



International Society of Bionic Engineering

NEWSLETTER

Issue 1 Dec. 2012



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ISBE is an educational, non-profit, non-political organization formed in 2010 to foster the exchange of information on bionic engineering research, development and application.

The society is dedicated to the advancement of communication and cooperation among all scholars, and the furtherance of knowledge and education in the field of bionic engineering.

Official Website of ISBE: <http://www.isbe-online.org/>

Welcome to ISBE Newsletter

Thank all the members for the great contribution and cooperation to ISBE. With the support of members, ISBE has been growing so fast since its establishment. As a growing academic society, ISBE is also facing challenges. Let all the members work together to turn challenges into opportunities, and continue to grow ISBE.

ISBE newsletter is going to be published twice a year which will keep members informed with the latest news, events, resources and academic trends. If any member has comments or information and would like to be included in future editions of the newsletter, just feel free to contact ISBE secretariat.



ISBE Membership
ISBE membership is currently free and open to any individual or organization with an interest in Bionic Engineering. ISBE provides *Individual Membership* and *Corporate Membership*.

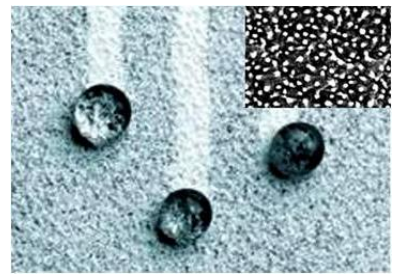
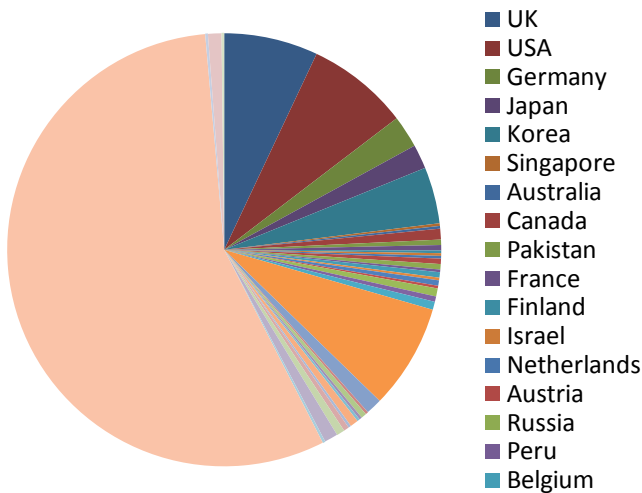
For more membership information, please click here
<http://www.isbe-online.org/membership.asp>

Membership

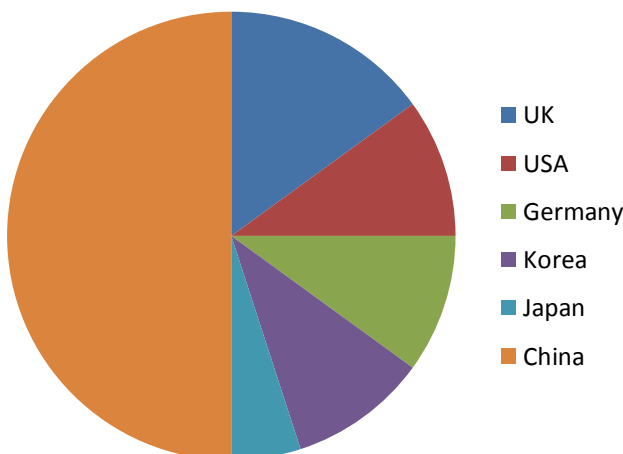
The International Society of Bionic Engineering (ISBE) is made up of 468 Individual Members and 20 Corporate Members. ISBE members come from over 23 different countries and 6 continents.

ISBE membership is open to those who have manifested a continuous interest in any discipline important to bionic engineering research as evidenced by work in the field, original contributions and attendance at meetings concerning bionic engineering research.

