



Application Information

The 23rd Beihang University “Feng Ru Cup” Competition is designed with three specifically themed projects in which contestants may participate ---- “Energy Saving and Emission Cutting,” “Smart City,” and “Future Aircraft.” Contestants can go to the website of “Feng Ru Cup” Competition to register and upload submissions, and the number of submissions is not limited.

Specifications for Special Competition:

1. “Energy Saving and Emission Cutting”

(1) Background

At present, environmental problems and energy shortages are becoming more and more severe due to global warming and destructive natural disasters. Therefore, energy saving and emission cutting play an important role in the entire world’s development. It is necessary to attract excellent students to become involved in this area. Accordingly, it is very important to have training courses on “Energy Saving and Emission Cutting” at the university educational level. The aim is to improve awareness of global warming and understand the spirit of the Copenhagen Summit. For this reason, the “Energy Saving and Emission Cutting” project, characterized with aeronautics and astronautics in Beihang University, is included in the 23rd Beihang “Feng Ru Cup” competition.

(2) Suggested Topics

Technology for saving energy and cutting emissions in the iron and steel industry; architecture and transportation; turbine flow alteration; optimizing the circulating water system in the cooling tower; cycling of condensed water; energy saving in the motor system of the variable frequency speed control; permanent magnet speed control; reactive power compensation; public information on logistics; automatic highway toll collection; service system of public travel; energy conservation of the motor system; energy consumption monitoring platform and energy-saving detection technology; energy-saving technology in housing; temperature control in public air-conditioning; optimizing the network design of steam, hot water and other mediums; energy saving in electricity including power transmission and distribution; in the coal industry; energy saving and emission cutting technology in non-ferrous metal production and recovery; in oil production; in the chemical industry; in the production and processing of building materials; in aviation science and technology; multiple complementary development of small hydropower, wind power, solar energy and technology of comprehensive utilization of crop straw; green design of industrial products, and green technology in agriculture and service industries; industrial wastewater treatments; diverter and high concentration



wastewater pre-treatment technology; application of natural gas, coal gas and other clean energies; alternative fuels for vehicles including alcohol ether and biodiesel fuels; optimization of energy systems; raising the information level of new energy management; an optimized model of traffic transport logistics; advanced transportation management technology; comprehensive management technology for energy consumption in large passenger stations; facility plans for gas filling stations and charging stations of energy saving automobiles; building of a low carbon transportation system.

2. “Smart City”

(1) Background

With the support of information technology, “Smart City” aims to improve the efficiency of city operations, administration, and public service levels. A “Smart City” thus strengthens the ability of urban administrators to deal with emergencies, enabling the city to become the center of a more harmonious society. The particular information technology needed to build a “Smart City” includes full and transparent information acquisition, broad and unobstructed information sharing, and utilization of effective normative scientific information. Presently, the development of “Smart City” is in a critical period and faces different strategy direction options, giving this topic great research value as well as practical significance. To meet the international frontiers of science and technology and national and social demands, this year the “Feng Ru Cup” competition includes the special project of “Smart City.”

(2) Reference Direction

“Smart City” has four characteristics: thorough perception, broad interconnection, intelligent and integrated application, and people-oriented and sustainable innovation.

In the 21st century, a “Smart City” fully utilizes information and communication technologies to sense, analyze, and integrate key information from the core systems of all city operations. Thus, a “Smart City” can intelligently respond to demands such as a providing a cleaner environment, improving public security, and increasing city services. Success in this endeavor improves the livelihood of all city residents.

Entries for this special competition can be conceptual designs of a “Smart City,” namely design philosophies, ideas and plans about “Smart City,” or application development and program designs of “Smart City.” After extensive surveys, there are several main research directions of “Smart City”: Data Vitalization, Intensive Data Computing, Internet of Data (IOD) computer vision, smart city and big data, text data mining, and personalized recommendation. These all have extensive and pragmatic



application prospects and are for competitors' reference while choosing a research direction.

3. "Future Aircraft"

(1) Background

The key of future aircraft design is to go beyond the limits of theoretical knowledge and allow full use of one's imagination in outlining the blueprint of future aircrafts. The development idea of aircraft is to continually expand the flight envelope, flight performance, and flying ability. As a whole, the goal is to make aircrafts fly higher, faster, farther, and smarter. In order to promote aviation science, technology, and innovation; popularize aviation knowledge; and create a cultural atmosphere of aviation, this year the "Feng Ru Cup" sets the special competition of "Future Aircraft."

