

## ADDRESS



**Sadayoshi Suga**  
**Bunri Gakuen Educational Foundation**  
**Nippon Bunri University**  
**Chairman/Chancellor**

A handwritten signature in black ink, consisting of the letters 'S' and 'Suga' in a cursive, flowing style.

**Sadayoshi Suga**  
**Bunri Gakuen Educational Foundation**  
**Nippon Bunri University**  
**Chairman/Chancellor**

It is my great pleasure to welcome you all to The Fifteenth International Symposium on Artificial Life and Robotics. I would like to offer my sincere thanks and respect to the many people who have helped make this yearly event possible.

In 2008, Nippon Bunri University invited Professor Sugisaka to lead the symposium's team, and with his help we have undertaken this new venture.

As well as being a great venue to meet specialists in many fields, I also feel it's an important platform for presenting research and giving Universities the opportunity to support such research.

As Chairman of this University, I feel great pleasure in working with such outstanding educators who have, on so many occasions, presented their research to the world.

It's my sincere wish that advances in Artificial Life and Robotics Research, in cooperation with the Medical Sciences, Information Systems and other technological fields will lead to improvements in all of our lives.

During your stay here in Beppu, please take time to enjoy the beautiful scenery, relaxing hot springs, and healthy Japanese cuisine that Oita Prefecture has to offer. It's my heartfelt hope that when you leave here, you do so with fresh enthusiasm and motivation.

## MESSAGES



**Fumio Harashima**  
**Advisory Committee Chairman**  
(Professor, Tokyo  
Metropolitan University)

**Fumio Harashima**  
**Advisory Committee Chairman of AROB**

The science and technology (S&T) on Artificial Life and Robotics was born in 1996, and it's been providing human being with happiness. This S & T is not only important but also necessary for people living in the world to maintain high quality of life. Research is heart and desire of human being and the S&T is going toward clarifying tool to achieve our objective.

I would like to congratulate researchers who work in the fields on Artificial Life and Robotics.



**Masanori Sugisaka**  
**General Chairman**  
(Professor, Nippon Bunri  
University and President,  
ALife Robotics Co., Ltd. ,  
Japan)

**Masanori Sugisaka**  
**General Chairman of AROB**

It is my great honor to invite you all to the Fifteenth International Symposium on Artificial Life and Robotics (AROB 15th '10).

The symposium from the first (1996) to the Fourteenth (2009) were organized by Oita University, Nippon Bunri University(NBU), and ALife Robotics Corporation Ltd. under the sponsorship of the Science and Technology Policy Bureau, the Ministry of Education, Science, Sports, and Culture (Monbusho), presently, the Ministry of Education, Culture, Sports, Science, and Technology (Monkasho), Japanese Government, Japan Society for the Promotion of Science (JSPS), The Commemorative Organization for the Japan World Exposition ('70), Air Force Office of Scientific Research, Asian Office of Aerospace Research and Development (AFOSR/AOARD), USA. I would like to express my sincere thanks to not only Monkasho, JSPS, the Commemorative Organization for the Japan World Exposition ('70) but also Japanese companies for their repeated support.

This symposium is organized by International Organizing Committee of AROB and is co-operated by the Santa Fe Institute (USA), RSJ, IEEJ, ICASE (Now ICROS) (Korea), CAAI (P. R. China), ISCIE, IEICE, IEEE (Japan Council), JARA, and SICE.

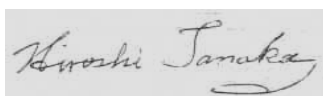
The AROB symposium is growing up by absorbing many new knowledge and technologies into it. The future of the AROB symposium is brilliant from a point of view of yielding new technologies to human society in 21st century.

I hope that fruitful discussions and exchange of ideas between researchers during symposium will yield new merged technologies for happiness of human beings and, hence, AROB 15th '10 will facilitate the establishment of an international joint research institute on Artificial Life and Robotics in future.