ISBE Individual Members



ISBE Corporate Members



News and Events

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We have the Technology

UK member Melissa Sterry recently championed the potential of medical bionics in The Guardian newspaper in a piece titled 'We have the Technology'. Sterry highlighted how the science fiction of yesteryear is rapidly being eclipsed by the burgeoning technologies of the present. Her piece highlighted

the potential of a wide range of medical bionics, including BiOM Bionic Ankle System and Axio Bionics Wearable Therapy neuroprosthetic systems. Highlighting how

developments in other scientific and technological fields, including Big Data, supercomputing and 3D printing, will integrate with bionics, Sterry predicted that in the future bionics will be more exciting than any science fiction film or TV show, not because it will enable

people to outrun a cheetah or lift a three-ton boulder, but because it has the potential to make ordinary men

and women healthier and happier. Sterry has further highlighted the potential of emergent bionic technologies in her contribution to the Global Handbook of Innovation Science, a McGraw Hill Publishing title coming to print in 2013, and in podcasts with Star Talk radio and Conversations with Mensa.




We have the technology

With the science fiction of yesteryear rapidly being eclipsed by the burgeoning technologies of the present day, everyone's future can be made that little bit better, says Melissa Sterry

Read more: [The pros and cons of progress](#)

guardian.co.uk, Saturday 27 October 2012 00.01 BST



Futurologist Melissa Sterry asks, can we build a world in which life-changing technologies such as bionic limbs and organs are accessible to all, regardless of nation or wealth? Photograph: Philip Sinden

The 1970s TV series *The Six Million Dollar Man* inspired a generation of scientists to set their sights on building a bionic future. Today, the science fiction of the 1970s has become science fact, with real-life bionic men and

For more Info, please visit <http://www.guardian.co.uk/volvo-design/technology-disability-improvements>

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The future: designed around you

We have the technology
With the science fiction of yesteryear rapidly being eclipsed by the burgeoning technologies of the present day, everyone's future can be made that little bit better, says Melissa Sterry

The pros and cons of progress
Technologies

What is a physicist doing in the jungle? Biomimetics of the rainforest

TEDxKL 2012: Interdependence

Speaker Prof. Ille C. Gebeshuber

Title of Talk: "What is a physicist doing in the jungle? Biomimetics of the rainforest"

Venue and date: Temple of Fine Arts, Kuala Lumpur, Malaysia, July 14, 2012



Having lived and worked in South East Asia for several years now, the European physics professor Ille C. Gebeshuber has broadened her horizon by getting to know and understand completely new ways of thinking, doing research, and dealing with problems. On rainforest expeditions with her PhD students from Europe and Malaysia from fields such as economics, engineering, biology, the veterinary sciences, physics and the applied as well as the fine arts and collaborators from around the globe she has established an interdisciplinary sound basis to unveil the unique wisdom and potential of the largest sustainable system we know, living nature, and what we can learn from it regarding successful addressing of major global challenges such as climate change and sustainable development, major changes in biodiversity, supply with clean water for everybody and health problems due to resistant microorganisms. New ways of teaching, of disseminating and accessing knowledge, of doing engineering and shaping our approaches towards a better, healthy and good way of living, that would not compromise future generations, are the focus of her research. Her work is based on biomimetics and a deep understanding of trends and developments.

Polar Bear House Stores Solar Heat from Summer to Wintertime

by Thomas Stegmaier, Jamal Sarsour, Heinrich Planck

At the Institute of Textile Technology and Process Engineering, Denkendorf, Germany an innovative demonstration building for solar energy harvesting and solar thermal heat storage based on bionic developments is under construction. In the near future it will be finished and the measurements on real climatic conditions can start.

The innovations in this building are based on two new bionic or bionic inspired technologies:

One bionic approach is the transfer of the solar thermal functions of the polar bear fur to a solar thermal collector based on textiles and foils. The sunlight transmits through a translucent layer system to a black solar thermal collector, in which the energy of sun radiation is transferred into thermal heat energy. Due to the translucent layer system above and a high thermal insulation on the lower side, the heat losses are minimal by convection, radiation and conduction. In the thermal collector air is heated up to 140°C (1000 W/m² sun intensity radiation) and is transferred to a physical/chemical storage systems.

This storage system stores the sunlight energy –such as living nature does– in a chemical way. By using special hygroscopic materials the changes in drying and rehumidification are used to store thermal energy from hot air and to heat up cold air:

The hygroscopic material is dried with the hot air (saving energy).

If cold, humid air flows over the hygroscopicdry material and a temperature increase of about 20°C is achieved.

In a close cooperation of specialised companies from Germany (Wagner Tragwerke, TAO-Group, Tinnit Technologies GmbH, Arnold Isolierungen, Laboratorium Blum and the ITV Denkendorf) the basic developments, the engineering and the construction itself was effected in two years in a research project, picture 1.