(2) Reference Direction

Entries for this special competition of "Future Aircraft" are required to be innovative, feasible, and complete. The requirements of the aircraft are that they be unmanned, reusable, and able to accomplish specific tasks through autonomous or distant control.

Under the theme of scientific and technological innovation, any valuable innovation exploration is encouraged. There are no restrictions on technical innovations, whether they are innovations of principle, layout and structure, driving force, material, external load, and/or flight mode. In addition, designs and productions showing the aviation culture and green aviation concepts are advocated and encouraged.

Direction and Innovation of Entries (for reference only)

① Innovation of Entries

- a. Unique principles: flight principle, propulsion principle, control principle and special principles of parts.
- b. Innovative layouts: aerodynamic layout, structure layout and functional layout.
- c. Novel patterns: flight mode, takeoff and landing mode, application and processing technology.
- d. Integrated elements: culture, environmental protection and cost.

② Reference Direction: Solar-powered aircraft, Vertical takeoff and landing aircraft, Aero-car, Long-endurance and high-lift body aircraft, Hypersonic aircraft and bionic aircraft.



Requirements and Categories of Works

Works submitted for any of the above three specific competitions may fall into the three categories of innovation, creation, or undertaking. The requirements for each work are as follows:

1. Works of Innovation

Submissions must contain related project papers, although sample works are not required. Each paper or report must contain no less than 3,000 words and the content should include two parts. The first part must contain explanations on the theme and background of the innovation as well as practical problems addressed. The second part must contain discourse on feasibility and analysis of the basic status of related fields. Theory basis and relative references are required.

2. Works of Creation

Works of creation include four categories---machinery manufacture, machinery and electronic control, material technology, and information technology. Samples of machinery manufacture and machinery and electronic control must be able to be displayed on-site. Samples of material technology should be molded, and samples of information technology must include completed human-computer interaction software/hardware. Participants also have to submit related papers and the paper must contain no less than 3,000 words. The score of the paper will be counted into the contestant's total score.

3. Works of Undertaking

They must include a completed undertaking plan as well as clear names of program and business. Works should explain business opportunities, the process of company-setup, needed recourses, risks and expected return, etc... We encourage graduate groups who have previously undertaken business endeavors to participate in the competition.

How to apply

Beginning mid-March 2013, participants may apply through the website of "Feng Ru Cup" Competition. Contestants must register a user name, a login password, and fill out and submit required information about authors and works **by April 15th, 2013**. The organizing committee will send feedback to confirm whether applications are successful or not. For detailed information about the opening time, please pay attention to the website's notices.

For application details, please visit: <http://en.fengrubei.net>.



Schedule

1. The 23rd “Feng Ru Cup” is scheduled to open in May 25th, 2013 and will last a week. Participants should bring their work, register in Beihang University, and do related preparation for the exhibition.
2. During the exhibition the evaluation committee will ask questions and evaluate works in different groups.
3. During the competition, the organizing committee will organize a series of student activities based on the “Feng Ru Cup” Competition, which include practical scientific activities as well as diversified communicative events in order to exchange experiences in innovation practices.

Evaluation and Awards

The evaluation committee will evaluate all works based on their technology, advancement, and practicality. This competition will award a first prize, second prize, and third prize, which account for 3%, 12%, and 20% of all works respectively. The results will be announced at the closing ceremony and on the website, and winners will receive certificates.

Financial Arrangement

Beihang University will bear the relevant costs of overseas participants (accommodation, food, local transportation and sightseeing) during the competition. Participants need to bear the cost of return tickets for air or train.

About “Feng Ru Cup” Competition

Founded in 1990, the “Feng Ru Cup” - named after Feng Ru, the first Chinese aircraft designer and aviator - has become a high-level academic and science and technology gala for students held annually at Beihang University. The event takes the form of a competition in which participating students present their own innovations and inventions. However, a series of other activities will also be held during the “Feng Ru Cup” competition including special lectures, science and technology salons, workshops and a student innovation expo. Over the past two decades some 10,656 innovation and invention projects from 30,007 participants have appeared at the “Feng Ru Cup” competition. Many of these went on to be granted patents and produced commercially. Since 2011, Feng Ru Cup has attracted many students from partner universities of Beihang to share their achievements of research and innovation.