**Hiroshi Tanaka**  
**Program Chairman of AROB**



**Hiroshi Tanaka**  
**Program Chairman**  
**(Professor, Tokyo Medical**  
**and Dental University)**



On behalf of the program committee, it is my great pleasure and honor to invite you all to the Fifteenth International Symposium on Artificial Life and Robotics (AROB 15th 2010). This symposium is made possible owing to the cooperation of Nippon Bunri University and Santa Fe Institute. We are also debt to Japanese academic associations such as SICE, RSJ, and several private companies. I would like to express my sincere thanks to all of those who make this symposium possible.

As is needless to say, the Alife or biologically-inspired Robotics approach now attracts wide interests as a new paradigm of science and engineering. Taking an example in the field of bioscience, the accomplishment of HGP (Human Genome Project) and subsequent post-genomic comprehensive "Omics data" such as transcriptome, proteome and metabolome, bring about vast amount of bio-information. However, as a plenty of omics data becomes available, it becomes sincerely recognized that the framework by which these omics data can be understood to make a whole picture of life is critically necessary. Thus, in the post-genomic era, biologically-inspired systems approach like Alife is expected to give one of new alternative ideas to integrate this vast amount of bio-data.

This example shows the Alife approach is very promising and may exert a wide influence on the effort to develop a new paradigm for next generation of life science. We hope this symposium becomes a forum for exchange of the ideas of the attendants from various fields, including the life science field, who are interested in the future possibility of biologically-inspired computation and systems approach.

I am looking forward to meeting you in Beppu, Oita.



**Ju-Jang Lee**  
**Vice Chairman**  
**(Professor, KAIST)**

A handwritten signature in black ink, appearing to read "J. Lee", written in a cursive style.

**Ju-Jang Lee**  
**Vice Chairman of AROB**

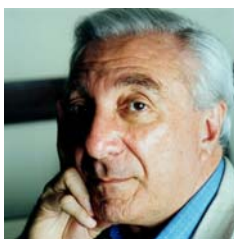
The Fifteenth International Symposium on Artificial Life and Robotics (AROB) will be held in Beppu, Oita, Japan from Feb. 4th to 6th, 2010. This year's Symposium will be held amidst the high expectation of the increasingly important role of the new interdisciplinary paradigm of science and engineering represented by the field of artificial life and robotics that continuously attracts wide interests among scientist, researchers, and engineers around the globe.

Since the time of the very first AROB meeting in 1996, each year, distinguished researchers and technologists from around the world are looking forward to attending and meeting at AROB. AROB is becoming the annual excellent forum that represents a unique opportunity for the academic and industrial communities to meet and assess the latest developments in this fast growing artificial life and robotics field. AROB enables them to address new challenges, share solutions, discuss research directions for the future, exchange views and ideas, view the results of applied research, present and discuss the latest development of new technologies and relevant applications.

In addition, AROB offers the opportunity of hearing the opinions of well known leading experts in the field through the keynote sessions, provides the bases for regional and international collaborative research, and enables to foresee the future evolution of new scientific paradigms and theories contributed by the field of artificial life and robotics and associated research area. The twenty-first century will become the century of artificial life and intelligent machines in support of humankind and AROB is contributing through wide technical topics of interest that support this direction.

It is a great for me as the Vice Chairman of the 15th AROB 2010 to welcome everyone to this important event. Also, I would like to extend my special thanks to all authors and speakers for contributing their research works, the participants, and the organizing team of the 15th AROB.

Looking forward to meeting you at the 15th AROB in Beppu-Oita and wishing you all the best.



**J. Casti**  
**Vice Chairman**  
**(Professor, International**  
**Institute for Applied**  
**Systems Analysis)**

A handwritten signature in black ink, appearing to read "John F. Casti", written in a cursive style.

**John Casti**  
**Vice Chairman of AROB**

Since its inception, the AROB has become the most important meeting in Asia each year for workers in the fields of artificial life and robotics. Many significant advances in these areas have been first discussed at the AROB, and it has served as a forum for building an international network of researchers exploring novel uses of computing for social needs. So as a member of the Scientific Committee of AROB since it began, I'm pleased to wish Professor Sugisaka and all participants another successful in the lovely surroundings of Beppu.