The demonstration building works nearly energy independent with the following technologies:

In summertime the sun energy loads the storage system or directly heats up the room inside.

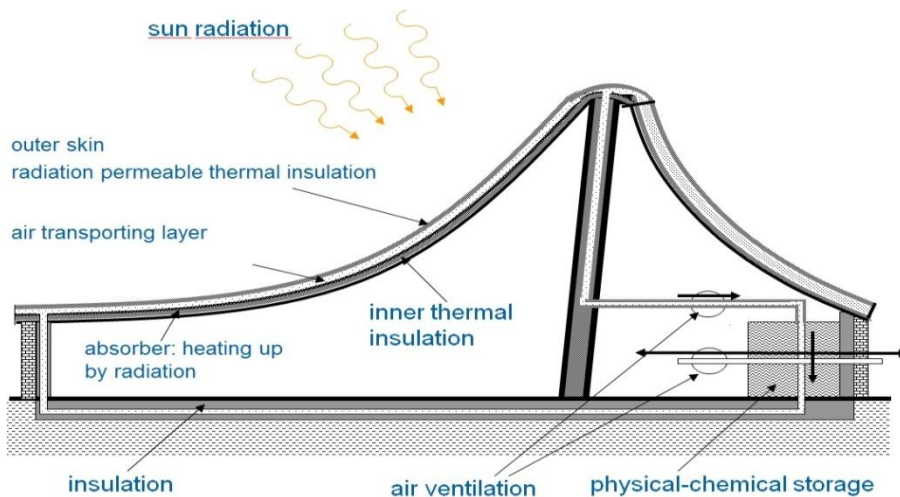
In cold days and in wintertime the storage system supplies energy to heat up the house and keep a comfortable temperature.

In this way a seasonal storage system for thermal energy is available. To run the necessary ventilators, valves, temperature sensors and control system electrical power is necessary, which can be supplied by a small photovoltaic system.

After the installation, which will be finished in 2012, the measurements will start in 2013 to evaluate the whole system regarding efficiencies in solar radiation transfer, energy storing and economics.

Picture 1:

Polar bear demonstration building at the ITV Denkendorf, Germany – schematic view



Picture 1

Picture 2: Polar bear demonstration building at the ITV Denkendorf, Germany – view to the solar thermal collector (south side)



Picture 2



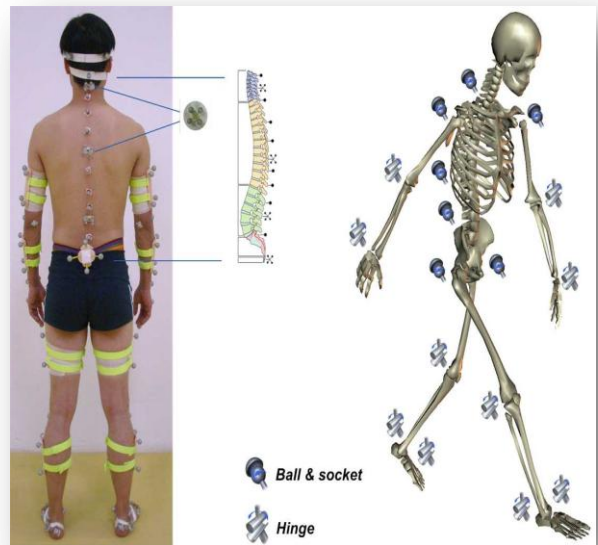
Picture 3

Picture 3: Polar bear demonstration building at the ITV Denkendorf, Germany – view from the west side.

Why We Walk the Way We Do?

Dr. Lei Ren, an academics at School of Aerospace, Mechanical and Civil Engineering, University of Manchester and also a founding member of the International Society of Bionic Engineering, has been awarded a UK EPSRC (Engineering and Physical Sciences Research Council) grant with the title “A Large-Scale Predictive Musculoskeletal Model to Simulate Human Walking” to conduct human biomechanics research and also its biomimetic relevance to the innovative designs of humanoid robotics and prosthetic devices.

