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

Nanjing, China 6-8 May 2019



**IEEE Catalog Number: CFP19F43-POD ISBN**:

978-1-5386-7396-6

# Copyright $\odot$ 2019 by the Institute of Electrical and Electronics Engineers, Inc. All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

 IEEE Catalog Number:
 CFP19F43-POD

 ISBN (Print-On-Demand):
 978-1-5386-7396-6

 ISBN (Online):
 978-1-5386-7395-9

#### **Additional Copies of This Publication Are Available From:**

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA Phone: (845) 758-0400 Fax: (845) 758-2633

E-mail: curran@proceedings.com Web: www.proceedings.com



#### **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 Activities Recognition and Fall Detection in Continuous Data Streams Using Radar Sensor 1
  - Haobo Li, Aman Shrestha, Hadi Heidari, Julien Le Kernec, Francesco Fioranelli (University of Glasgow)
- 13:50 14:10 Conditional Random Field Feature Generation of Smart Home Sensor Data using Random Forests 5
  - Mark Eastwood, Alexandros Konios, Bo Tan, Yanguo Jing, Abdul Hamid (Coventry University)
- 14:10 14:30 Accuracy Evaluation on the Respiration Rate Estimation using Off-the-shelf Pulse-Doppler Radar 9
  - Xingzhuo Li, Shaoxuan Li, Haobo Li, Francesco Fioranelli (University of Glasgow)
- 14:30 14:50 Non-Contact Human Activity Classification using DCNN based on UWB Radar 13

  Wenying Chen, Chuanwei Ding, Yu Zou, Li Zhang, Chen Gu, Hong Hong, Xiaohua Zhu
  (Nanjing University of Science and Technology)
- 14:50 15:10 Radar Sensing in Assisted Living: an Overview 17

  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 Multimodal Single-Cell Death Recognition Based on Optically Induced Electrokinetics
   Cell Manipulation 35
   Yuliang Zhao (Northeastern University at QHD)
- 16:20 16:40 Novel Magnetic Cell-Scaffold Construct with and without Magnetic Field Enhanced Osteogenesis of Stem Cells and Formation of new bone 37

  Yang Xia, Jianfei Sun, Feimin Zhang, Ning Gu, Hockin Xu (Nanjing Medical University)
- 16:40 17:00 Effects of EMP on BBB permeability and the application in brain tumor treatment 41 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 Testosterone secretion in mouse Leydig cells decreasing induced by Radiofrequency electromagnetic radiation 43

  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 Label-free Circulating Tumor Cell Detection based on Microfluidic Millimeter-wave Dielectric Sensing N/A
  - Haijun Gao, Xiwei Huang, Lingling Sun (Hangzhou Dianzi University)
- 17:40 18:00 A Computational Study on Number of Elements in Antenna Array for Focused Microwave Breast Hyperthermia 45

  Jianian Li, Lifan Xu, Xiong Wang (Shanghai Tech University)

#### **ORAL Session: MP1B**

# **Wireless and IoT-Based Biomedical Applications**

Chair: Changzhi Li, Texas Tech University 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 21
  - 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 N/A *Yuan Feng, Yue Li* (Tsinghua University)
- 14:10 14:30 MD-Link: A portable ECG monitoring device with active dry electrodes and its validation 25
  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 29

  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 32 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 48 Fang Zhu, Kuangda Wang, Ke Wu (Polytechnique Montréal)
- 16:20 16:40 RF Compressed Sensing Based Radar for 2-D Localization and Mapping 52 *Prateek Nallabolu, Changzhi Li* (Texas Tech University)
- 16:40 17:00 Signal Processing for Monitoring of Static Persons Using UWB Sensors: A Survey 55 Dušan Kocur, Mária Švecová (Technical University of Kosice)
- 17:00 17:20 A Reconfigurable Active Beamforming Array for Biomedical Radar Applications 58 *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 61

  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 65

  Takuya Sakamoto (Kyoto University)

# 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 A VR Combined with MI-BCI Application for Upper Limb Rehabilitation of Stroke 69 Wei Wang, Banghua Yang, Cuntai Guan, Bo Li (Shanghai University)
- 08:50 09:10 Design and Evaluation of the Mental Relaxation VR Scenes Using Forehead EEG Features 73