**Y. G. Zhang**  
**Vice Chairman**  
**(Professor, Academia Sinica)**

*Yongguang Zhang*

**Y. G. Zhang**  
**Vice Chairman of AROB**

Dear all friends and all participants,

Here I would like to show my warm welcome to you all attending the Fifteenth International Symposium on Artificial Life and Robotics (AROB '10). As you know, this annual symposium was founded in 1996 by the support of Science and International Affairs Bureau, Ministry of Education, Science, Sports, and Culture (currently, Ministry of Education, Culture, Sports, Science and Technology) of Japan. Since then AROB is gradually become worldwide famous international symposium. Now AROB is already not an "academic baby", but "academic teenage", and AROB also owns an international journal, named the "Journal of Artificial Life and Robotics" published by Springer in decade.

The objective of AROB is aimed to develop new technologies for Artificial Life and Robotics which have been born recently. The important devotion of AROB is not only to pay attention to the development of theory on Artificial Life, but also expected to apply the principle to various fields, especially, the combination of both the Artificial Life and Robotics together. So far there are only few international symposiums or conference on artificial life, however, AROB is the only one that to explore the new generation of Robotics in far-sight with artificial life principle. In fact, some intelligent toys and intelligent systems have already been developed, although they have not completed knowledge construction and no evolution. Obviously, this is a very great and difficult career, and need continuous and consistent efforts of more and more scientists and engineers. In recent years, to our pleasure, many young professors and researchers join our team and bring significant outcomes of their work focusing on intelligent robots that we believe applies to the concepts of artificial life and artificial brain. We'd like to welcome and encourage more challenges like these for we are also devoting to the same target.

Beppu, the place of held most AROB symposium, is very charming city in Japan, she has variety of hot spring (jigoku), beautiful bay and colorful mountains. Her phantasmagoric visual change in various season attract many tourists. I hope all of you enjoy and appreciate her.

Finally, I would like to show my great thanks to all people who are working for this AROB 15th '10, including all staffs of AROB Secretariat at ALife Robotics Co., Ltd., and students, the successful holding of AROB symposium is dependent on the contributions of you all.



**Henrik Hautop Lund**  
**Vice Chairman**  
**(Professor, Technical**  
**University of Denmark)**

**Henrik Hautop Lund**  
**Vice Chairman of AROB**

I am much honored to invite you to the Fifteenth International Symposium on Artificial Life and Robotics (AROB 15th '10). The international symposium marks its 15<sup>th</sup> anniversary after the being held each year since 1996, initially organized by Oita University and now being organized by Nippon Bunri University.

The symposium attracts an impressive range of researchers from all continents, who all share the vision of merging research based upon artificial life and robotics. The symposium is visionary in merging these two, science and engineering disciplines, and has become the most important forum for research into merging artificial life and robotics.

The research in artificial life and robotics is very important since it both brings us insight into ourselves as human beings and natural systems, and brings us new engineering solutions that may influence our lives. It is my hope that you will use this insight and opportunity to develop systems that help humankind in socially responsible ways.

I would like to take this opportunity to thank the general chairman of AROB, Prof. Masanori Sugisaka, for being so visionary 15 years ago to engage in creating and organizing this important annual event for our research community. It takes a lot of courage to be the first to create a novel interdisciplinary research field such as the one that comes from the merge between artificial life and robotics. Prof. Sugisaka has shown how being courageous enough to engage in the adventurous activities of merging two fields may lead to very fruitful research and to the lively research community that you are now part of with your participation in this international symposium.

I would also take this opportunity to thank Springer-Verlag for supporting this research community, and remind all participants of the Springer-Verlag Artificial Life and Robotics Journal. Hopefully, we will see numerous, high quality contributions to the journal as the outcome of this symposium and the research collaboration that may entail the symposium. Indeed, it is my hope that you will all engage in open and fruitful scientific discussions with your colleague researchers during the symposium, and that these discussions may open up for future research collaborations in order to bring new insight into artificial life and robotics to the community.