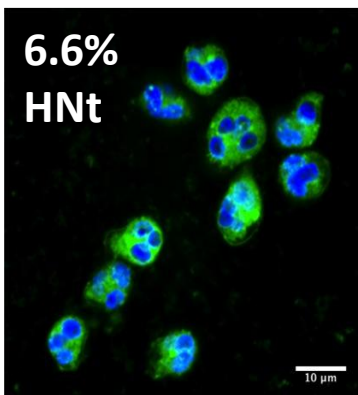
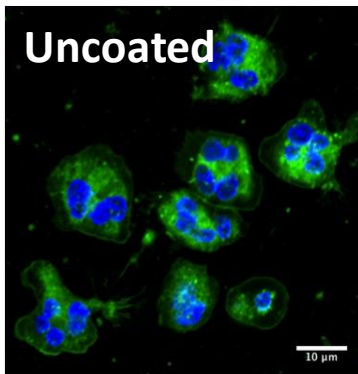
Walking is our most fundamental and widespread mode of transportation and is recommended for a healthy lifestyle. We walk automatically without the need for conscious attention. However, this seemingly simple task requires very complex control between our body segments, joints and muscles, working together to provide highly adaptable and energy efficient forward movement. What are the basic mechanisms underlying human walking? What are the fundamental control strategies governing human walking. There are still many unsolved



questions toward the fundamental understanding of human walking. Most of experimental studies have been descriptive in nature as they are based on measurements, and by its very nature tell us what happens but not why it happens. While mathematical models, which can predict human walking without the need of measurement data, has the capacity to tell us why it happens because the reasons for particular model behaviours can be examined. The aim of this research project is to develop a novel computer model to predict human walking using an advanced computational approach, which has great potential for the simulation of large-scale systems and has not yet been fully explored.

Michael King has been Promoted to the Rank of Professor at Cornell University

ISBE Vice President Michael King has been promoted to the rank of Professor at Cornell University in the United States.



“One recent research project in our laboratory has been to examine how nanostructured surfaces control the degree of spreading of biological cells, in analogy with the well known lotus leaf effect of superhydrophobicity. We have found that by engineering the surface energy of halloysite nanotube (HNT) surfaces, we can either induce wetting (spreading) or prevent it to achieve biologically useful behaviors (see Figure, provided by Andrew Hughes, Cornell University).

A second, ongoing project is to look for inspiration from extremophile magnetic bacteria that utilize naturally produced magnetic nanoparticles to guide themselves and migrate along the Earth's magnetic field lines. We wish to utilize engineered versions of these bacteria to encourage rare human cell populations, such as stem cells or circulating tumor cells, to sort themselves in a fluidic device. We would welcome discussions with ISBE members who are interested in collaborating on this research.”



Conference

Meeting of the Executive Board of Directors

The first meeting of the Executive Board of Directors, ISBE was held in Bath, UK on April 14th, 2012. ISBE President, Julian FV Vincent, Standing Vice-President, Luquan Ren, Vice-President Michael R. King, Vice-President Thomas Stegmaier, General Secretary Jianqiao Li and Shujun Zhang was in attendance.

The President chaired the meeting. Prof. Jianqiao Li reported the progress of the secretariat. Other topics covered were the Statutes of ISBE, International Workshop 2012, and the Fourth International Conference of Bionic Engineering ICBE'13.

Meeting of the Board of Directors

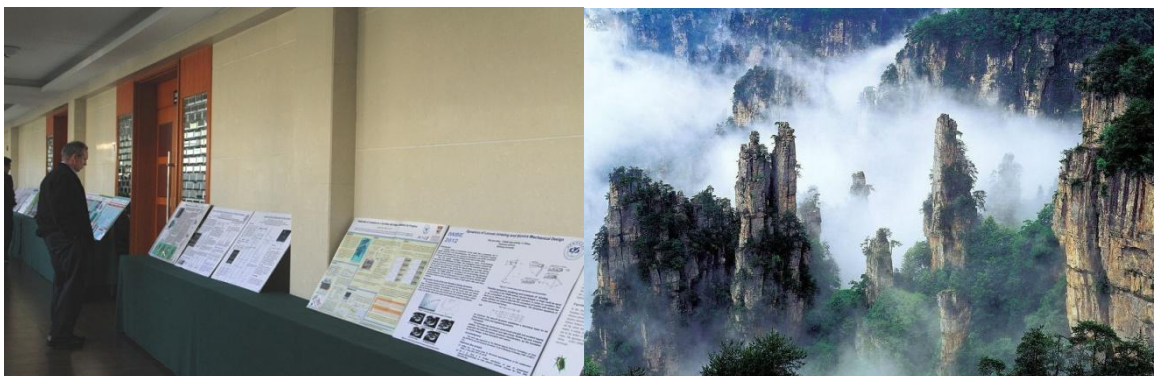
The meeting of the Board of Directors was held via email in October, 2012. All members of the board of directors was involved in the meeting . The subjects mainly include the following aspects: a summary of the Executive Board of Directors, recent work progress of ISBE and the improvement of ISBE official website. The members of the Board of Directors not only showed the high degree of appreciation and affirmation for the continuous effort of ISBE secretariat but also proposed valuable proposals for the future development of ISBE.

