
Hang Lan, Chunhong Chen, Chao Fang, Jiahao Chen, Yulan Lin (Nanjing University of Science and Technology)

2019-05-07 PM

Room A

ORAL Session: TP1A

VR for Biomedical Applications II

Chair: Xiujuan Zheng, Sichuan University

Co-Chair: Chao Chen, Tianjin University of Technology

13:30 - 13:50 Classification of EEG Multiple Imagination Tasks Based on Independent Component Analysis and Relevant Vector Machines
111
Shanting Zhang, Rui Xu, Abdelkader Nasreddine Belkacem, Duk Shin, Kun Wang, Zhongpeng Wang, Lu Yu, Zhifeng Qiao, Changming Wang, Chao Chen (Tianjin University of Technology)

13:50 - 14:10 Emotion Recognition Using Frontal EEG in VR Affective Scenes
130
Tianyuan Xu, Ruixiang Yin, Lin Shu, Xiangmin Xu (South China University of Technology)

14:10 - 14:30 The Relationship between EEG and Depression under Induced Emotions Using VR Scenes
134
Guodong Liang, Yingxuan Li, Dan Liao, Hanchun Hu, Yingying Zhang, Xiangmin Xu (Guangzhou Brainview Intelligent Technology Co., Ltd.)

14:30 - 14:50 Arousal Evaluation of VR Affective Scenes Based on HR and SAM
133
Dan Liao, Wenzhuo Zhang, Guodong Liang ,Yingxuan Li, Jingyan Xie, Lingqing Zhu, Xiangmin Xu, Lin Shu (South China University of Technology)

ORAL Session: TP2A

RF/microwave circuits and systems II

Chair: Changzhi Li, Texas Tech University

Co-Chair: Jianchao Yang, Nanjing University of Science and Technology

16:40 - 17:00 Reliable, Fast and Reusable Interfacing of High-Frequency Signals to Disposable Lab-on-a-Chip Devices
100
Gertjan Maenhout, Juncheng Bao, Tomislav Markovic, Ilja Ocket, Bart Nauwelaers (KU Leuven)

17:00 - 17:20 Balanced-to-Unbalanced Filtering Power Dividers with Extended Upper Stopband
175
Wenjie Feng, Wenquan Che (Nanjing University of Science and Technology)

17:20 - 17:40 Design of 1:4 Power Divider Using Artificial Magnetic Conductor Packaging for Millimeter-wave Application
183
Jun Jin, Feng Xu (Nanjing University of Posts and Telecommunications)

17:40 - 18:00 Novel Scalable Rectifying Diode for Enhanced Dynamic-Range Wireless Powered Endoscopic Capsules
24
Hao Zhang, Si-Ping Gao, Yong-Xin Guo, Wen Wu (Nanjing University of Science and Technology)

2019-05-07 PM
Room B

ORAL Session: TP1B

Circuit and System for Wireless Sensing and Communications

Chair: Lianming Li, Southeast University
Co-Chair: Changzhi Li, Texas Tech University

13:30 - 13:50 Portable Radar Circuits and Systems for Wireless Sensing and Localization
35 *Changzhi Li* (Texas Tech University)

13:50 - 14:10 Wearable Magnetic Localization System with Noise Cancellation for Wireless Capsule Endoscopy
31 *Guoliang Shao, Yong-Xin Guo* (National University of Singapore)

14:10 - 14:30 Respiratory Pattern Recognition of an Adult Bullfrog Using a 100-GHz CW Doppler Radar Transceiver
61 *Xujun Ma, Yiyang Wang, Xiaohu You, Jenshan Lin, Lianming Li* (Southeast University)

14:30 - 14:50 A Dual-band High-efficiency Power Amplifier with Small Frequency Ratio
4 *Jiacheng Zhang, Shaoyong Zheng* (Sun Yat-sen University)

ORAL Session: TP2B

From microwave sensing to electromagnetic effects on cells

Chair: J.-C. Chiao, Southern Methodist University
Co-Chair: Katia Grenier, LAAS-CNRS

16:40 - 17:00 A Compact Microwave Applicator for the Rapid Detection of Clostridium Difficile
53 *Hayder Hamzah, Evans Ahortor, Dmitry Malyshev, Heungjae Choi, Jonathan Lees, Les Baillie, Adrian Porch* (Cardiff University)

17:00 - 17:20 Microdosimetry of Multi Electrodes Array in an RF Exposure System for In vitro Real-Time Recordings
55 *Amani Nefzi, Clement E.Lemercier, Corinne El Khoueiry, Noëlle Lewis, Isabelle Lagroye, Clemens Boucsein, Philippe Leveque, Delia Arnaud-Cormos* (University of Limoges)

17:20 - 17:40 Impact of a chemical stimulus on two different cell lines through microwave dielectric spectroscopy at the single cell level
59 *Amar Tamra, Marie-Pierre Rols, David Dubuc, Katia Grenier* (Université de Toulouse)

