

# **Intelligent Rehabilitation and Human-Machine Engineering Conference (IRHE 2019)**

IET Conference Publications 772

Qinhuangdao, China  
18 - 21 November 2019

ISBN: 978-1-7138-2790-0

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2019) by the Institution of Engineering and Technology  
All rights reserved.

Printed with permission by Curran Associates, Inc. (2021)

For permission requests, please contact the Institution of Engineering and Technology  
at the address below.

Institution of Engineering and Technology  
P. O. Box 96  
Stevenage, Hertfordshire  
U.K. SG1 2SD

Phone: 01-441-438-767-328-328  
Fax: 01-441-438-767-328-375

[www.theiet.org](http://www.theiet.org)

**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  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

ADAPTIVE TORQUE CONTROL OF HIP EXOSKELETON FOR WALKING ASSIST BASED ON MOTION COMPARISON METHOD AND PHASE OSCILLATOR METHOD .....	1
<i>Wei Yang, Ling H Xu, Can J Yang</i>	
ANALYSIS AND PREDICTION OF MULTI-JOINT COUPLING TORQUE OF FINGERS .....	7
<i>Jinxu Yu, Lin Zheng, Xiaolin Bai, Yihao Du, Lijie Zhang, Ping Xie</i>	
DATA STRUCTURES INFLUENCE THE NUMBER OF MUSCLE SYNERGIES AND RECONSTRUCTION EFFECT ACROSS TRIALS .....	13
<i>Jiayin Lin, Le Li, Peng Fang, Guanglin Li, Jie Luo</i>	
DEVELOPMENT OF A DRUG ADDICTION REHABILITATION TRAINING SYSTEM BASED ON BCI-VR TECHNOLOGY.....	19
<i>Dewen Kong, Xuelin Gu, Banghua Yan</i>	
FUNCTIONAL CORTICOMUSCULAR COUPLING—INTERACTION STRENGTH AND INFORMATION FLOW FOLLOWING STROKE.....	24
<i>Yuanyuan Zhang, Xiaoling Chen, Xiaohui Pang, Ping Xie</i>	
LEFT/RIGHT CONTRIBUTIONS OF ARTICULATORY MUSCLES IN SPEECH RECOGNITION USING HIGH-DENSITY SURFACE ELECTROMYOGRAPHY .....	30
<i>Xiaochen Wang, Mingxing Zhu, Jiashuo Zhuang, Dan Wang, Shixiong Chen, Zijian Yang, Xin Wang, Jianping Huang, Wanzhang Yang, Lin Qi, Wanqing Wu, Guanglin Li</i>	
LOW INTENSITY PULSED ULTRASOUND STIMULATION AT DIFFERENT NUMBER OF TONE-BURST ON MULTI-SCALE COUPLING.....	36
<i>Ziqiang Jin, Yibo Wang, Ping Xie</i>	
MULTIFRACTAL ANALYSIS OF JOINT FLEXION IN ELDERLY WITH THE HISTORY OF FALLS.....	41
<i>Ziyang Lv, Yingnan Ma, Xing Gao, Qiujie Zhang, Tongxiao Hou</i>	
RESEARCH ON NEURAL ACTIVATION MECHANISM OF MOTOR IMAGERY BASED ON VIRTUAL SCENE.....	47
<i>Ping Xie, Zihao Wang, Hualei Fang, Wei Chen, Jinxu Yu, Zihao Fu, Sifan He, Xiaoling Chen</i>	
SYSTEM DESIGN OF UPPER LIMB SEMG REAL-TIME CONTROL MANIPULATOR .....	52
<i>Cunfang Zheng, Lixin Ren, Xin Guo, Yiming Chen, Wang Ma, Zhen Tong</i>	
CENTRAL AORTIC PRESSURE WAVEFORM ESTIMATION USING GENETIC-ALGORITHM-BASED MULTICHANNEL BLIND SYSTEM IDENTIFICATION.....	58
<i>Ning Ji, Wan-Hua Lin, Wenyan Liu, Jianping Huang, Yuanheng Li, Oluwarotimi Williams Samuel, Lisheng Xu, Guanglin Li</i>	
INFLUENCE OF PROSTHETIC WEIGHT ON MUSCLE FATIGUE IN UPPER LIMB AMPUTEES.....	62
<i>Yue Zheng, Xiangxin Li, Lan Tian, Guanglin Li</i>	
MONITORING MUSCLE OXYGEN VARIATIONS DURING MUSCLE CONTRACTION IN MILD AND SEVERE HEMIPARESIS USING NEARINFRARED SPECTROSCOPY: A PILOT STUDY.....	67
<i>Han Cui, Haibo Yu, Xingxian Huang, Weizheng Zhong, Yirong Chen, Shixiong Chen, Oluwarotimi Williams Samuel, Guanglin Li, Zhuoxin Yang</i>	

FLEXIBLE NON-CONTACT ELECTRODES FOR MINIMIZING ARTIFACTS IN  
ELECTROCARDIOGRAMS MEASUREMENT DURING MOTION ..... 72  
*Shuting Liu, Xin Wang, Mingxing Zhu, Yanbing Jiang, Dan Wang, Xiaochen Wang,  
Wanzhang Yang, Shixiong Chen, Guanglin Li*

**Author Index**