

MESSAGES



Hiroshi Tanaka

General Chair

**Professor Emeritus, Tokyo Medical and Dental University
Specially appointed professor, Tohoku University**

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It is my great pleasure and honor to welcome you all to the Twenty-third International Symposium on Artificial Life and Robotics (AROB 23rd 2018). This year we have also organized a sister symposium on bio-complex systems study, named "The Third International Symposium on BioComplexity, (ISBC3)". By organizing the joint symposium of AROB and ISBC, we could broaden the scope of this symposium to cover the fields of complex systems dealing with anything, related to and inspired by life.

As is needless to say, Alife together with bio-complex systems and biologically-inspired Robotics now attracts wide interests as a new paradigm of science and engineering. For example, the bio-complex systems theory and methodology is now increasing its importance in entering upon the healthcare "Big Data Era", as a promising approach to promote "cutting-edge medicine", such as to reveal and conquer the cancer progression mechanism or to explore the efficient reprogramming method of cells/tissues in regeneration medicine (iPS cells). Furthermore, study of "synthetic biology" is now developed in the attempt to synthesize life in wetware or re-design existing, natural biological systems (bacteria) for useful purposes.

Also in the biologically-inspired robotics field, rapid progresses in various types of robot systems have been remarkable such as bipedal humanoid, multi-agent robots. Also in the real world, nursing care robot is gradually being in practice. Furthermore, in wider sense, "molecular robots", small DNA-based device which identifies receptors in cell surface and targets the cells causing diseases is expected to achieve drug-like function within human body. These examples show the Alife and biologically-inspired Robotics approach are exerting a wide influence on the development of a new paradigm for next generation of science and engineering

In recent years, especially Artificial Intelligence (AI) has attracted an enthusiastic interest again from all branches of society, due to the extraordinary capability of "Deep Learning", from the very high performance of image understanding to the splendid competence of playing complex game like GO to win the world champion. In our fields of AROB, the impact of AI is outstanding and would revolute the total landscape of our discipline. These trends could be seen already in this year's symposium

In organizing this year AROB symposium, we are in debt to many Japanese academic associations such as SICE, RSJ, IEEEJ, IEICE, ISCIE and JSOM. I would like to express my sincere thanks to all of those who make this symposium possible.

We hope this symposium becomes a forum for exchange of the ideas of the attendants from various fields, who are interested in the future possibility of Alife, biocomplexity and biologically-inspired Robotics approach. I am looking forward to meeting you in Beppu, Oita.



Hee-hyol Lee

Program Chair

Professor, Waseda University

A handwritten signature in cursive script that reads "Hee-hyol Lee".

On behalf of the program committee, it is my great pleasure and honor to invite all of you to the 23rd International Symposium on Artificial Life and Robotics (ISAROB 23rd 2018) and the 3rd International Symposium on Bio-Complexity (ISBC 3rd 2018). The ISAROB was started in 1996 at B-Con Plaza, Beppu, Japan, to develop new frontier of artificial life, robotics, complexity, medicine, and their related fields. The ISBC was started two years ago to find new science and technologies concerning biomedicine and biophysics based on theories, computer simulations, wetware's, and hardware designs.

These ISAROB 23rd and ISBC 3rd 2018 consist of 2 plenary speeches, 20 organizing sessions, 20 general sessions, 23 papers in poster session, and then a total of 210 papers are published. The brilliant papers presented in these symposiums are able to submit to the international journal - AROB. All papers submitted to the journal go through a peer-review process. In addition, the quality of our journal depends heavily on support from referees. Thanks for all of referees of our journal.

Third artificial intelligent boom, it is just now. The second AI boom was in the 1980s and the first came in the 1960s. The third AI boom is sparked by a deep learning. In 2010, professor Geoffrey Hinton and other researchers at the University of Toronto developed a deep learning technology. The form of machine learning they developed trains the neural network and applied recently to image recognition, robotic cars, home and nursing-care robots, anti-crime and monitoring systems as well as other applications.

However, we are facing a root question about AI: whether AI can explain and duplicate all events. We take a stance in scientific fields - Reductionism: that is, though complex events, we can understand the events in a systematic manner when they are resolved into its component elements and then we understand them. On the other hand, it is still a fresh memory of that Alpha Go, which is a computer program of Go game, competed against legendary Go player Lee Sedol in 2016 and made an inexplicable move - a kind of mysterious move. Well then, can we actually entrust people's life on board to the robotic cars controlled by AI's decision-making? We hope high-spirited discussion about it.

We are wishing continued outstanding success of our symposiums.

I am going to look forward to our meeting with all of you again.