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# Intelligent Robotics and Applications

12th International Conference, ICIRA 2019  
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Proceedings, Part IV

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# Preface

On behalf of the Organizing Committee, we welcome you to the proceedings of the 12th International Conference on Intelligent Robotics and Applications (ICIRA 2019), organized by Shenyang Institute of Automation, Chinese Academy of Sciences, co-organized by Huazhong University of Science and Technology, Shanghai Jiao Tong University, and the University of Portsmouth, technically co-sponsored by the National Natural Science Foundation of China and Springer, and financially sponsored by Shenyang Association for Science and Technology. ICIRA 2019 with the theme of “Robot Era” offered a unique and constructive platform for scientists and engineers throughout the world to present and share their recent research and innovative ideas in the areas of robotics, automation, mechatronics, and applications.

ICIRA 2019 was most successful this year in attracting more than 500 submissions regarding the state-of-the-art development in robotics, automation, and mechatronics. The Program Committee undertook a rigorous review process for selecting the most deserving research for publication. Despite the high quality of most of the submissions, a total of 378 papers were selected for publication in six volumes of Springer’s *Lecture Notes in Artificial Intelligence* a subseries of *Lecture Notes in Computer Science*. We sincerely hope that the published papers of ICIRA 2019 will prove to be technically beneficial and constructive to both the academic and industrial community in robotics, automation, and mechatronics. We would like to express our sincere appreciation to all the authors, participants, and the distinguished plenary and keynote speakers.

The success of the conference is also attributed to the Program Committee members and invited peer reviewers for their thorough review of all the submissions, as well as to the Organizing Committee and volunteers for their diligent work. Special thanks are extended to Alfred Hofmann, Anna Kramer, and Volha Shaparava from Springer for their consistent support.

August 2019

Haibin Yu  
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