IWBE 2012 Got a Success

The International Workshop on Bionic Engineering (IWBE 2012) was held in ZhangJiajie China, on October 16-19, 2012, which was sponsored and organized by International Society of Bionic Engineering (ISBE), National University of Defense Technology and Jilin University. It was also supported by IEEE Robotics and Automation Society Technical Committee on Biorobotics.



The theme of IWBE 2012 is "New Challenges of Bionic Engineering in Artificial Systems". Prof. Julian F. V. Vincent, the President of ISBE, Bath University, UK and Prof. REN Luquan, Jilin University, China serve as the special advisers of the workshop. Sixteen invited lectures were given in two days, the invited speakers are from USA, UK, Swiss, Canada, Australia, Poland, Korea, Singapore and China. The topics covered bionic science, biomimetic robotic, biomaterials, bio-chemistry, bio-inspired algorithms, bionic surface, etc. . LI Jianqiao, general secretary of ISBE, introduced the society work process at the workshop. Prof. DAI Zhendong who is from Nanjing University of Aeronautics and Astronautics, China, gave detail descriptions of the 4th International Conference of Bionic Engineering (ICBE2013), Nanjing, China.



Nearly one hundred representatives attended the workshop, respectively from Bath University (UK), Manchester University (UK), Nottingham University (UK), Michigan University(US), Drexel University (US), Guelph University(Canada), the Federal Institute of Technology, ETH Zurich (Switzerland), Warsaw University of Technology (Poland), CSIRO Animal Food and Health Sciences(Australia), Konkuk University (Korea), Nanyang Technological University (Singapore), Institute of Chemistry, Chinese Academy of Sciences (China), Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences (China), National University of Defense Technology (China), Nanjing Aeronautics and Astronautics University (China), Beihang University (China), and Jilin University (China). Especially, Prof. Chris Rudd, the expert of biomaterials and vice president of Nottingham University, and Academician JIANG Lei, the outstanding bionic scholar in China attended the workshop and gave presentations. The representatives of ISBE and Journal of Bionic Engineering (JBE) attended the workshop as well. IWBE would be a memorable event to promote academic exchanges at an international and interdisciplinary level.

Professional Workshop on TVS Applications

The Workshop on Terrain-Vehicle Systems Applications (including Bionic Walking) which is sponsored by the International Society of Bionic Engineering and the Chinese Society for Agricultural Machinery was held in Changchun P. R. China on July 20-22, 2012.

The workshop is presented by Prof. J. Y. Wong who is from Carleton University, Canada, and is the past president of International Society for Terrain-Vehicle Systems (ISTVS). 32 delegates from North China Vehicle Research Institute, China Academy of Space Technology (CAST), Shanghai Aerospace System Engineering Institute, and Tsinghua University etc. took part in the workshop. The workshop was a complete success and played a significant role on the development of International Vehicle-Terramechanics and the bionic walking machines.



Upcoming Activities



ICBE'13 will be Held in Nanjing P.R. China

The 4th International Conference of Bionic Engineering - ICBE'13 will be held on August 13-16, 2013, in Nanjing, P. R. China

Organized by

- International Society of Bionic Engineering

Sponsored by

- Nanjing University of Aeronautics and Astronautics (China)

Topics of interest

Suggested topics include but not limit to the following:

- Biomechanics
- Bionic Structure
- Biomimetic Materials
- Biomimetic Surface
- Industry applications in biomimetics
- Sensors and signal processing
- Energy systems
- Robotics, motion systems and artificial intelligence

Secretariat

Dr. Hao WANG

Tel: 86- 25-84892581 ext. 816

E-mail: icbe2013@bio-inspired-tech.com

More information is available on <http://www.icbe2013.cn>

Biomimetic Workshop 2013

THEME: A Workshop on some of the basic methods of biomimetics

PRESENTER: Prof. Julian F. V. Vincent, University of Bath, UK

LANGUAGE: English

DATE: August 10-12, 2013

LOCATION: Nanjing, China

APPLICATION DEADLINE: July 20, 2013

WORKSHOP CONTENTS

This Workshop covers the essential thinking skills for studying biomimetics and developing biomimetic concepts. Each session lasts for about an hour and is divided into two parts - formal instruction followed by open discussion. You will be provided with a reading list to follow up what you have learned.