  Lingqing Zhu, Xiang Tian, Xiangmin Xu, Lin Shu (South China University of Technology)
- 09:10 09:30 Brain network analysis of hand motor execution and imagination based on Granger causality 77

  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 A Novel Virtual Reality Design of Portable Automatic Perimetry 81

  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 A Coaxial Tri-slot Antenna with Aperiodic Layout of the Slots for Microwave Ablation 95 *Yishuai Xu, Wenjun Zhang, Bing Zhang* (East China University of Science and Technology)
- 10:40 11:00 Low-profile Flexible Perovskite based Millimetre Wave Antenna 98

  Abdoalbaset Abohmra, Fizzah Jilani, Hasan Abbas, Rami Ghannam, Hadi Heidari,

  Muhammad Ali Imran, Qammer H. Abbasi (University of Glasgow)
- 11:00 11:20 Slot Loading Effect on the Impedance and Radiation Performance of the TM03-Mode High-Gain Square Patch Antenna 101

  \*\*Kaidong Hong, Cong Zhang, Xiao Zhang, Lei Zhu, Guanlong Huang, Tao Yuan\*\* (Shenzhen University)
- 11:20 11:40 A Self-Complementary Fractal Antenna with Broad Bandwidth 105 *Yanlin Hei, Johannes A.Russer, Wen Wu* (Nanjing University of Science and Technology)
- 11:40 12:00 Electrically Small Half-Mode Substrate Integrated Waveguide Circular Cavity Antenna with Improved Gain 109

  Shui Liu, Feng Xu, Ke Wu (Nanjing University of Posts and Telecommunications)

#### **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 A Dual-Mode Multi-Polarization Millimeter Wave Wearable Antenna for WBAN Applications 84

  Xuanfeng Tong, Changrong Liu, Yan Chen, Jingbo Zhu, Xinmi Yang, Huiping Guo, Xueguan Liu (Soochow University)
- 08:50 09:10 Antenna Design with Polarization Diversity for Wireless Ingestible Capsule 87 *Hui Chu* (Nanjing University of Science and Technology)
- 09:10 09:30 Monitoring of Limb Movement Activities during Physical Exercises using UWB Channel Parameters 89

  \*\*Richa Bharadwaj, Shiban K.Koul\*\* (Indian Institute of Technology Delhi)
- 09:30 09:50 Averaging Area for Transmitted Power Density Correlated to Temperature Elevation on Human Skin Surface due to RF Exposure at 60 GHz 92

  \*\*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 FMCW-Radar-Based Vital-Sign Monitoring of Multiple Patients 113

  José-María Muñoz-Ferreras, Jing Wang, Zhengyu Peng, Changzhi Li, Roberto Gómez-Garcíaa (University of Alcalá)
- 10:40 11:00 SIL-Radar-based Rat Detector for Warehouse Management System 116

  Pin-Hsun Juan, Fu-Kang Wang, Yi-Ting Tzeng (National Sun Yat-sen University)
- 11:00 11:20 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 120 *Huey-Ru Chuang, Hsin-Chih Kuo, Chien-Chang Chou* (National Cheng Kung University)
- 11:20 11:40 Multi-Target Continuous-Wave Vital Sign Radar using 24 GHz Metamaterial Leaky Wave Antennas 123

  Chunchi Lu, Yichao Yuan, Chao-Hsiung Tseng, Chung-Tse Michael Wu (National Taiwan University of Science and Technology)
- 11:40 12:00 Development of Simultaneous Sensor Location-Detection and Powering with Harmonic Radar Technology for Biomedical Sensing 127

  Chun-Yu Ku, Chiao-Chieh Yang, Tzuen-Hsi Huang (National Cheng Kung University)