17:40 - 18:00 Advances in Modeling Dielectric Response of Biological Structures at Microscopic Level
60 *P. Marracino, A. de Angelis, E. Limiti, M. Cristofanon, A. Denzi, F.M. Andre, L.M. Mir, F. Apollonio,M. Liberti* (University of Rome)

2019-05-07 PM
Room B

ORAL Session: TPC
Best Student Papers Contest

14:50 - 14:52 Effects of 220 MHz Radiofrequency Field on Sperm Quality of SD Rat
15 *Ling Guo, Yizhe Xue, Jiajin Lin, GuangzhouAn, JunpingZhang, KeyingZhang, Wei He, Huan Wang, Wei Li, Guirong Ding* (Fourth Military Medical University)

14:52 - 14:54 Seat Integration of RF Vital-Sign Monitoring
18 *Xiaonan Hui, Edwin C.Kan* (Cornell University)

14:54 - 14:56 Novel Scalable Rectifying Diode for Enhanced Dynamic-Range Wireless Powered Endoscopic Capsules
24 *Hao Zhang, Si-Ping Gao, Yong-Xin Guo, Wen Wu* (Nanjing University of Science and Technology)

14:56 - 14:58 Activities Recognition and Fall Detection in Continuous Data Streams Using Radar Sensor
21 *Haobo Li, Aman Shrestha, Hadi Heidari, Julien Le Kernec, Francesco Fioranelli* (University of Glasgow)

14:58 - 15:00 A VR Combined with MI-BCI Application for Upper Limb Rehabilitation of Stroke
93 *Wei Wang, Banghua Yang, Cuntai Guan, Bo Li* (Shanghai University)

15:00 - 15:02 A Reconfigurable Active Beamforming Array for Biomedical Radar Applications
36 *Qiangli Xi, He Wang, Shiwei Dong, Lixin Ran* (Zhejiang University)

15:02 - 15:04 The Development of Vital-SAR-Imaging with an FMCW Radar System
68 *Jiaming Yan, Jiaming Hu, Gepeng Zhang, Hanqing Chen, Heng Hu, Hong Hong, Chen Gu, Xiaohua Zhu, Changzhi Li* (Nanjing University of Science and Technology)

15:04 - 15:06 Body Movement Cancellation Based on Hybrid Radar-Webcam Sensing System
105 *Hongyu Zhang, Li Zhang, Qian Gao, Yameng Xiao, Hong Hong, Xiaohua Zhu* (Nanjing University of Science and Technology)

15:06 - 15:08 A Computational Study on Number of Elements in Antenna Array for Focused Microwave Breast Hyperthermia
169 *Jianian Li, Lifan Xu, Xiong Wang* (ShanghaiTech University)

15:08 - 15:10 Respiratory Pattern Recognition of an Adult Bullfrog Using a 100-GHz CW Doppler Radar Transceiver
61 *Xujun Ma, Yiyang Wang, Xiaohu You, Jenshan Lin, Lianming Li* (Southeast University)

15:10 - 15:12 Low-profile Flexible Perovskite based Millimetre Wave Antenna
44 *Abdoalbaset Abohmra, Fizzah Jilani, Hasan Abbas, Rami Ghannam,Hadi Heidari, Muhammad Ali Imran , Qammer H. Abbasi* (University of Glasgow)

15:12 - 15:14 Wearable Magnetic Localization System with Noise Cancellation for Wireless Capsule Endoscopy
31 *Guoliang Shao, Yong-Xin Guo* (National University of Singapore)

2019-05-08 AM

Room A

ORAL Session: WA1A

Radar, imaging and sensor applications

Chair: Changzhan Gu, Shanghai Jiao Tong University

Co-Chair: Jiaming Yan, Nanjing University of Science and Technology

09:00 - 09:20 (13) Radar-based evaluation of lameness detection in ruminants: preliminary results
Francesco Fioranelli, Haobo Li, Julien Le Kernec, Valentina Busin, Nicholas Jonsson, George King, Martin Tomlinson, Lorenzo Viora (University of Glasgow)

09:20 - 09:40 (16) Observation of Cognition Effects Improvement by Repetitive Transcranial Magnetic Stimulation
Huijuan Chen, Hao Gao (The First Affiliated Hospital of Harbin Medical University)

09:40 - 10:00 (160) Skin Conductance as Proxy for the Identification of Hydration Level in Human Body
Ali Rizwan, Ahmed Zoha, Akram Alomainy, Najah AbuAli, Muhammad AliImran, Qammer Hussain Abbasi (University of Glasgow)

10:00 - 10:20 (181) A low-profile planar microwave lens based beam pattern for millimeter wave physiotherapy
Long Pan, Yaoliang Song, Shicheng Fan (Nanjing University of Science and Technology)

10:20 - 10:40 (188) Noncontact multi-modal sensor fusion for sleep stage detection
Xiaohui Yang, Biao Xue, Li Zhang, Xin Liu, Hong Hong (Nanjing Integrated Traditional Chinese and Western Medicine Hospital)