CONTACT: TIAN Ximei ISBE Secretariat,

Tel: +86-431-85166508; Fax: +86-431-85166507

Email: office-isbe@263.net; jlu_isbe@hotmail.com

The New ISBE Website

The newly redesigned ISBE website was launched. Click here to visit the new ISBE website.



ISBE website welcome you to share news and experience with all the members. If you have any ideas or information, please don't hesitate to contact us!

<http://www.isbe-online.org/>

CALL FOR SPONSORSHIP

The International Conference of Bionic Engineering (ICBE) and International Workshop of Bionic Engineering (IWBE) are premier meetings for those working on bionic engineering. ICBE is held every three years, and IWBE can be held at any time throughout the year. The meetings bring together researchers and developers, both academic and industrial, from around the world to share their research achievements and explore research collaborations in the fields of bionic engineering.

Sponsoring the ICBE or IWBE is an excellent way to communicate with hundreds of international researchers and exhibit to a wide range of institutions and universities from all over the world. All the members of the society could apply for the sponsorship. Sponsors are requested to submit their applications to the secretariat, stating the information and assumption of your sponsorship.

All offers of sponsorship will be considered on their merits. The Board of Directors of the ISBE will receive offers, judge the value of offers, request further information and make the decision.

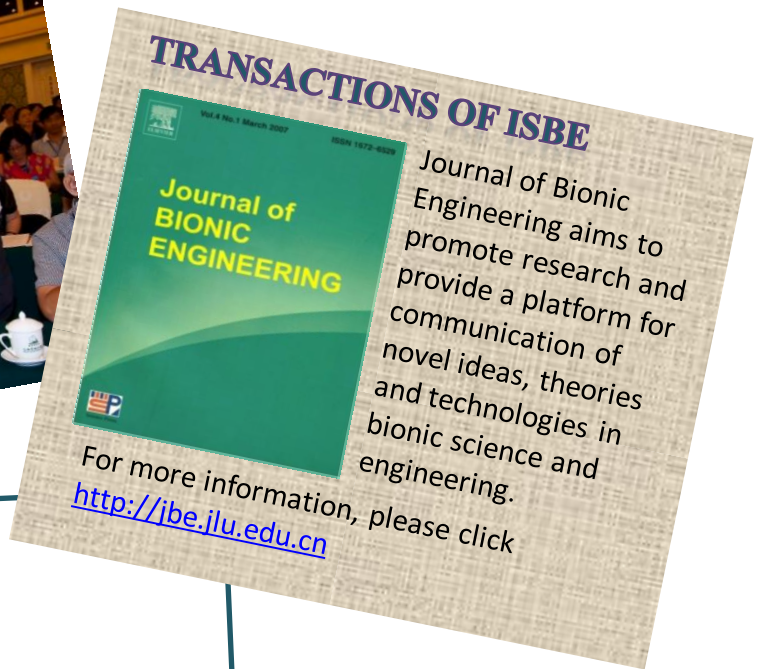
If you are interested in becoming a sponsor for ICBE or IWBE, please contact us by any of the means listed below.

ISBE Secretariat

Tel: +86-431-85166508;

Fax: +86-431-85166507;

E-mail: office-isbe@263.net; jlu_isbe@hotmail.com



WELCOME TO JOIN ISBE!
ISBE Members are leaders in Bionic Engineering!

ISBE Members recommend good papers to JBE!

ISBE Members receive the Transactions and Newsletters!

ISBE Members have discounts at the ICBE!



ISBE Secretariat is always calling for news among our members. If you have information you would like to include in future editions of the newsletter, just feel free to contact us.

NEWSLETTER EDITOR:

GAO Yue (ISBE Secretariat)

Address: 2699 Qianjin Street, Changchun 130012, P. R. China;

E-mail: gyuejl@jlu.edu.cn

gaoyuejl@163.com