<b>2019-05-07</b> Room P	AM
09:50 - 10:20	POSTER Session: TAP Poster Session I
P.1	Miniaturized wearable watch antenna for wristband applications 131 <i>Yuetian Jia, Lei Liu, Jiesi Hu, Lijie Xu</i> (Nanjing University of Posts and Telecommunications)
P.2	Transient Analysis with Simplified Particular Solution for Near-Field Resonant Transmission used in 13.56 MHz Wireless Power Transfer 134  Tsai-Sheng Chu, Yu-Yu Fan, Fu-Bin Yang, Po-Hung Chen (National Chiao Tung University)
P.3	Effects of 220 MHz Radiofrequency Field on Sperm Quality of SD Rat 137 Ling Guo, Yizhe Xue, Jiajin Lin, Guangzhou An, Junping Zhang, Keying Zhang, Wei He, Huan Wang, Wei Li, Guirong Ding (Fourth Military Medical University)
P.4	Research on Microwave Detection of Blood Volume Changes in Bleeding Stroke 141 <i>Miaoqin Zhong, Xing Jiang, Lin Peng, Hongjin An, Kairan Zhang, Xianrong Yu, Mujin Ye, Xiaoming Li, Xiaofeng Li</i> (Guilin University of Electronic Technology)
P.5	Design of Cortical Bone Drilling Temperature Measurement Instrument in Virtual reality system 144  Hao Bin, Hu Yahui, Zheng Qinchun, He Xin, Chen Chao (Tianjin University of Technology)
P.6	CBMeMBer Filter for Extended Target Tracking Based on Binomial Measurement Number Model 147  Wenjuan Li, Hong Gu, Weimin Su, Jianchao Yang, Mengying Xia (Nanjing University of Science and Technology)
P.7	Decoupling circuit design for dual-band and dual-polarized microstrip antenna 152 <i>Yulan Lin, Chunhong Chen, Shanjiang Dai, Xuanli Fu, Hang Lan</i> (Nanjing University of Science and technology)
P.8	Ultra-wideband (UWB) Monopole Antenna with Dual Notched Bands by Combining Electromagnetic-Bandgap (EBG) and Slot Structures 156  Yi Wang, Tongde Huang, Dongdong Ma, Peipei Shen, Jiaofei Hu, Wen Wu (Nanjing University of Science and Technology)
P.9	Dual-Band Dual-Polarized Slot-Coupled Microstrip Antenna for Duplex Applications 159 <i>Xuanli Fu, Chunhong Chen, Yunjiao Chen, Ming Xie, Yulan Lin</i> (Nanjing University of Science and Technology)
P.10	Application of hyper beamforming algorithm in automobile anti-collision radar 163 <i>Hui Tang, Chen Miao</i> (Nanjing University of Science and Technology)
P.11	Design of Compact Coaxial Cavity Bandpass Filter with High Selectivity 167 Sai Li, Xuedao Wang, Yi Li, Jianpeng Wang (Nanjing University of Science and Technology)

019-05-07 AM oom P		
:50 - :20	POSTER Session: TAP Poster Session I	
P.12	Research on a Bioradar Based on the Analog Correlator 171  Hang Lan, Chunhong Chen, Chao Fang, Jiahao Chen, Yulan Lin (Nanjing University of Science and Technology)	
P.13	A Ultra-Wideband Polarization Conversion Metasurfaces Used for RCS Reduction 175 Ming Xie, Chunhong Chen, Guang Xue, Xuanli Fu, Jiahao Chen (Nanjing University of Science and Technology)	
P.14	Research on imaging algorithm of millimeter wave radar based on stolt interpolation 178 <i>Jiacheng Shu, Chen Miao</i> (Nanjing University of Science and Technology)	
P.15	Covariance Difference Matrix-based Sparse Bayesian learning for Off-grid DOA Estimation with Colored Noise 182  Meihong Pan, Gong Zhang, Zhentao Hu (Nanjing University of Aeronautics and Astronautics)	
P.16	A back-feed OAM Antenna for Planar Integration 186  Tong-Tong Qiu, Jun Hu, Xue Lan, Wei Xu, Jing Yang, Yan-jing Hu, Run-zhe Zhao (Nanjing University of Science and Technology)	
P.17	A Convolutional Neural Network Feature Fusion Framework with Ensemble Learning for EEG-based Emotion Classification 189  Kailing Guo, Han Mei, Xiaona Xie, Xiangmin Xu (South China University of Technology)	
P.18	Study on Chaff Interference for Doppler Fuze 193  Fan Zhang, Jingping Liu, Huijun Lin (Nanjing University of Science and Technology)	
P.19	A novel DLA-Based Digital Predistortion Technique for Power Amplifier 197 Wanlun Chen, Jingqi Wang, Zhisheng Jiang, Wenjie Jiao, Wen Wu (Nanjing University Of Science And Technology)	
P.20	Electromagnetic Properties of Plant Leaves at Terahertz Frequencies for Health Status Monitoring 200  Adnan Zahid, Hasan Tahir Abbas, Hadi Heidari, Muhammad Imran, Akram Alomainy, Qammer H. Abbasi (University of Glasgow)	
P.21	Frequency-agile Coherent Radar Target Sidelobe Suppression Based on Sparse Bayesia Learning 204  Yanji Tao, Gong Zhang, Tingbao Tao, Yang Leng, Henry Leung (Nanjing University of Aeronautics and Astronautics)	
P.22	A Broadband Microstrip-to-Folded Substrate Integrated Waveguide Transition and Inphase Power Divider 208  Jiaojiao Xu, Feng Xu, Dandan Li, Shui Liu (Nanjing University of Posts and Telecommunications)	