10:40 - 11:00 (123) Implementation of Radar-based Breathing Disorder Recognition Using FPGA
Chen Feng, Heng Zhao, Qian Liu, Hong Hong, Chen Gu, Xiaohua Zhu (Nanjing University of Science and Technology)

2019-05-08 AM
Room B

ORAL Session: WA1B

Biological and medical applications of microwave and RF systems

Chair : Wenjie Feng, Nanjing University of Science and Technology
Co-Chair: Hong Hong, Nanjing University of Science and Technology

09:00 - 09:20 Seat Integration of RF Vital-Sign Monitoring
18 *Xiaonan Hui, Edwin C.Kan* (Cornell University)

09:20 - 09:40 Fully Printable, Folded, High Frequency Chipless RFID Tag for Surgical Tracking and Detection
161 *Marcos Martinez, Yuchen Gu, Daniel Van Der Weide* (University of Wisconsin-Madison)

09:40 - 10:00 A Short-Time Autocorrelation Method for Noncontact Detection of Heart Rate Variability Using CW Doppler Radar.
49 *Nhan Thi Phuong Nguyen, Pei-Yu Lyu, Meng Hsuan Lin, Chia-Chan Chang and Sheng-Fuh Chang* (National Chung Cheng University)

10:00 - 10:20 Simultaneous Detection of Multi-Target Vital Signs Using EEMD Algorithm Based on FMCW Radar
43 *Guan-Wei Fang, Ching-Yao Huang, Chin-Lung Yang* (National Cheng Kung University)

10:20 - 10:40 Speech Recovery Based On Auditory Radar and Webcam
120 *Yue Ma, Hong Hong, Heng Zhao, Hui Li, Chen Gu, Xiaohua Zhu* (Nanjing University of Science and Technology)

10:40 - 11:00 CW Radar Based OSA Detection Solution with Residual Comparison Method
83 *Junjun Xiong, Jie Jiang, Hong Hong, Chen Gu, Yusheng Li, Xiaohua Zhu* (Nanjing University of Science and Technology)

2019-05-08 AM
Room P

11:00 - 12:00

POSTER Session: WAP
Poster Session II

P.1 20
Bioelectromagnetic Dose Characteristics in Bounded Wave Simulator under Nanosecond Pulse
Jiajin Lin, Guirong Ding, Jing Li, Shenglong Xu, Wei He (Fourth Military Medical University)

P.2 41
A New Design of a Wideband Low-Profile Monopole Patch Antenna Based on SIW Resonator
Binyu Han, Mengni Yang, Jianpeng Wang, Wen Wu (Nanjing University of Science and Technology)

P.3 47
Respiration and Heartbeat Rates Measurement Based on Convolutional Sparse Coding
Pengfei Wang, Miao Liu, Huijie Zhu, Fulai Liang, Hao Lv, Zhao Li, Jianqi Wang (Air Force Military Medical University)

P.4 54
Design of E-Band Zoned-lens Horn Antenna
Hai-Bin Ma, Jin-Dong Zhang, Xiang-Yun Chen, Wen Wu (Nanjing University of Science and Technology)

P.5 65
Dual-band Omnidirectional Filtering Antenna with High Selectivity
Wenwei Wang, Chunhong Chen, Wen Wu (Nanjing University of Science and Technology)

P.6 69
Moving target detection with single frequency-stepped burst using fast FRFT
Xinhai Wang, Gong Zhang, Henry Leung (Nanjing University of Aeronautics and Astronautics)

P.7 84
A novel wide beam open-ended waveguide antenna
Hui Huang, Shi-Shan Qi, Yong Sun, Tian Zhou, Wen Wu (Nanjing University of Science and Technology)

P.8 108
Information Fusion of Digital Camera and Radar
Jiexin Ren, Yao Wang, Yubing Han, Renli Zhang (Nanjing University of Science and Technology)

P.9 114
A Smart Eye Tracking System for Virtual Reality
Bin Li, Yun Zhang, Xiujuan Zheng, Xiaoping Huang, Sheng Zhang, Jia He (Northwest University)

P.10 116
Design of Multimode Triplex Antenna with High Isolation
Jiahao Chen, Chunhong Chen, Yunjiao Chen, Hang Lan, Ming Xie (Nanjing University of Science and Technology)

P.11 119
Video SAR High-speed Processing Technology Based on FPGA
Die Wang, Daiyin Zhu, Rui Liu (Nanjing University of Aeronautics and Astronautics)

P.12 132
Effect of Virtual Reality on Fear Emotion Base on EEG Signals Analysis
Kailing Guo, Junming Huang, Yicai Yang, Xiangmin Xu (South China University of Technology)

P.13 137
Small Phased Array Radar Based on AD9361 For UAV Detection
Liming Tang , Hao Wang , Zhengkang Feng , Dalong Xu , Yan Wang , Shuanglong Quan Wenwen Xu (Nanjing University of Science and Techology)