# 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 211
  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 215

  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 219
  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 223

  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 Labon-a-Chip Devices 237
  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 N/A *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 241
   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 245

  Hao Zhang, Si-Ping Gao, Yong-Xin Guo, Wen Wu (Nanjing University of Science and Technology)

#### **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 227 *Changzhi Li* (Texas Tech University)
- 13:50 14:10 Wearable Magnetic Localization System with Noise Cancellation for Wireless Capsule Endoscopy 228

  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 231

  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 234 *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 248

  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 252

  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 255

  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 259
  - P. Marracino, A. de Angelis, E. Limiti, M. Cristofanon, A. Denzi, F.M. Andre, L.M. Mir, F. Apollonio, M. Liberti (University of Rome)

#### **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 Radar-based evaluation of lameness detection in ruminants: preliminary results 263

  Francesco Fioranelli, Haobo Li, Julien Le Kernec, Valentina Busin, Nicholas Jonsson,
  George King, Martin Tomlinson, Lorenzo Viora (University of Glasgow)
- 09:20 09:40 Observation of Cognition Effects Improvement by Repetitive Transcranial Magnetic Stimulation 267

  Huijuan Chen, Hao Gao (The First Affiliated Hospital of Harbin Medical University)
- 09:40 10:00 Skin Conductance as Proxy for the Identification of Hydration Level in Human Body 270 Ali Rizwan, Ahmed Zoha, Akram Alomainy, Najah AbuAli, Muhammad AliImran, Qammer Hussain Abbasi (University of Glasgow)
- 10:00 10:20 A low-profile planar microwave lens based beam pattern for millimeter wave physiotherapy 273

  Long Pan, Yaoliang Song, Shicheng Fan (Nanjing University of Science and Technology)
- 10:20 10:40 Noncontact multi-modal sensor fusion for sleep stage detection 277

  Xiaohui Yang, Biao Xue, Li Zhang, Xin Liu, Hong Hong (Nanjing Integrated Traditional Chinese and Western Medicine Hospital)
- 10:40 11:00 Implementation of Radar-based Breathing Disorder Recognition Using FPGA 280 *Chen Feng, Heng Zhao, Qian Liu, Hong Hong, Chen Gu, Xiaohua Zhu* (Nanjing University of Science and Technology)

#### **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 283

  Xiaonan Hui, Edwin C.Kan (Cornell University)
- 09:20 09:40 Fully Printable, Folded, High Frequency Chipless RFID Tag for Surgical Tracking and Detection N/A

  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. 286 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 290 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 294 *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 297 *Junjun Xiong, Jie Jiang, Hong Hong, Chen Gu, Yusheng Li, Xiaohua Zhu* (Nanjing University of Science and Technology)

<b>019-05-08</b> loom P	ANI
1:00	POSTER Session: WAP
12:00	Poster Session II
P.1	Bioelectromagnetic Dose Characteristics in Bounded Wave Simulator under Nanosecond Pulse 300  Jiajin Lin, Guirong Ding, Jing Li, Shenglong Xu, Wei He (Fourth Military Medical University)
P.2	A New Design of a Wideband Low-Profile Monopole Patch Antenna Based on SIW Resonator 303  Binyu Han, Mengni Yang, Jianpeng Wang, Wen Wu (Nanjing University of Science and Technology)
P.3	Respiration and Heartbeat Rates Measurement Based on Convolutional Sparse Coding 306 Pengfei Wang, Miao Liu, Huijie Zhu, Fulai Liang, Hao Lv, Zhao Li, Jianqi Wang (Air Force Military Medical University)
P.4	Design of E-Band Zoned-lens Horn Antenna 309  Hai-Bin Ma, Jin-Dong Zhang, Xiang-Yun Chen, Wen Wu (Nanjing University of Science and Technology)
P.5	Dual-band Omnidirectional Filtering Antenna with High Selectivity 312 <i>Wenwei Wang, Chunhong Chen, Wen Wu</i> (Nanjing University of Science and Technology)
P.6	Moving target detection with single frequency-stepped burst using fast FRFT 315 <i>Xinhai Wang, Gong Zhang, Henry Leung</i> (Nanjing University of Aeronautics and Astronautics)
P.7	A novel wide beam open-ended waveguide antenna 319 <i>Hui Huang, Shi-Shan Qi, Yong Sun, Tian Zhou, Wen Wu</i> (Nanjing University of Science and Technology)
P.8	Information Fusion of Digital Camera and Radar 322  Jiexin Ren, Yao Wang, Yubing Han, Renli Zhang (Nanjing University of Science and Technology)
P.9	A Smart Eye Tracking System for Virtual Reality 326  Bin Li, Yun Zhang, Xiujuan Zheng, Xiaoping Huang, Sheng Zhang, Jia He (Northwest University)
P.10	Design of Multimode Triplex Antenna with High Isolation 329 <i>Jiahao Chen, Chunhong Chen, Yunjiao Chen, Hang Lan, Ming Xie</i> (Nanjing University of Science and Technology)
P.11	Video SAR High-speed Processing Technology Based on FPGA 333  Die Wang, Daiyin Zhu, Rui Liu (Nanjing University of Aeronautics and Astronautics)

<b>2019-05-08 AM</b> Room P		
1:00	POSTER Session: WAP Poster Session II	
2:00	r oster Session II	
P.12	Effect of Virtual Reality on Fear Emotion Base on EEG Signals Analysis 337 <i>Kailing Guo, Junming Huang, Yicai Yang, Xiangmin Xu</i> (South China University of Technology)	
P.13	Small Phased Array Radar Based on AD9361 For UAV Detection 341 Liming Tang, Hao Wang, Zhengkang Feng, Dalong Xu, Yan Wang, Shuanglong Quan, Wenwen Xu (Nanjing University of Science and Techology)	
P.14	A C To Ku Band Ultra-wideband LNA With RLC-Feedback And T-matching Network 344 <i>Yu Wang, Jie Cui, Renli Zhang</i> (Nanjing University of Science and Technology)	
P.15	SAR Target Recognition Based On Variational Autoencoder 347 <i>Yanbing Xu, Gong Zhang, Ke Wang, Henry Leung</i> (Nanjing University of Aeronautics and Astronautics)	
P.16	A Method of Deformation Expression of Soft Tissue in Virtual Operation Based on Surface Mesh Model 351  Jinfang Li, Xiaona Cai, Jing Tan, Erfang Li, Yuwei Wei, Guanghua Ge (Guangdong University of Technology)	
P.17	Design of a two-cavity dual-mode bandpass SIW Filter 355  Lewei Cao, Feng Xu, Shui Liu (Nanjing University of Posts and Telecommunications)	
P.18	Single-Layer Metasurface Focusing Lens for Medical Applications 358 <i>Y. Xiao, L. Wu, S. S. Peng, Z. L. Xiao</i> (Nanjing University of Science and Technology)	
P.19	Target Localization for FDA-MIMO Radar with Random Frequency Increment via Atomic Norm Minimization 361  Wei Wu, Feng Xi (Nanjing University of Science and Technology)	
P.20	Compact Dual-Band Diplexer Based on Dual-Layer Substrate Integrated Waveguide 365 <i>Yuying Li, Feng Xu</i> (Nanjing University Of Posts And Telecommunications)	
P.21	Miniaturized Substrate Integrated Waveguide Bandpass Filters Based on Novel Complementary Split Ring Resonators 368  Jingjing Pu, Feng Xu, Yuying Li (Nanjing University Of Posts And Telecommunications)	
P.22	Multi-scale Convolution and Feature-weighting Network for Radar Target Recognition 371 <i>Chenchen Wang, Weimin Su, Hong Gu, Jianchao Yang</i> (Nanjing University of Science and Technology)	
P.23	Efficiency Improvement of High-Directivity Fabry- Perot Resonator Antenna Array 37: <i>Yizhou Wu, Min Wang, Rui Wan, Wen Wu</i> (Nanjing University of Science and Technology)	